

<https://www.halvorsen.blog>

# Azure DevOps

Hans-Petter Halvorsen



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# Introduction to Azure DevOps

Hans-Petter Halvorsen



# Azure DevOps

- Tool for Software Engineering
  - Planning, Collaboration, Source Code Control, Bug Tracking, etc.
- Developed by Microsoft
- <https://dev.azure.com>
- Free for 5 Developers + Stakeholders

# Features

- Integrated with Visual Studio
- Agile/Scrum Tools
  - Product Backlog
  - Sprint Backlog and Taskboard
- Source Code Control (SCC)
- Bug Reporting and Tracking
- ++ (Not covered in this tutorial)

# Getting Started with Azure DevOps

Hans-Petter Halvorsen



# Create New Project

## Create a project to get started

Project name \*

MyProject1

Description

Visibility



Public

Anyone on the internet can view the project. Certain features like TFVC are not supported.



Private

Only people you give access to will be able to view this project.

Advanced

Version control ?

Git

Work item process ?

Scrum

<https://dev.azure.com>

Enter a meaningful **Name** for your Project

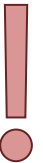
Enter a meaningful **Description** for your Project

**Note!!!**

Select “Advanced” Settings

Version control = **Git**

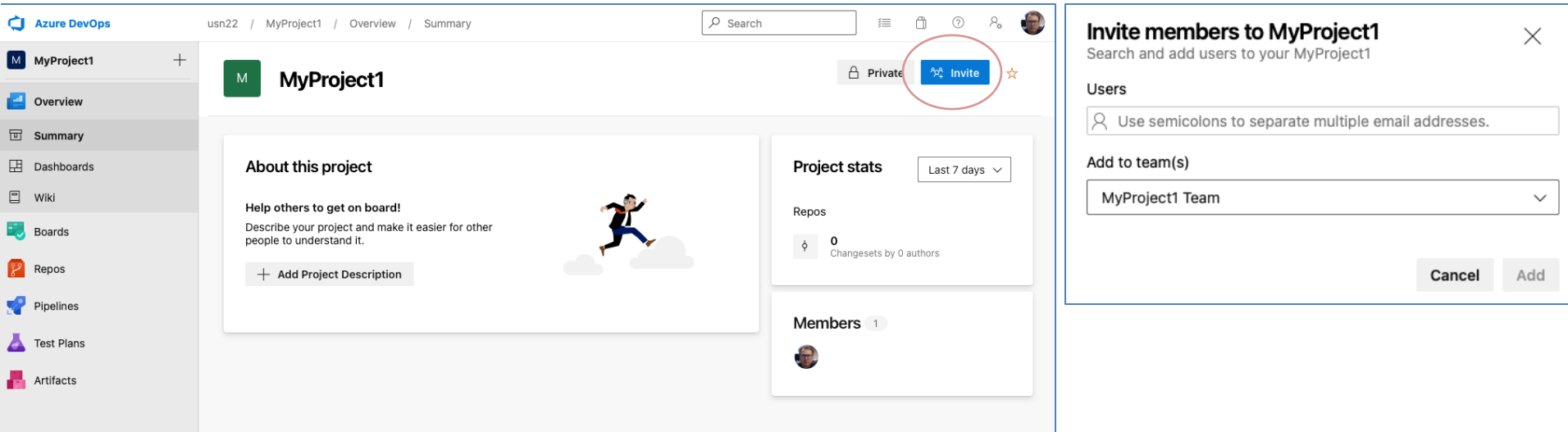
Work item process = **Scrum**



+ Create project

**Note!** (Aug. 2024)! “Team Foundation Version Control (TFVC)” is no longer supported for New Projects

# Invite/Add Members



The screenshot displays the Azure DevOps interface for a project named 'MyProject1'. The left sidebar contains navigation options: Overview, Summary, Dashboards, Wiki, Boards, Repos, Pipelines, Test Plans, and Artifacts. The main content area shows the project overview with sections for 'About this project', 'Project stats', and 'Members'. The 'Invite' button is circled in red. A modal window titled 'Invite members to MyProject1' is open on the right, featuring a search bar for users, a dropdown for the team, and 'Cancel' and 'Add' buttons.

By adding users here, you will only get “Read” rights (“Stakeholder”). To get full access (“Administrator” access) go into “**Organization setting**”. Select “Users” and then “Add users”.



# Give Users "Full Access" in Organization Settings

To get full access ("Administrator" access) go into "**Organization setting**". Select "**Users**" and then "**Add users**". Then Access level = Basic and the proper Project.

Azure DevOps 255721 / Settings / Users

Search

☰ 🗑️ ⌚ ⚙️ KN

Organization Settin...  
255721

## Users

All users Group rules

Search Settings

- General
  - Overview
  - Projects
  - Users**
  - Billing
  - Global notifications
  - Usage
  - Extensions
  - Microsoft Entra
- Security
  - Security overview
  - Policies
  - Permissions

## Add new users

Required fields are marked with an asterisk

Users or Service Principals \*

Users or Service Principals

Access level

Basic

Add to projects

ProjectHPH

Azure DevOps Groups

Project Contributors

Send email invites (to Users only)

Export users

Microsoft Entra User Type

Summary **Add users**

Last Accessed

5.9.2024

5.9.2024

4.9.2024

5.9.2024

Make sure to select "Send email .." as well

# Project Settings

usn22 / MyProject1 / Settings / Overview

## Project Settings

MyProject1

- General
- Overview
- Teams
- Permissions
- Notifications
- Service hooks
- Dashboards
- Boards
  - Project configuration
  - Team configuration
  - GitHub connections
- Pipelines
  - Agent pools
  - Parallel jobs
  - Settings
  - Test management
  - Release retention
  - Service connections
  - XAML build services
- Repos
  - Repositories
- Artifacts
  - Storage
- Test
  - Retention

### Project details

Name: MyProject1

Description:

Process: Scrum

Visibility: Private

Project administrators: Hans-Petter Halvorsen

Azure DevOps services:

- Boards: On
- Repos: On
- Pipelines: On
- Test Plans: On
- Artifacts: On

Show/Hide Features

usn22 / MyProject1 / Settings / Project configuration

## Project Settings

MyProject1

- General
- Overview
- Teams
- Permissions
- Notifications
- Service hooks
- Dashboards
- Boards
  - Project configuration
  - Team configuration
  - GitHub connections
- Repos
  - Repositories
- Artifacts
  - Storage
- Test
  - Retention

Search

Boards This project is currently using the Scrum process. To customize your work item types, [go to the process customization page.](#)

Iterations Areas

Create and manage the iterations for this project. These iterations will be used by teams for iteration planning (sprint planning). [Learn more about customizing areas and iterations](#)

To select iterations for the team, go to [the default team's settings](#).

New New child

Iterations	Start Date	End Date
MyProject1		
Sprint 1		
Sprint 2	...	<a href="#">Set dates</a>
Sprint 3		
Sprint 4		
Sprint 5		
Sprint 6		

- In Scrum we divide the work into different Iterations
- An Iteration is called a Sprint
- A Sprint is typically 2-4 weeks long

# Agile/Scrum Features in Azure DevOps

Hans-Petter Halvorsen



# Product Backlog

Azure DevOps

usn22 / MyProject1 / Boards / Backlogs

- MyProject1
- Overview
- Boards
- Work items
- Boards
- Backlogs**
- Sprints
- Queries
- Delivery Plans
- Repos

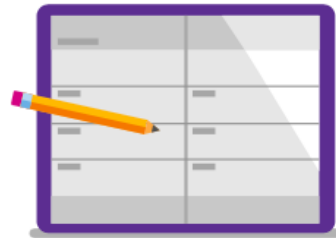
MyProject1 Team

Backlog Analytics

+ New Work Item

Product Backlog Item

Add to top



## Get started with your product backlog

Use the "New Work Item" command to create and prioritize work items

+ New Work Item

[Learn more about backlogs](#)

# Product Backlog

usn22 / MyProject1 / Boards / Backlogs

Search

MyProject1 Team

Backlog Analytics + New Work Item View as Board ... Backlog items

## Product Backlog Items (PBI)

Order	Work Item Type	Title	State	Effort	Value Area	Iteration Path
1	Product Back...	Send Patient Data to Doctor	New		Business	MyProject1\Sprint 1
2	Product Back...	Search for Patient Data	New		Business	MyProject1\Sprint 1
3	Product Back...	Show Patient Information	New		Business	MyProject1\Sprint 1

- The Scrum Product Backlog is simply a list of all things that needs to be done within the project.
- It replaces the traditional requirements specification.
- So basically, The Product Backlog is a List of all the Requirements for a given Software System.

# Work Items

usn22 / MyProject1 / Boards / Work items

Search

Work items

Recently updated ▾ + New Work Item ▾ Open in Queries Column Options ...

ID	Title	Assigned To	State	Area Path
34	Sen	Unassigned	New	MyProject1
33	Sea	Unassigned	New	MyProject1
32	Sho	Unassigned	New	MyProject1

3 important Work Item Types related to Product Backlog

- **Product Backlog Item (PBI)**
- **Feature** – Can be used to group PBIs that belong together
- **Task** – Divide a PBI into doable Tasks. Each PBI needs to be broken down into a set of Tasks. A Task is something that should be done by the developer

# Feature → PBI → Task

- Feature X
  - Product Backlog Item A
    - ✓ Task A.1
    - ✓ Task A.2
  - Product Backlog Item B
    - ✓ Task B.1
    - ✓ Task B.2
- Feature Y
  - Product Backlog Item C
    - ✓ Task C.1
    - ✓ Task C.2

etc.

Features makes in easier to structure all the Product Backlog Items

Each Product Backlog Item is broken down in one or more Tasks by the Developer

# Example

- MyProject1 +
- Overview
- Boards
- Work items
- Boards
- Backlogs
- Sprints
- Queries
- Delivery Plans
- Repos
- Project settings <<

MyProject1 Team ▾ ☆ 👤

Backlog Analytics | + New Work Item ↻ View as Board ...

Backlog items ▾ ⚙️ 🔍 ⚙️ ↗️

Order	Work Item Type	Title	State	Iteration Path
+ □	Feature	Web	New	MyProject1\Sprint 1
	Product Backlog Item	Send Patient Data to Doctor	New	MyProject1\Sprint 1
	Task	Create Web API	To Do	MyProject1\Sprint 1
	Product Backlog Item	Search for Patient Data	New	MyProject1\Sprint 1
	Task	Create Web Page for Search	To Do	MyProject1\Sprint 1
	Product Backlog Item	Show Patient Information	New	MyProject1\Sprint 1
	Task	Create Web Page for Patient Data	To Do	MyProject1\Sprint 1
	Feature	Storage	New	MyProject1\Sprint 1
	Product Backlog Item	Store Patient Data in local storage	New	MyProject1\Sprint 1
	Task	Create SQL Server	To Do	MyProject1\Sprint 1
	Task	Create Database Tables	To Do	MyProject1\Sprint 1



# Sprints/Taskboard

usn22 / MyProject1 / Boards / Sprints

MyProject1 Team

Taskboard Backlog Capacity Analytics + New Work Item Column Options

No iteration dates Set dates

Sprint 1

**You do not have any work scheduled yet**

Schedule work from your product backlog or create new work items.

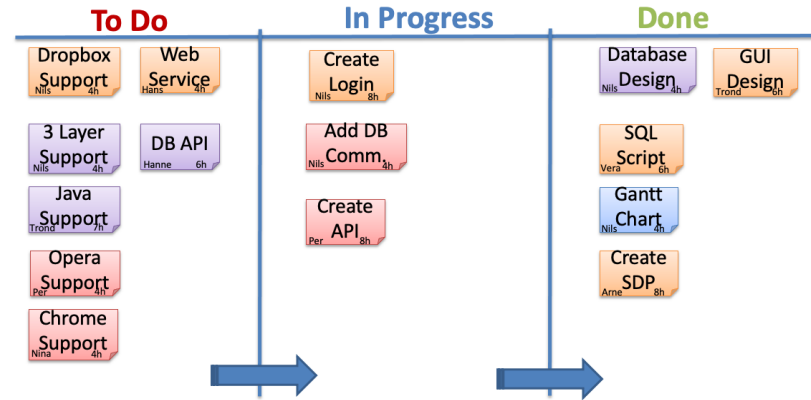
+ New Work Item

## A Taskboard in Scrum has 3 columns

- To Do
- In Progress
- Done

Within a Sprint you move the Tasks from left to right as the status changes

## Illustrative Example:



# Sprints/Taskboard

Azure DevOps

usn22 / MyProject1 / Boards / Sprints

Search

MyProject1 Team

Taskboard Backlog Capacity Analytics + New Work Item Column Options

Sprint 1 Person: All

No iteration dates Set dates

	To Do	In Progress	Done
<b>38</b> Store Patient Data in local storage Unassigned State New	<b>39</b> Create SQL Server Unassigned State To Do	<b>40</b> Create Database Tables Unassigned State In Progress	
<b>34</b> Send Patient Data to Doctor Unassigned State New	<b>37</b> Create Web API Unassigned State To Do		
<b>33</b> Search for Patient Data Unassigned State New			<b>41</b> Create Web Page for Search Unassigned State Done
<b>32</b> Show Patient Information Unassigned State New	<b>42</b> Create Web Page for Patient Data Unassigned State To Do		

Project settings

# Source Code Control with Azure DevOps

Hans-Petter Halvorsen



# Configure .gitignore File

Azure DevOps usn24 / ProjectHPH / Repos / Files / ProjectHPH

- ProjectHPH
- Overview
- Boards
- Repos**
- Files
- Commits
- Pushes
- Branches
- Tags
- Pull requests
- Advanced Security
- Pipelines
- Test Plans
- Artifacts

ProjectHPH is empty. Add some code!

Clone to your computer

**HTTPS** SSH `https://usn24@dev.azure.com/usn24/ProjectHPH/_git/ProjectHPH` OR **Clone in VS Code**

Generate Git Credentials

Having problems authenticating in Git? Be sure to get the latest version [Git for Windows](#) or our plugins for [IntelliJ](#) [Eclipse](#) [Android Studio](#) or [Windows command line](#).

Push an existing repository from command line

**HTTPS** SSH  
`git remote add origin https://usn24@dev.azure.com/usn24/ProjectHPH/_git/ProjectHPH`  
`git push -u origin --all`

Import a repository

Import

Initialize **main** branch with a README or gitignore

Add a README **Add a .gitignore: VisualStudio** Initialize

Initialize **main** branch with a README or gitignore

Add a README **Add a .gitignore: None** Initialize

Select "VisualStudio" and click "Initialize"

# .gitignore

Azure DevOps usn24 / ProjectHPH / Repos / Files / ProjectHPH

Search

ProjectHPH

Overview

Boards

Repos

Files

Commits

Pushes

Branches

Tags

Pull requests

Advanced Security

Pipelines

Test Plans

Artifacts

Project settings

ProjectHPH

.gitignore

README.md

main

Type to find a file or folder...

Files

Set up build

Clone

Contents

History

Name ↑	Last change	Commits
.gitignore	Just now	682d8aaf Added README.md, .gitignore (VisualStudio) files Hans-Petter Halvorsen
README.md	Just now	682d8aaf Added README.md, .gitignore (VisualStudio) files Hans-Petter Halvorsen

### Introduction

TODO: Give a short introduction of your project. Let this section explain the objectives or the motivation behind this project.

### Getting Started

TODO: Guide users through getting your code up and running on their own system. In this section you can talk about:

1. Installation process
2. Software dependencies
3. Latest releases
4. API references

### Build and Test

TODO: Describe and show how to build your code and run the tests.

### Contribute

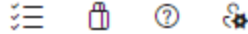
TODO: Explain how other users and developers can contribute to make your code better.

If you want to learn more about creating good readme files then refer the following [guidelines](#). You can also seek inspiration from the below readme files:

- [ASP.NET Core](#)
- [Visual Studio Code](#)
- [Chakra Core](#)

# Local Clone

Project URL: [https://usn24@dev.azure.com/usn24/ProjectHPH/\\_git/ProjectHPH](https://usn24@dev.azure.com/usn24/ProjectHPH/_git/ProjectHPH)



## Clone Repository



Command line

HTTPS

SSH



Generate Git Credentials

IDE

▾

Having problems authenticating in Git? Be sure to get the latest version of [Git for Windows](#) or our plugins for [IntelliJ](#), [Eclipse](#), [Android Studio](#) or [Windows command line](#).



Untitled



Google Translate

Azur

**This site is trying to open Microsoft Visua...ndler Selector.**

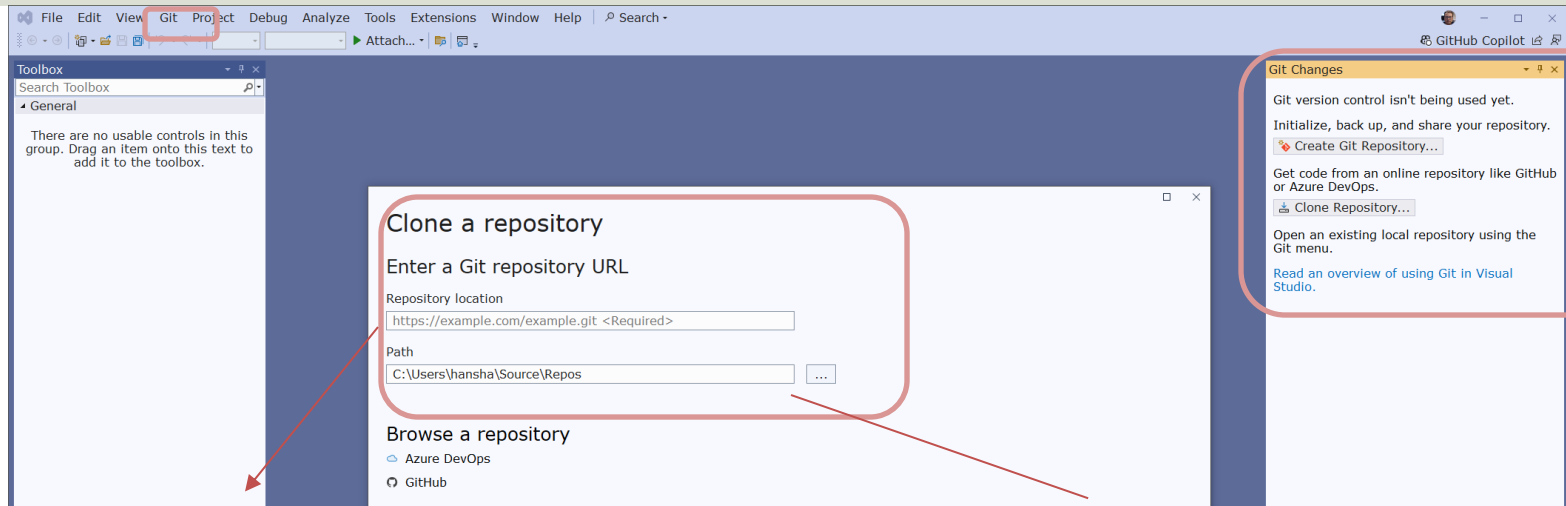
https://dev.azure.com wants to open this application.

Always allow dev.azure.com to open links of this type in the associate...

Open

Cancel

# Visual Studio – Clone a repository



“Repository location” – If it is not filled out automatically, copy the URL from Azure DevOps

Path: local Path on your hard drive where you want to store your local version (clone) of the source code

Command line

HTTPS

SSH

https://usn24@dev.azure.com/usn24/Proj

# Clone a Repository

## Clone a repository

Enter a Git repository URL

Repository location

Path

...

## Browse a repository

Azure DevOps

GitHub

Either enter the URL directly, or if you don't know the URL, select "Browse a repository" and "Azure DevOps"

Back

Clone

## Connect to a Project

Showing hosted repositories for:

▲ Re-enter your credentials

[Add Azure DevOps Server](#) | [Refresh](#)

Type here to filter the list 🔍

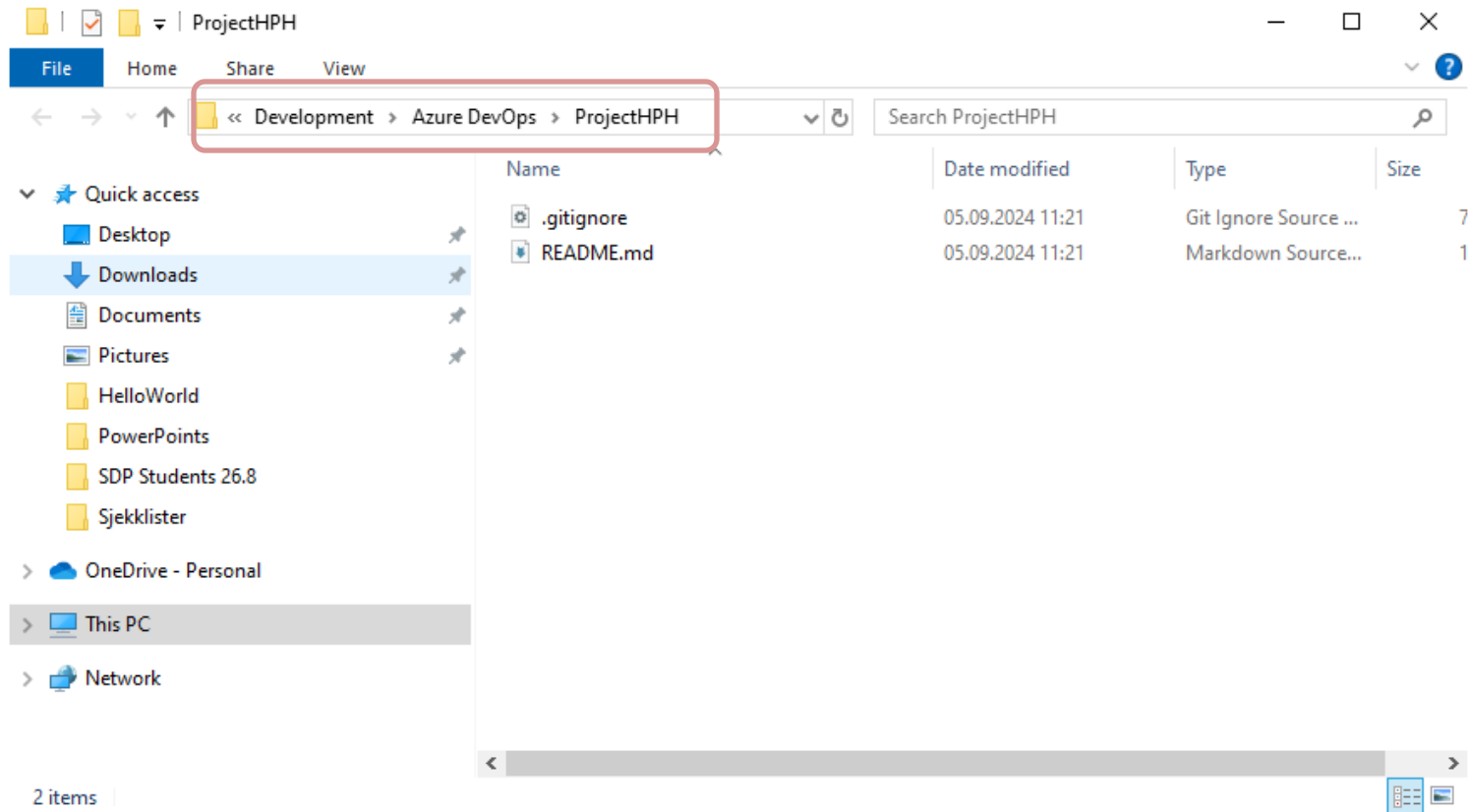
- dev.azure.com
  - 255721
    - GreenSense Systems
      - GreenSenseRepo
  - 271370
    - Payment\_System
      - Payment\_System
  - usn22
    - MyProject1
      - \$/MyProject1
    - MyProject2
      - \$/MyProject2
    - MyProject3
      - \$/MyProject3
  - usn23

Connect

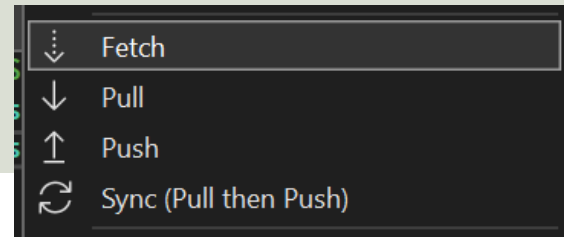
Cancel



# Local Clone/Development folder



# Git Terms

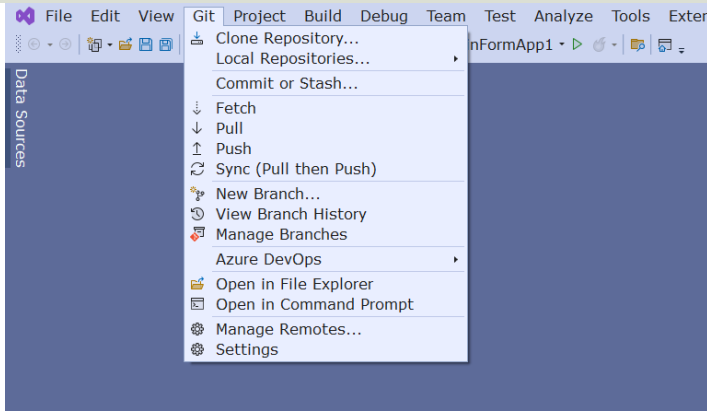


Git maintains a local copy of the entire repository, so you need now and then to sync your local activities with the server.

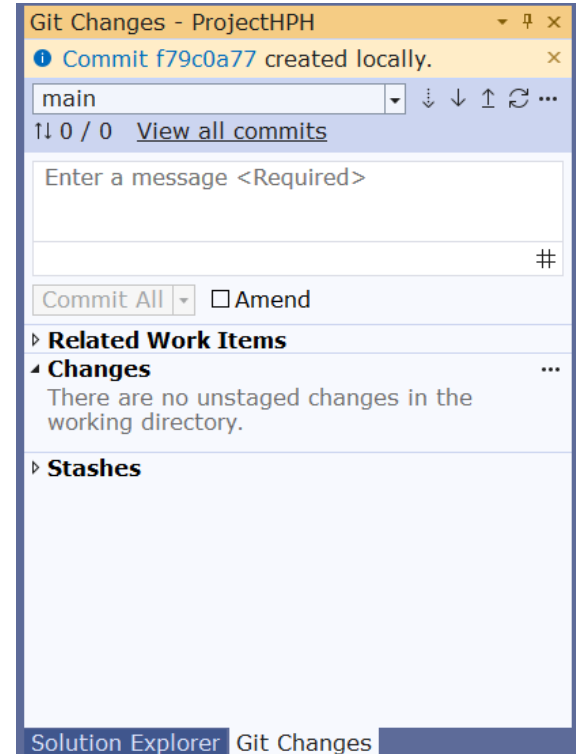
- **Fetch** - It's important to fetch and pull before you push.
  - Fetching checks if there are any remote commits that you should incorporate into your local changes. If you see any, pull first to prevent any upstream merge conflicts.
- **Pull** - Always pull before you push. When you pull first, you can prevent upstream merge conflicts.
- **Push** - When you create **commits** you save local snapshots of your code. You then need to use **Push** to push the commits to the server.
- **Sync** - Use this operation to both Pull, then Push, sequentially.

# Git Tools in Visual Studio

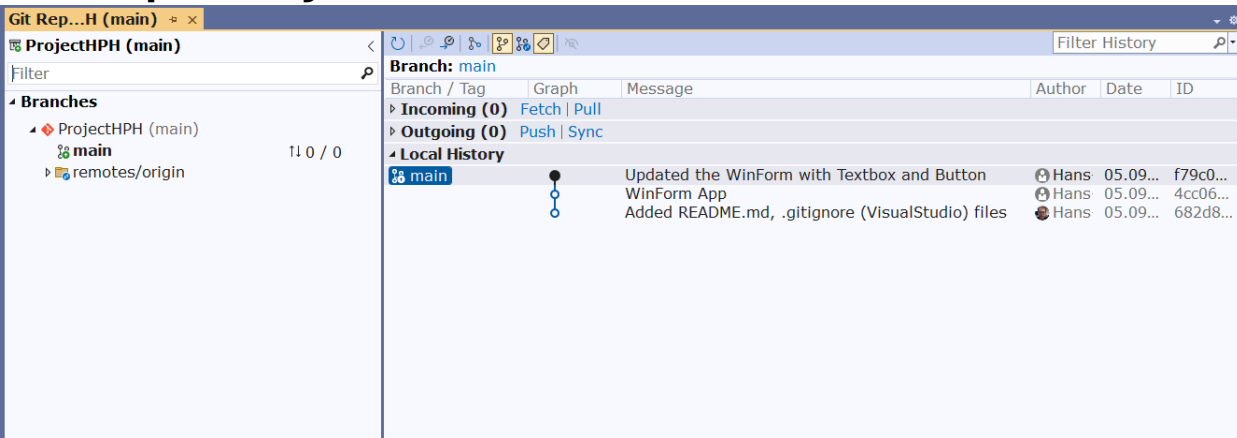
## Git menu



## Git Changes window



## Git Repository window

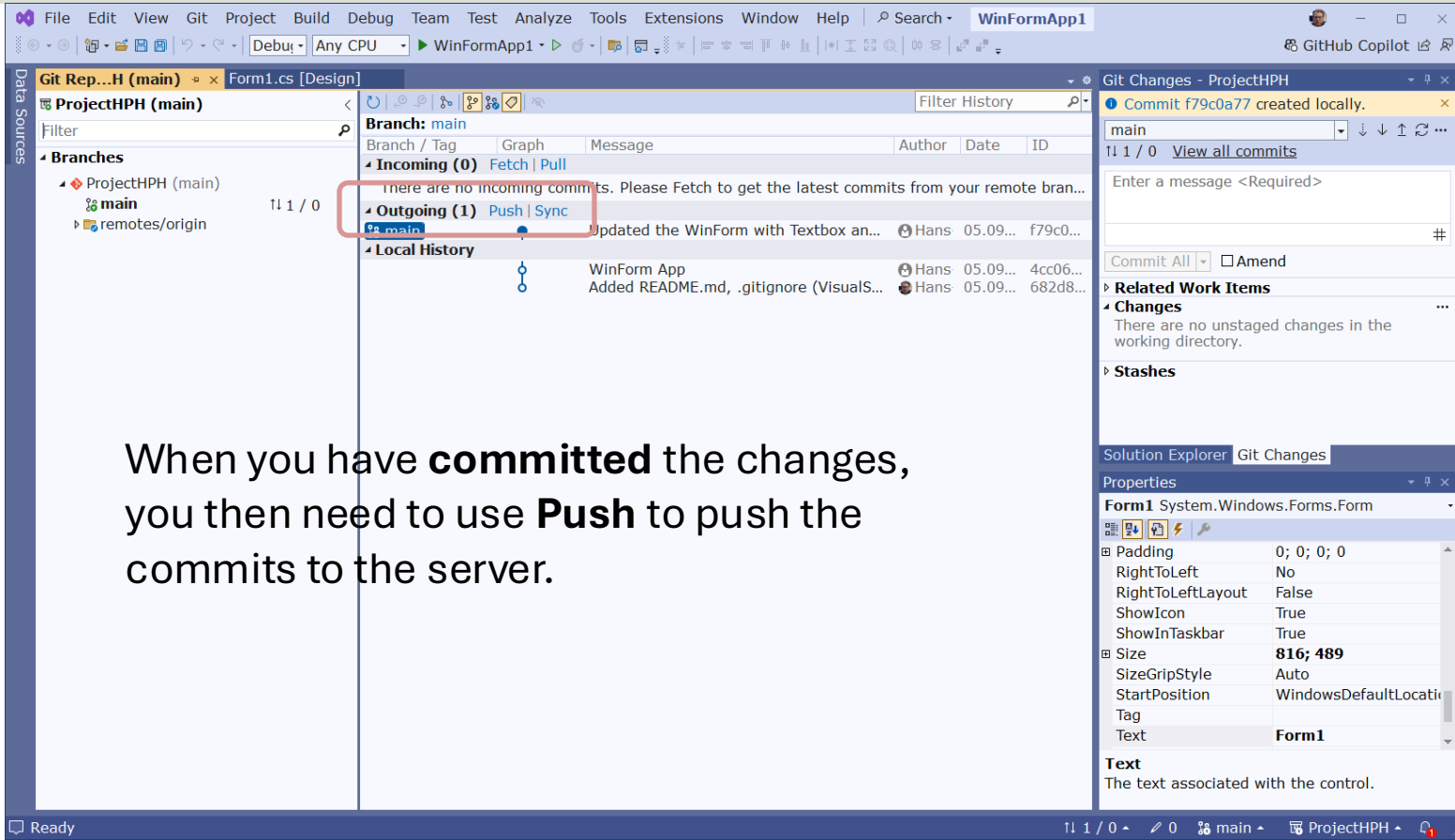


# Commit Changes

The screenshot shows the Visual Studio IDE with a WinForm application in design mode. The 'Git' menu is highlighted with a red box. The 'Form1' window shows a simple form with a text box and a button. The 'Git Changes' window is open on the right, showing the current commit message 'Enter a message <Required>' and a 'Commit All' button, which is also highlighted with a red box. The 'Properties' window for 'Form1' is visible at the bottom right, showing various properties like Padding, Size, and Text.

Commit Changes: When you create **commits** you save local snapshots of your code. You then need to use Push to push the commits to the server

# Push Changes



The screenshot shows the Visual Studio interface with the Git extension. The 'Git Changes' window is open, showing a commit titled 'Commit f79c0a77 created locally.' The 'main' branch is selected, and the 'Outgoing (1) Push | Sync' button is highlighted with a red box. The 'Local History' section shows a commit by Hans from 05.09... with the message 'Updated the WinForm with Textbox an...'. The 'Properties' window shows the 'Form1' control with various properties like 'Padding', 'RightToLeft', 'ShowIcon', 'Size', and 'Text'.

When you have **committed** the changes, you then need to use **Push** to push the commits to the server.

# Bug Tracking with Azure DevOps

Hans-Petter Halvorsen



# Work Items

The image shows the Azure DevOps interface for managing work items. The main header includes the Azure DevOps logo, the user 'usn22', and the project path 'MyProject1 / Boards / Work items'. A search bar is located in the top right. The left sidebar contains navigation options: MyProject1, Overview, Boards, Work items (selected), Backlogs, Sprints, Queries, Delivery Plans, and Repos. The main content area displays 'Work items' with a 'Recently updated' filter and a '+ New Work Item' dropdown menu, which is circled in red. Below this, there are filter options for 'Filter by keyword', 'Types', 'Assigned to', 'States', 'Area', and 'Tags'. A secondary screenshot is overlaid on the main one, showing the 'New Work Item' dropdown menu expanded. The menu items are: Bug (circled in red), Epic, Feature, Impediment, Product Backlog Item, Task, and Test Case. The background of the secondary screenshot shows the same interface but with the 'New Work Item' dropdown highlighted.

usn22 / MyProject1 / Boards / Work items

Search

MyProject1

Work items

Recently updated ▾ + New Work Item ▾ → Open in Queries ↗ Column Options ↗ Import Work Items ↗ Recycle Bin ↗

Filter by keyword

Types ▾ Assigned to ▾ States ▾ Area ▾ Tags ▾ X

usn22 / MyProject1 / Boards / Work items

Work items

Recently updated ▾ + New Work Item ▾ → Open in Queries ↗

Filter by keyword

Bug

Epic

Feature

Impediment

Product Backlog Item

Task

Test Case

# Bug Reporting

**Azure DevOps** usn22 / MyProject1 / Boards / Work items

**MyProject1** +

- Overview
- Boards
- Work items**
- Boards
- Backlogs
- Sprints
- Queries
- Delivery Plans
- Repos

Project settings <<

Work Items | [Back to Work Items](#)

**NEW BUG** ! Field 'Title' cannot be empty.

Unassigned 0 comments [Add tag](#) [Save](#) [Refresh](#) [Share](#) [More](#)

State	<input checked="" type="radio"/> New	Area	MyProject1	<a href="#">Details</a> <a href="#">Refresh</a> <a href="#">Link</a> <a href="#">Copy</a>
Reason	New defect report...	Iteration	MyProject1	

### Repro Steps

[Click to add Repro Steps](#)


### System Info

[Click to add System Info](#)

### Acceptance Criteria

[Click to add Acceptance Criteria](#)

### Discussion

 *Add a comment. Use # to link a work item, ! to link a pull request, or @ to mention a person.*

### Details

Priority  
2

Severity  
3 - Medium

Effort

Remaining Work

Activity

### Build

Found in Build

Integrated in Build

### Deployment

To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)

### Development

[+ Add link](#)

### Related Work

[+ Add link](#) ▼

[Add an existing work item as a parent](#)



# Queries

Azure DevOps usn22 / MyProject1 / Boards / Queries

Search

MyProject1 +

Overview

Boards

Work items

Boards

Backlogs

Sprints

**Queries**

Delivery Plans

Repos

Project settings <<

Queries > My Queries > Bugs v ☆ 3 work items  
1 selected

Results Editor Charts | Run query + New v Save query Save as... Rename Revert changes ...

Type of query Flat list of work items Query across projects

Filters for top level work items

And/Or

Field*	Operator	Value
Work Item Type	=	Bug

+ Add new clause

ID	Work It...	Title	Assigned To	State	Tags
43	Bug	Search Not Working	Hans-Petter Halv...	New	
44	Bug	Search button is disabled	Hans-Petter Halv...	New	
45	Bug	Web Application crashes during loading	Hans-Petter Halv...	New	

Queries are used to get a list of specific Work Items

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