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Azure DevOps

Azure DevOps with Git and Visual Studio

Hans-Petter Halvorsen



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Introduction



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Hans-Petter Halvorsen

Azure DevOps

- Azure DevOps is tool for Software Engineering
 - Planning, Collaboration, Source Code Control, Bug Tracking, Agile and Scrum, etc.
- Developed by Microsoft
- <https://dev.azure.com>
- Free for 5 Developers + Stakeholders
- You use it in your web browser, and it also has integration with Visual Studio for Source Code Control

Git



- Git is a distributed revision control system. Git maintains a local copy of the entire repository.
- Git was created for use in the development of the Linux kernel by Linus Torvalds and others developing the kernel.
- Git has now become the most used revision control system or source code control system today.
- Git is a free and open-source software.
- Visual Studio has integrated support for Git.
- Azure DevOps use Git as their source code control system.
- Another system/provider that uses Git is GitHub.
- Azure DevOps and GitHub are Microsoft owned proprietary products that uses Git as the repository. Other similar systems are SourceForge, BitBucket and GitLab.

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Getting Started with Azure DevOps




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Getting Started with Azure DevOps


First, you need to Create a New **Organization**

 Azure DevOps
hansha@usn.no [Switch directory](#)

Get started with Azure DevOps

Choosing **Continue** means that you agree to our [Terms of Service](#), [Privacy Statement](#), and [Code of Conduct](#).

I would like information, tips, and offers about Azure DevOps and other Microsoft products and services. [Privacy Statement](#).

 Azure DevOps
hansha@usn.no [Switch directory](#)

Almost done...


Name your Azure DevOps organization *

We'll host your projects in

Europe

Enter the characters you see

New Audio



Create New Project

Create new project



Project name *

SoftwareHPH

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.

Public projects are disabled for your organization. You can turn on public visibility with [organization policies](#).

^ Advanced

Version control ?

Git

Work item process ?

Scrum

Select a meaningful Project name

Make sure to select “Advanced”:

Version control = **Git**

Work item process: **Scrum**

Cancel

Create

Project Start Page

Azure DevOps usn24 / ProjectHPH / Overview / Summary

Search

ProjectHPH

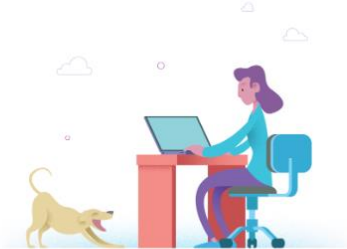
Private Invite

Project stats

No stats are available at this moment
Setup a service to see project activity.

Members 1

Project settings



Welcome to the project!

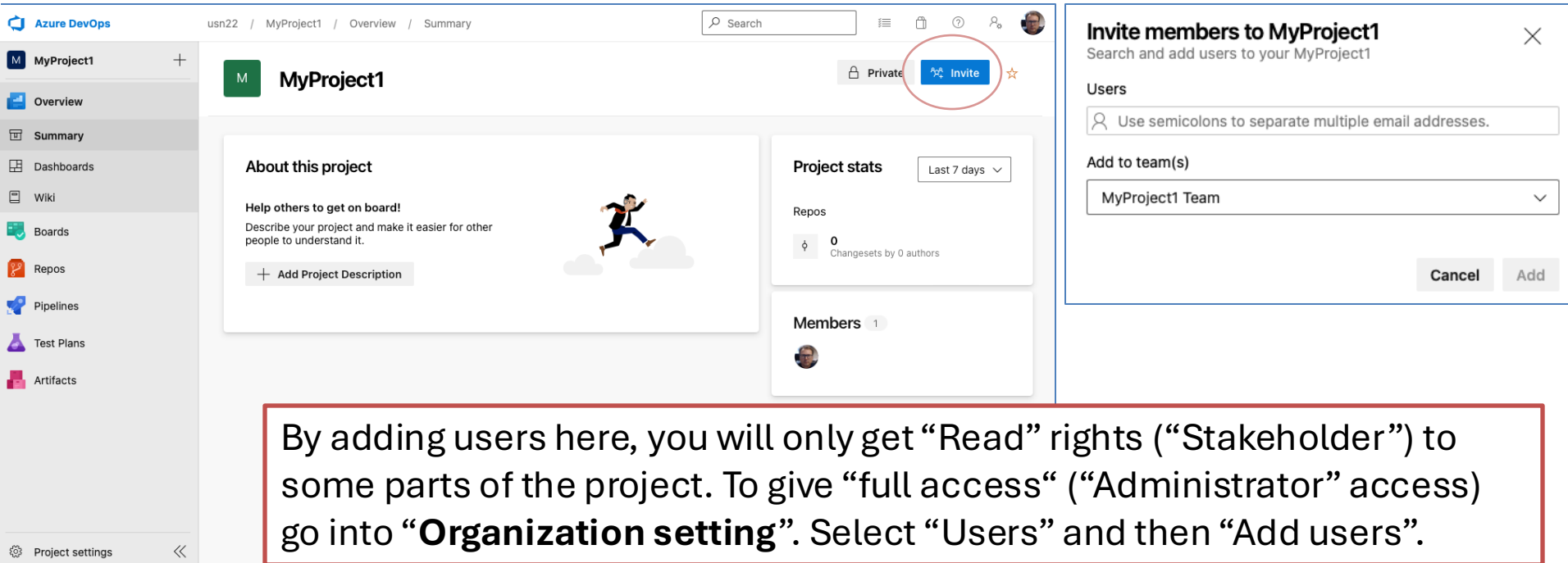
What service would you like to start with?

Boards Repos Pipelines Test Plans

Artifacts

[or manage your services](#)

Invite/Add Members



The screenshot displays the Azure DevOps interface for a project named 'MyProject1'. The left sidebar shows navigation options like Overview, Summary, Dashboards, Wiki, Boards, Repos, Pipelines, Test Plans, and Artifacts. The main content area includes 'About this project', 'Project stats' (0 changesets by 0 authors), and 'Members' (1 member). A red circle highlights the 'Invite' button in the top right corner. A modal window titled 'Invite members to MyProject1' is open on the right, showing a search field for users, a dropdown for 'Add to team(s)' (set to 'MyProject1 Team'), and 'Cancel' and 'Add' buttons.

By adding users here, you will only get “Read” rights (“Stakeholder”) to some parts of the project. To give “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.

The screenshot shows the Azure DevOps interface. On the left, the 'Organization Settings' menu is open, with 'Users' selected. The main area shows the 'Add new users' dialog. The 'Access level' dropdown is set to 'Basic', and the 'Add to projects' field contains 'ProjectHPH'. The 'Send email invites' checkbox is checked. The 'Add users' button is circled in blue. Annotations include a red box around the 'Organization Settings' menu, a red box around the 'Add new users' dialog, and a blue arrow pointing from the 'Add users' button to the 'Basic' dropdown.

Organization Settings

Users

All users Group rules

Filter users

Total 4

<input type="checkbox"/>	Name ↑	Access level	Add to projects	Azure DevOps Groups	Last Accessed
<input type="checkbox"/>	Hans-Petter Halvorsen hans.p.halvorsen@usn.no	Basic	ProjectHPH	Project Contributors	5.9.2024
<input type="checkbox"/>	Hakon Andre Iveltan hakon.aveltan@usn.no				5.9.2024
<input type="checkbox"/>	Johannes Skarabekk johannes.skarabekk@usn.no				4.9.2024
<input type="checkbox"/>	Kim Mangard Norborg kim.mangard@usn.no				5.9.2024

Make sure to select “Basic”

Select Project(s)

Make sure to select “Send email ..” as well

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Start using Git with Azure DevOps and Visual Studio

Hans-Petter Halvorsen



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Git

- Git is a distributed version control system, meaning that all the changes only happens locally on your computer.
- First, you need to make a local **Clone** of the remote repository.
- To contribute these changes to the remote repository, you must **push** those local commit(s) to the server.
- If you are working in a team, or if you are using different machines, you might often need to **fetch** and **pull** new changes on the remote repository

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

ProjectHPH

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

Project settings

main / Type to find a file or folder...

Files

Set up build Clone

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

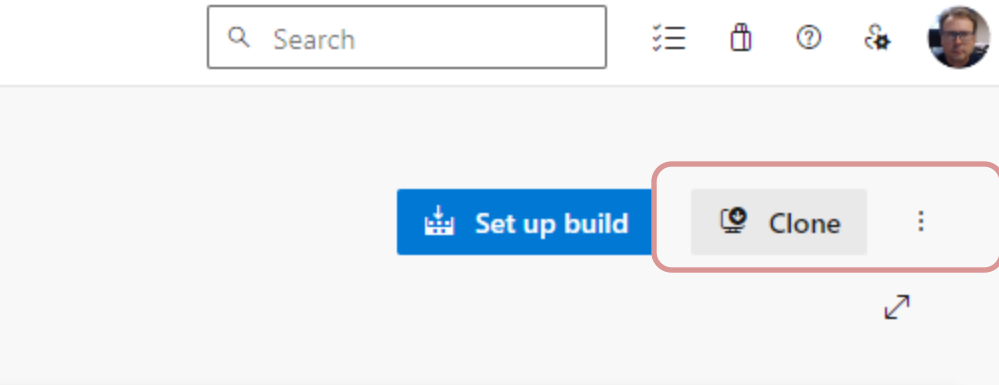
TODO: Explain how other users and developers can contribute to make your code better.

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



Clone Repository

Command line

HTTPS

SSH

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

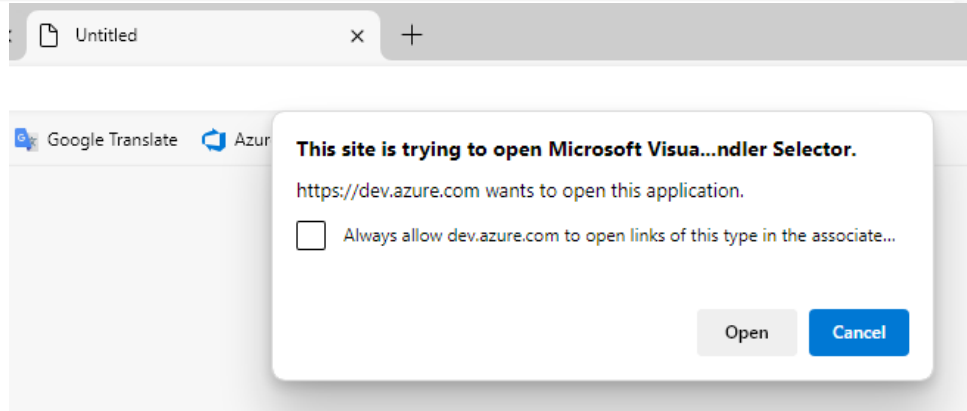
Generate Git Credentials

IDE

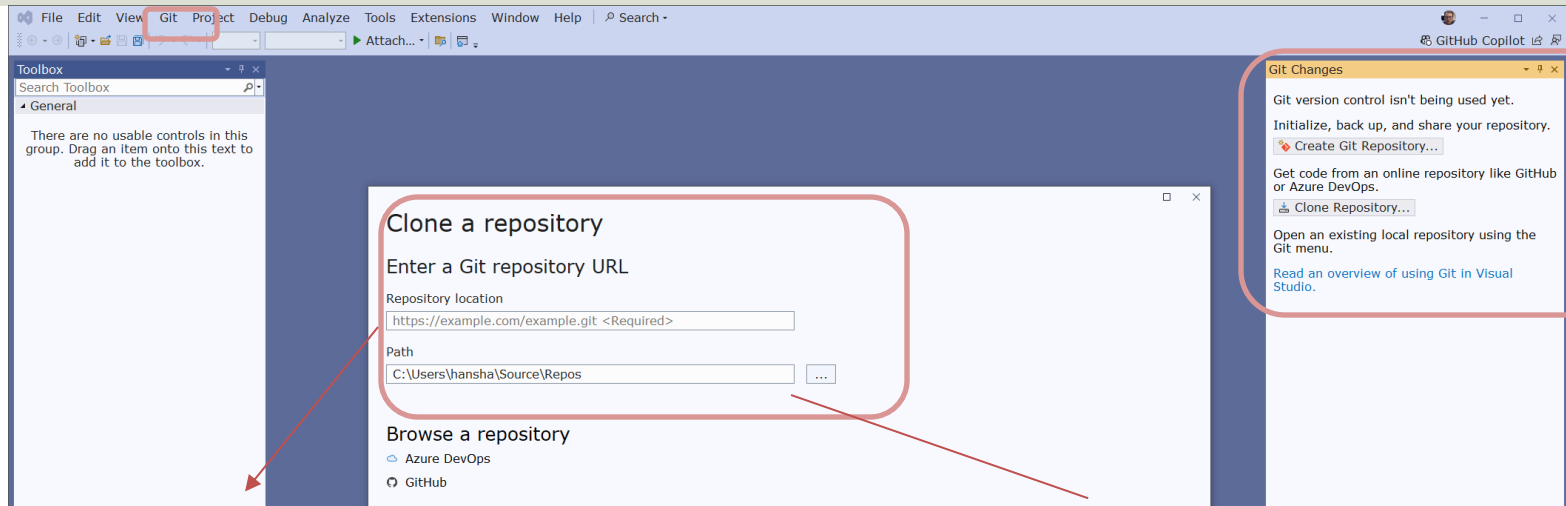
Clone in Visual Studio



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](#).



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](#)

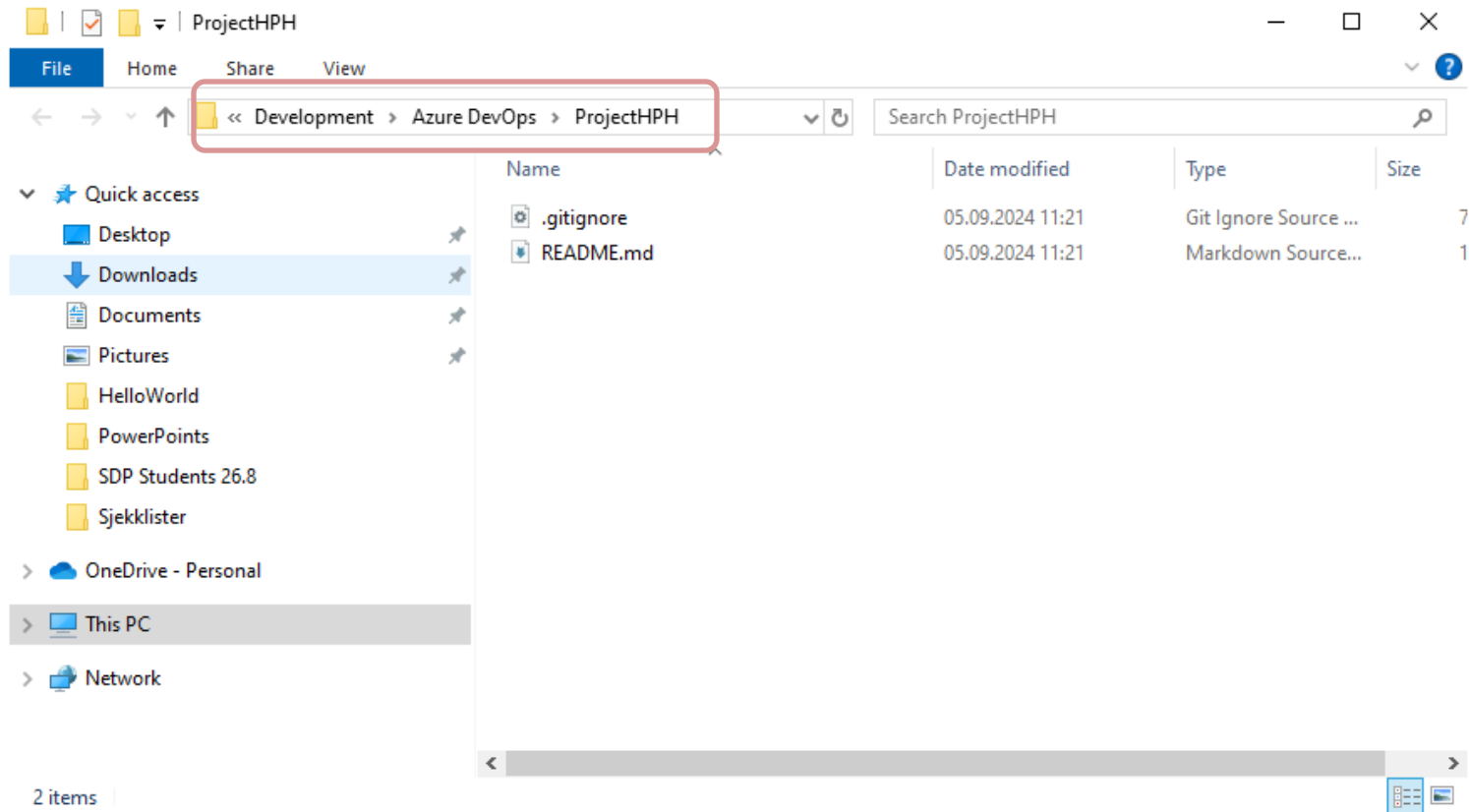
Type here to filter the list 🔍

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

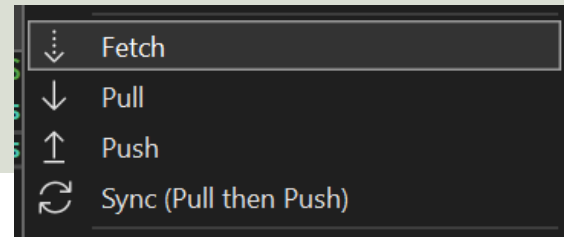
Connect

Cancel

Local Clone/Development folder



Git Terms

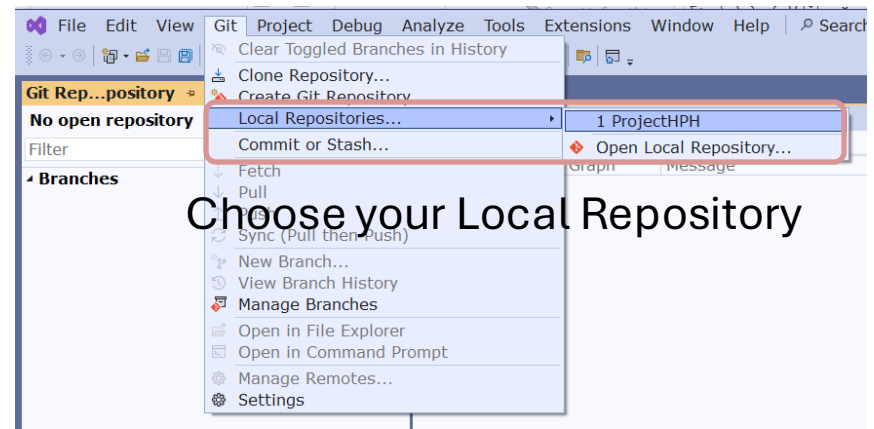
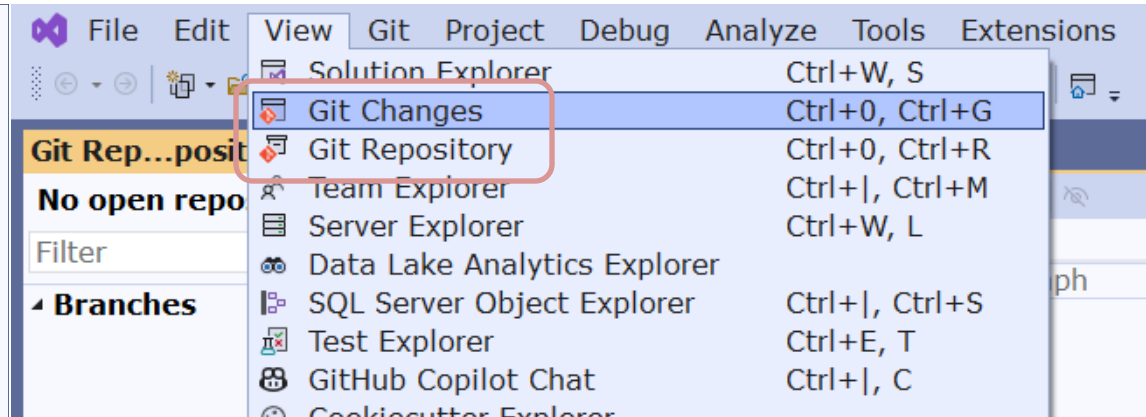
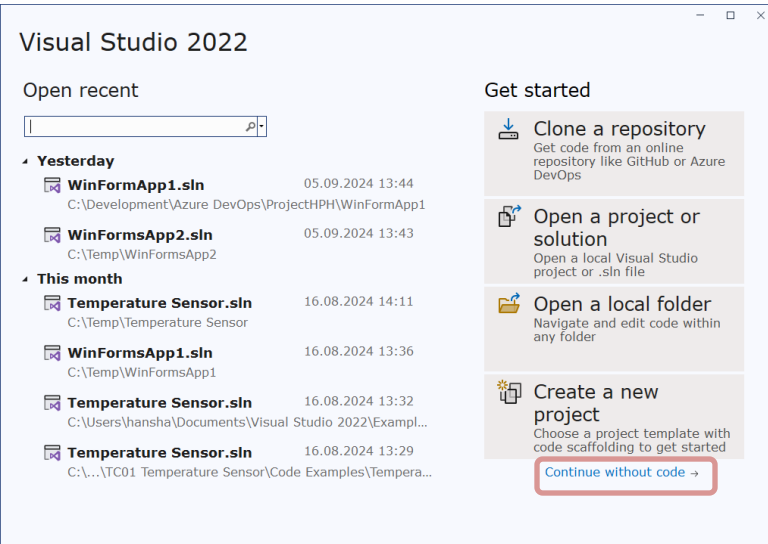


Git maintains a local copy of the entire repository, so you need now and then to sync your local activities with the server.

- **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.

Open Git Tools in Visual Studio

Select **Git Changes** and **Git Repository**

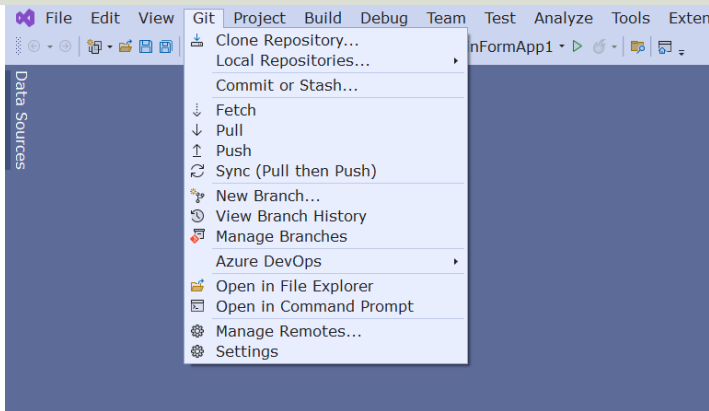


Just open Visual Studio without creating or opening a Project

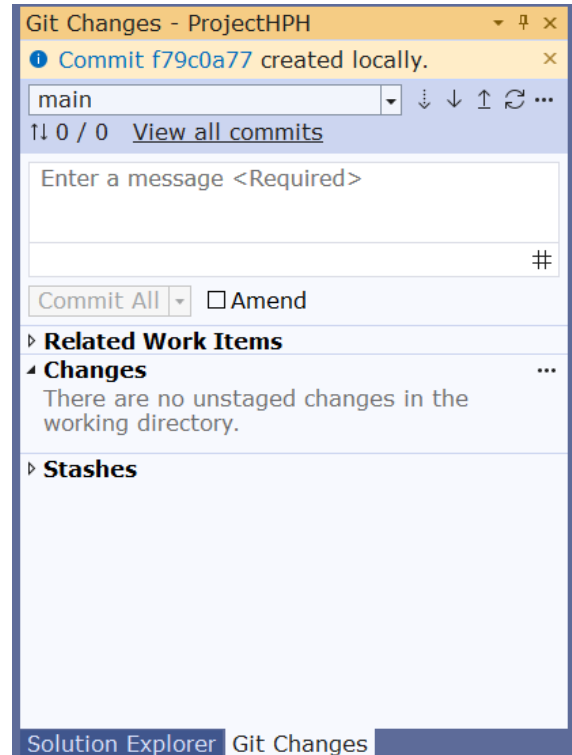
Choose your Local Repository

Git Tools in Visual Studio

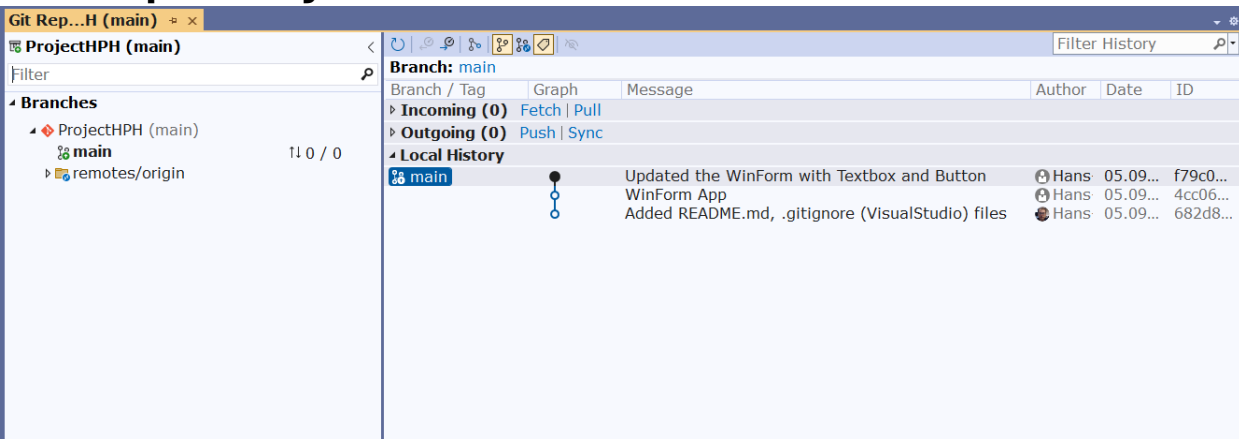
Git menu



Git Changes window



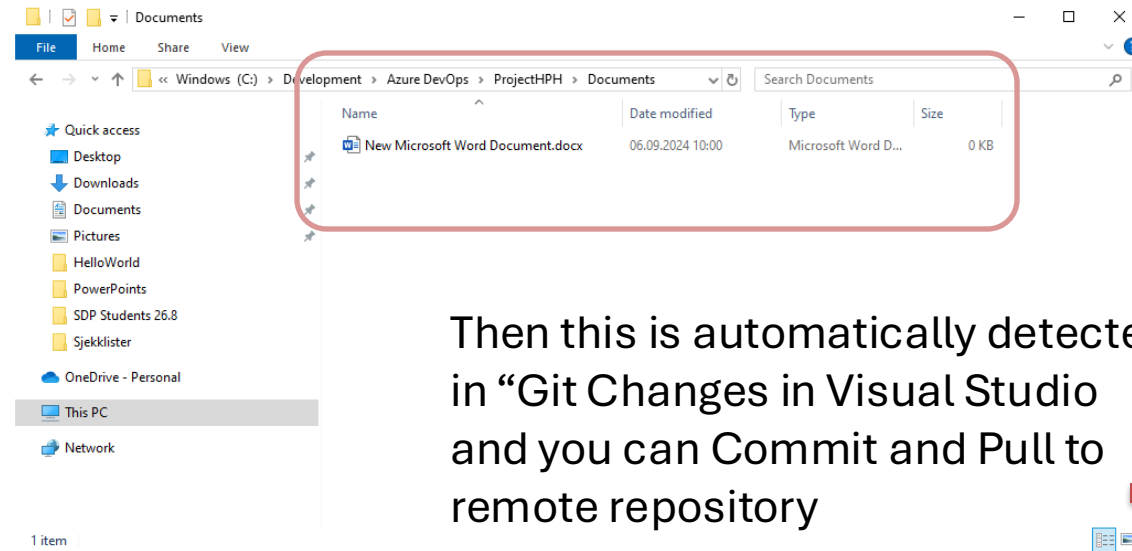
Git Repository window



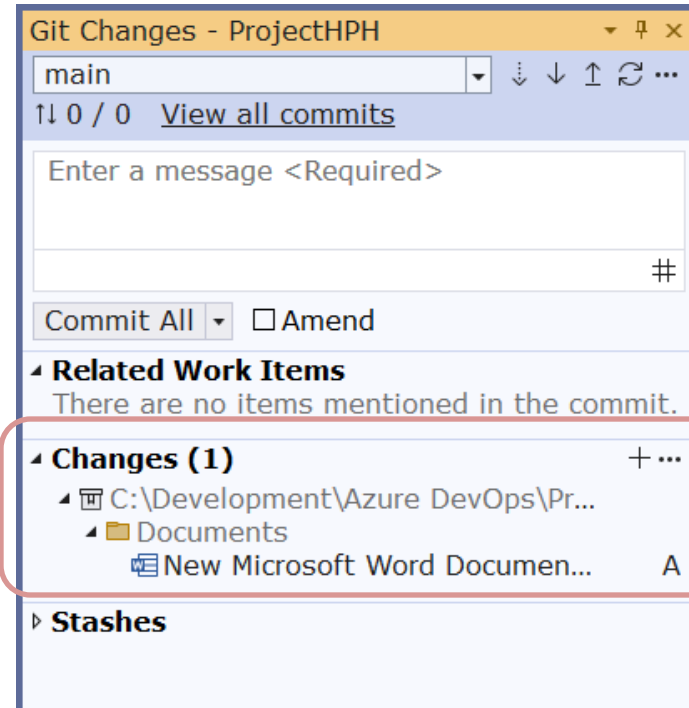
Adding Folders and Files

You can Add Folder and Files directly in Windows File Explorer.

Here I have added a Folder “Documents” and added a Word document inside.



Then this is automatically detected in “Git Changes in Visual Studio and you can Commit and Pull to remote repository



Note! To detect a Folder, you also need to create a File inside the Folder because a Git folders cannot be

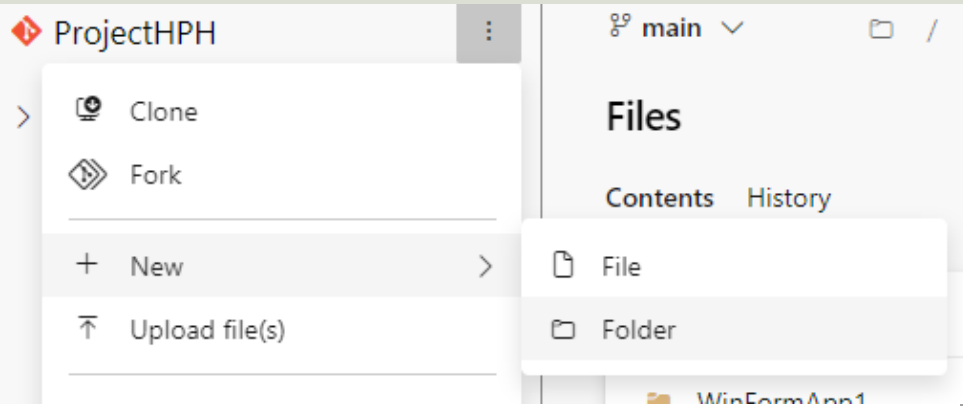
Azure DevOps – Folders and Files

You can also add Folder and Files from the Azure DevOps web interface

The screenshot displays the Azure DevOps web interface for a repository named 'ProjectHPH'. The left sidebar shows navigation options: Overview, Boards, Repos, Files (selected), Commits, Pushes, Branches, and Tags. The main content area shows the 'Files' section for the 'main' branch. A context menu is open over the 'New' option, showing 'File' and 'Folder' as choices. The file list shows 'WinFormApp1' (1h ago), '.gitignore' (5h ago), and 'README.md' (5h ago). Below the file list is an 'Introduction' section with a 'TODO' note: 'TODO: Give a short introduction of your project. Let this section explain t'.

File Name	Last change
WinFormApp1	1h ago
.gitignore	5h ago
README.md	5h ago

Create New Folder



Here we show how to create a new Folder from the Azure DevOps web interface.

Git folders cannot be empty, so you need to create a File as well inside the Folder



New folder

New folder name

Use slashes to create multiple subfolders like "sub/folder".

New file name

Git folders cannot be empty, so a placeholder file will be added. Its content can be edited before commit.

Cancel

Create

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Start Creating Code in Visual Studio



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Visual Studio

Visual Studio 2022

Open recent

This month

-  **Temperature Sensor.sln** 16.08.2024 14:11
C:\Temp\Temperature Sensor
-  **WinFormsApp1.sln** 16.08.2024 13:36
C:\Temp\WinFormsApp1
-  **Temperature Sensor.sln** 16.08.2024 13:32
C:\Users\hansha\Documents\Visual Studio 2022\Exempl...
-  **Temperature Sensor.sln** 16.08.2024 13:29
C:\...\TC01 Temperature Sensor\Code Examples\Tempera...

Get started



Clone a repository

Get code from an online repository like GitHub or Azure DevOps



Open a project or solution

Open a local Visual Studio project or .sln file



Open a local folder

Navigate and edit code within any folder



Create a new project

Choose a project template with code scaffolding to get started

[Continue without code](#) →

In the Startup window in Visual Studio, you can Clone a Git Repository from Azure DevOps if you haven't already done that.

And you can start creating a new WinForm App or an ASP.NET Web App, etc.

Create New Project

Create a new project

Recent project templates

- Windows Forms App C#
- Windows Forms App (.NET Framework) C#

Search for templates (Alt+S)

Clear all

C# Windows Desktop

Windows Forms App
A project template for creating a .NET Windows Forms (WinForms) App.

C# Windows Desktop

Windows Forms App (.NET Framework)
A project for creating an application with a Windows Forms (WinForms) user interface

C# Windows Desktop

WPF Application
A project for creating a .NET WPF Application

C# Windows Desktop

WPF Class Library
A project for creating a class library that targets a .NET WPF Application

C# Windows Desktop Library

WPF Custom Control Library
A project for creating a custom control library for .NET WPF Applications

C# Windows Desktop Library

Next

Configure your new project

Windows Forms App C# Windows Desktop

Project name

WinFormApp1

Location

C:\Development\Azure DevOps\ProjectHPH\

Solution name

WinFormApp1

Place solution and project in the same directory

Project will be created in "C:\Development\Azure DevOps\ProjectHPH\WinFormApp1\WinFormApp1\"

Back

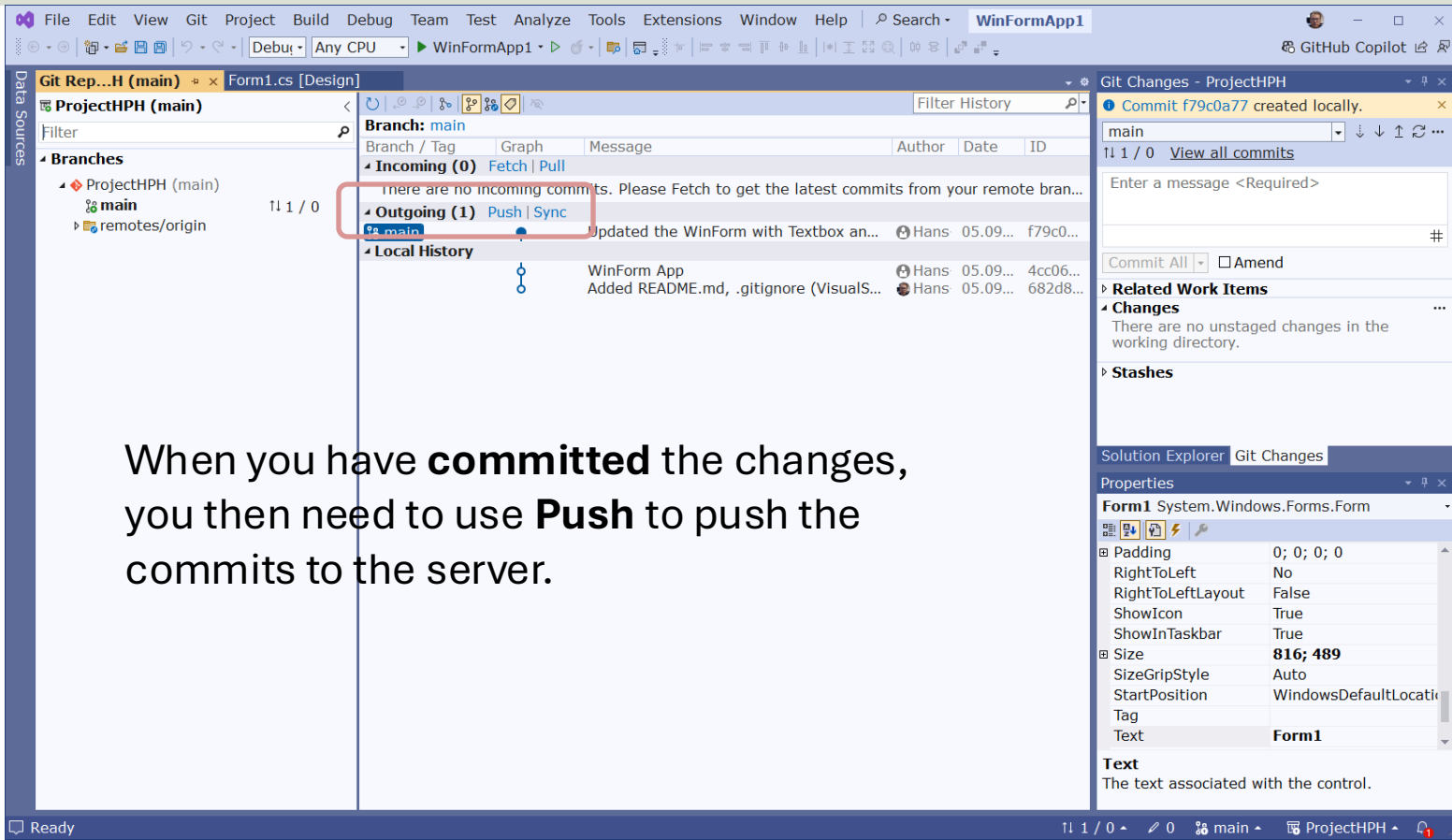
Next

Commit Changes

The screenshot shows the Visual Studio IDE with a WinForm application named 'WinFormApp1' open in Design mode. The 'Form1' window is visible, containing a text box and a button labeled 'button1'. 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 highlighted with a red box. The 'Properties' window at the bottom right shows the properties for the 'Form1' control, including 'Size' (816; 489) and 'Text' (Form1).

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 tool window open. The 'Git Changes - ProjectHPH' window displays a commit message 'Commit f79c0a77 created locally.' and a list of changes. The 'Outgoing (1) Push | Sync' button is highlighted with a red box. The 'Local History' section shows a commit by Hans on 05.09.2023 with the message 'Updated the WinForm with Textbox an...'. The 'Properties' window shows the 'Form1' control with various properties like 'Padding', 'RightToLeft', 'Size', and 'Text'.

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

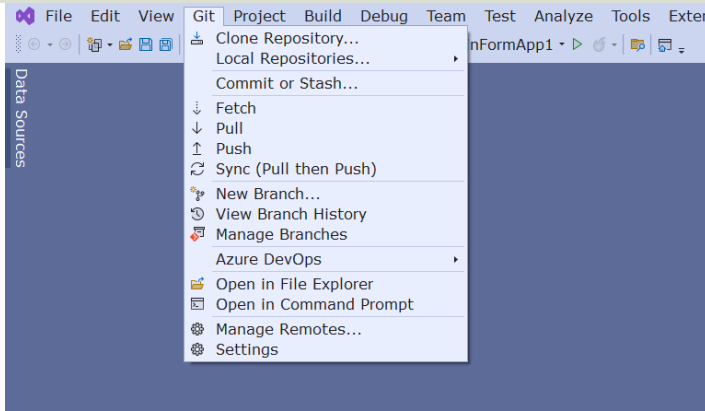
How it looks in Azure DevOps

The screenshot displays the Azure DevOps web interface. The browser address bar shows the URL `https://dev.azure.com/usn24/_git/ProjectHPPH/commits`. The page title is "Commits - Repos". The left sidebar contains navigation options: ProjectHPPH, Overview, Boards, Repos, Files, Commits (selected), Pushes, Branches, Tags, Pull requests, Advanced Security, Pipelines, Test Plans, Artifacts, and Project settings. The main content area shows the "Commits" page for the "main" branch. It features a search bar, a "Commit ID" filter, and a table of commit history. The commit history is as follows:

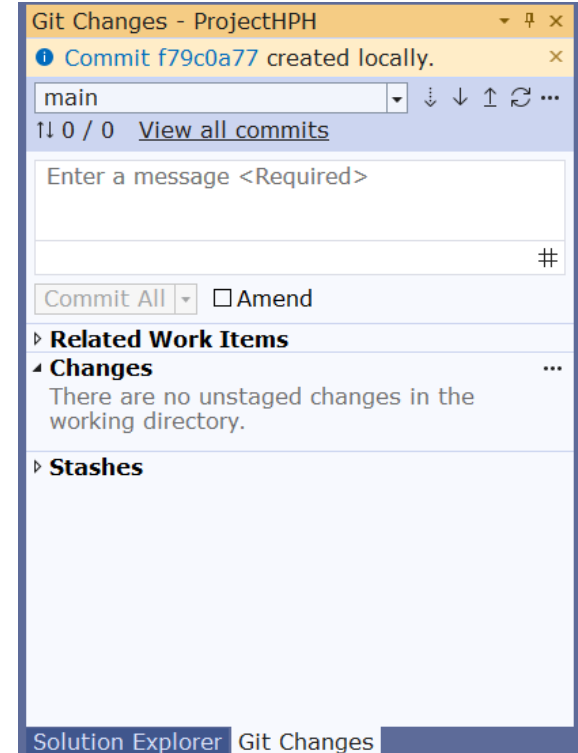
Graph	Commit	Pull Request	Status
	Updated the WinForm with Textbox and Button f79c0a77 Hans-Petter Halvorsen Today at 1:48 PM		
	WinForm App 4cc06308 Hans-Petter Halvorsen Today at 1:38 PM		
	Added README.md, .gitignore (VisualStudio) files 682d8aaf Hans-Petter Halvorsen Today at 9:47 AM		

Git Tools in Visual Studio - Summary

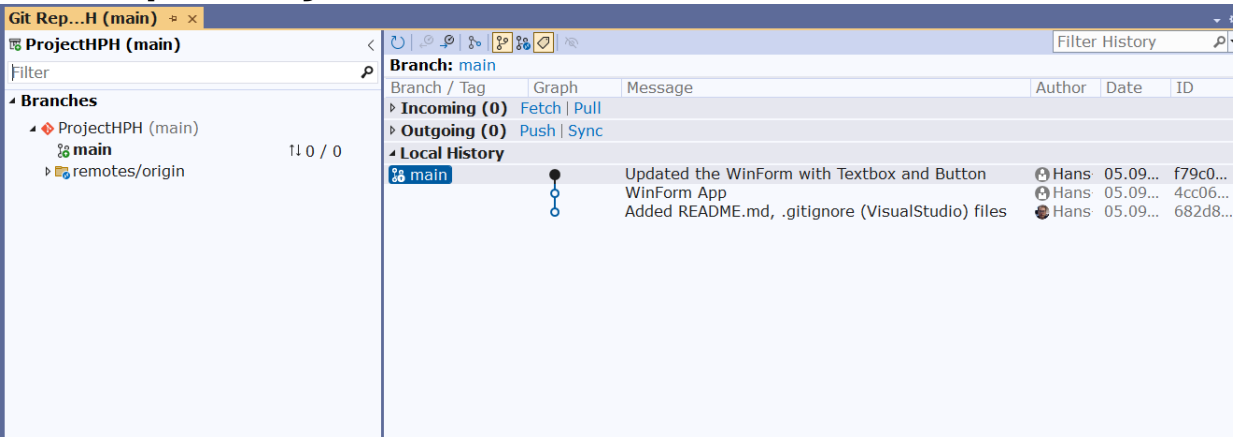
Git menu



Git Changes window



Git Repository window



Resources

- About Git in Visual Studio:
<https://learn.microsoft.com/en-us/visualstudio/version-control/git-with-visual-studio>
- Tutorial: Open a project from a repo:
<https://learn.microsoft.com/en-us/visualstudio/get-started/tutorial-open-project-from-repo>
- Use git fetch, pull, push and sync for version control in Visual Studio: <https://learn.microsoft.com/en-us/visualstudio/version-control/git-fetch-pull-sync>

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