What is Git?

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Git is the most commonly used version control system today and is quickly becoming *the* standard for version control. Git is a distributed version control system, meaning your local copy of code is a complete version control repository. These fully-functional local repositories make it is easy to work offline or remotely. You commit your work locally, and then sync your copy of the repository with the copy on the server. This paradigm differs from centralized version control where clients must synchronize code with a server before creating new versions of code.

Git's flexibility and popularity make it a great choice for any team. Many developers and college graduates already know how to use Git. Git's user community has created many resources to train developers and Git's popularity make it easy to get help when you need it. Nearly every development environment has Git support and Git command line tools run on every major operating system.

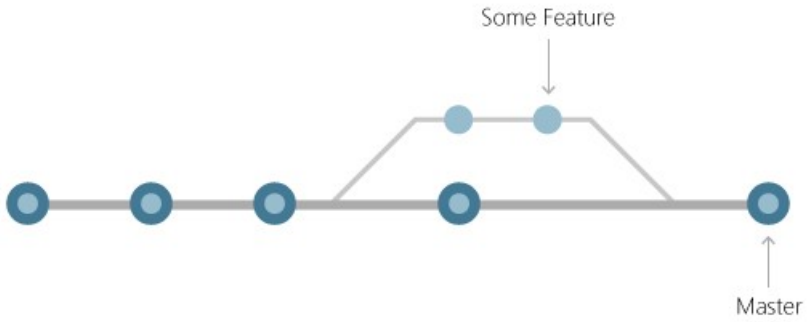
Git basics

Every time you save your work, Git creates a commit. A commit is a snapshot of all your files at a point in time. If a file has not changed from one commit to the next, Git uses the previously stored file. This design differs from other systems which store an initial version of a file and keep a record of deltas over time.

Commits create links to other commits, forming a graph of your development history . You can revert your code to a previous commit, inspect how files changed from one commit to the next, and review information such as where and when changes were made. Commits are identified in Git by a unique cryptographic hash of the contents of the commit. Because everything is hashed, it is impossible to make changes, lose information, or corrupt files without Git detecting it.

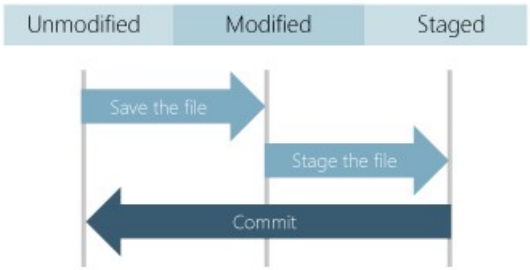
Branches

Each developer saves changes their own local code repository. As a result, you can have many different changes based off the same commit. Git provides tools for isolating changes and later merging them back together. Branches, which are lightweight pointers to work in progress, manage this separation. Once your work created in a branch is finished, merge it back into your team's main (or master) branch.



Files and commits

Files in Git are in one of three states: modified, staged, or committed. When you first modify a file, the changes exist only in your working directory. They are not yet part of a commit or your development history. You must *stage* the changed files you want to include in your commit (you can omit files that you wish to commit separately). The staging area contains all changes that you will include in your next commit. Once you're happy with the staged files, *commit* them with a message describing what changed. This commit becomes a part of your development history.



Staging lets you pick which file changes to save in a commit so you can break down large changes into a series of smaller commits. When you reduce the scope of your commits, it's easier to review the commit history to find specific file changes.

Benefits of Git

Simultaneous development

Everyone has their own local copy of code and can work simultaneously on their own branches. Git works when you're offline since almost every operation is local.

Faster releases

Branches allow for flexible and simultaneous development. The main branch contains stable, high-quality code from which you release. Feature branches contain work in progress, which you merge into the main branch upon completion. By separating your release branch from development in progress, you can manage your stable code better and ship updates more quickly.

Built-in integration

Due to its popularity, Git is integrated into most tools and products. Every major IDE has built-in Git support, and many tools that allow you to manage continuous integration, continuous deployment, automated testing, work item tracking, metrics, and reporting feature integration with Git. This integration simplifies your day to day workflow.

Strong community support

Git is open-source and has become the de facto standard for version control, and there is no shortage of tools and resources available for your team to leverage. The volume of community support for Git compared to other version control systems makes it easy to get help when you need it.

Git works with your team

Using Git with a source code management tool can increase your team's productivity by encouraging collaboration, enforcing policies, automating processes, and improving visibility and traceability of work. You may choose individual tools for version control, work item tracking, and continuous integration and deployment. Or, you can choose a solution like Azure DevOps that lets you manage all of these tasks in one place.

Pull requests

Use pull requests to discuss code changes with your team before merging them into your main branch. The discussions you have in pull requests are invaluable to ensuring code quality and increase knowledge across your team. Visual Studio Team Services offers a rich pull request experience where you can browse file changes, leave comments, inspect commits, view builds, and vote to approve the code.

Branch policies

Your team can configure Azure DevOps to enforce consistent workflows and process across your team. Set up branch policiesto ensure that pull requests meet your requirements before completion. Branch policies protect your important branches by preventing direct pushes, requiring reviewers, and ensuring clean builds.

Get started with unlimited free private Git repos in Azure Repos.

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