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Connect a GitHub Repo with AWS



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```
[ec2-user@ip-172-31-0-34 nextwork-web-project]$ ls
pom.xml  src
[ec2-user@ip-172-31-0-34 nextwork-web-project]$ sudo dnf update -y
[ec2-user@ip-172-31-0-34 nextwork-web-project]$ Last metadata expiration check: 0:31:17 ago on Tue Mar 25 10:27:14 2025.
Dependencies resolved.
Nothing to do.
Complete!
Last metadata expiration check: 0:31:18 ago on Tue Mar 25 10:27:14 2025.
Dependencies resolved.
=====
Package           Architecture      Version       Repository   Size
=====
Installing:
git              x86_64          2.47.1-1.amzn2023.0.2   amazonlinux  54 kB
Installing dependencies:
git-core          x86_64          2.47.1-1.amzn2023.0.2   amazonlinux  4.7 kB
git-core-doc     noarch          2.47.1-1.amzn2023.0.2   amazonlinux  2.8 kB
perl-Error        noarch          1:0.17.029-5.amzn2023.0.2   amazonlinux  41 kB
perl-File-Find    noarch          1:1.73-1.amzn2023.0.6   amazonlinux  26 kB
perl-File-ReadKey noarch          2.47.1-1.amzn2023.0.2   amazonlinux  42 kB
perl-TermReadKey x86_64          2.38-9.amzn2023.0.2    amazonlinux  36 kB
perl-lib          x86_64          0.65-477.amzn2023.0.6   amazonlinux  15 kB
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```



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Introducing Today's Project!

In today's project, I will build a foundational CI/CD pipeline using AWS services to automate the deployment of a web app. This involves integrating code changes with automated builds and deployments, ultimately creating a streamlined workflow.

Key tools and concepts

Services I used were EC2, VSCode with Remote-SSH, Git, and GitHub. Key concepts I learnt include remote server connection, version control, and GitHub authentication.

Project reflection

This project took me approximately a few hours. The most challenging part was setting up the GitHub token. It was most rewarding to successfully connect my local repo to GitHub.

I did this project to solidify my understanding of Git and GitHub integration within a cloud environment. It met my goals by demonstrating the complete workflow from local development to remote repository management.

This project is part two of a series of DevOps projects where I'm building a CI/CD pipeline! I'll be working on the next project as soon as I can, to continue building out the pipeline.



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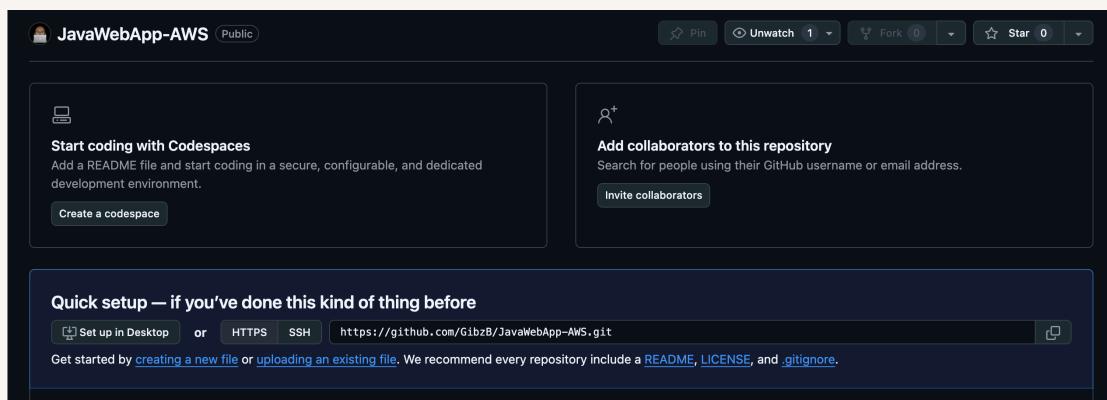
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Git and GitHub

Git is a distributed version control system that tracks changes in computer files and coordinates work on those files among multiple people. I installed Git using the commands sudo dnf update -y followed by sudo dnf install git -y.

GitHub is a web-based platform that provides hosting for software development and version control using Git. I'm using GitHub in this project to store my code remotely, enable collaboration, and manage different versions of my web application.



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My local repository

A Git repository is a storage location for your project files and their revision history. It tracks changes to files, allowing you to revert to previous versions and collaborate with others.

git init is a command that creates a new, empty Git repository in the specified directory. I ran git init in the nextwork-web-project directory to initialize a Git repository for my web application.

After running git init, the response from the terminal was "initialized empty Git repository in..." A branch in Git is a separate line of development that allows you to work on new features or bug fixes without affecting the main codebase

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS EXPOSED PORTS
Verifying      : perl-TermReadKey-2.38-9.amzn2023.0.2.x86_64
Verifying      : perl-lib-0.65-477.amzn2023.0.6.x86_64
Installed:
git-2.47.1-1.amzn2023.0.2.x86_64          git-core-2.47.1-1.amzn2023.0.2.x86_64  git-core-doc-2.47.1-1.amzn2023.0.2.noarch  perl-TermReadKey-2.38-9.amzn2023.0.2.x86_64  perl-Error-1:0.17029-5.amzn2023.0.2.noarch
perl-File-Find-1.37-477.amzn2023.0.6.noarch  perl-Git-2.47.1-1.amzn2023.0.2.noarch  perl-Error-1:0.17029-5.amzn2023.0.2.noarch  perl-lib-0.65-477.amzn2023.0.6.x86_64

Complete!
● [ec2-user@ip-172-31-0-34 nextwork-web-project]$ pwd
/home/ec2-user/nextwork-web-project
● [ec2-user@ip-172-31-0-34 nextwork-web-project]$ git init
hint: Using 'master' as the name for the initial branch. This default branch name
hint: is subject to change. To configure the initial branch name to use in all
hint: of your new repositories, which will suppress this warning, call:
hint:   git config --global init.defaultBranch <name>
hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
hint: 'development'. The just-created branch can be renamed via this command:
hint:
hint:   git branch -m <name>
Initialized empty Git repository in /home/ec2-user/nextwork-web-project/.git/
● [ec2-user@ip-172-31-0-34 nextwork-web-project]$
```

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To push local changes to GitHub, I ran three commands

git add

The first command I ran was `git add ..`. This command adds all the modified files in the current directory to the staging area. A staging area is a place where Git tracks changes before they are committed to the repository's history.

git commit

The second command I ran was `git commit -m "Updated index.jsp with new content"`. Using `-m` means I'm adding a commit message directly in the command line, describing the changes I made.

git push

The third command I ran was `git push -u origin master`. Using `-u` means I'm setting the upstream branch, linking my local master branch to the remote origin/master branch.

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Authentication

When I commit changes to GitHub, Git asks for my credentials because it needs to authenticate my identity and verify that I have permission to push changes to the repository

Local Git identity

Git needs my name and email because it uses this information to identify the author of each commit. This helps track who made specific changes and provides accountability in collaborative projects.

Running git log showed me that Git was tracking my commits, displaying the commit history, including the commit message, author, and timestamp for each change I made.

```
● [ec2-user@ip-172-31-0-34 nextwork-web-project]$ git push -u origin master
Username for 'https://github.com': Gibzb
Password for 'https://Gibzb@github.com':
Enumerating objects: 9, done.
Counting objects: 100% (9/9), done.
Compressing objects: 100% (9/9), done.
Writing objects: 100% (9/9), 1.10 KiB | 563.00 KiB/s, done.
Total 9 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/Gibzb/JavaWebApp-AWS.git
 * [new branch]      master --> master
branch 'master' set up to track 'origin/master'.
● [ec2-user@ip-172-31-0-34 nextwork-web-project]$ git log
commit 71201c5a54561cd42b646febb5fe1b342c618fec (HEAD --> master, origin/master)
Author: EC2 Default User <ec2-user@ip-172-31-0-34.ec2.internal>
Date:  Tue Mar 25 11:14:40 2025 +0000

    Updated index.jsp with new content
● [ec2-user@ip-172-31-0-34 nextwork-web-project]$
```

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GitHub tokens

GitHub authentication failed when I entered my password because GitHub no longer supports password authentication for Git operations. They require the use of personal access tokens (PATs) for security reasons.

A GitHub token is a secure, unique string used for authentication. I'm using one in this project because GitHub no longer allows password-based Git authentication, and tokens are a more secure alternative.

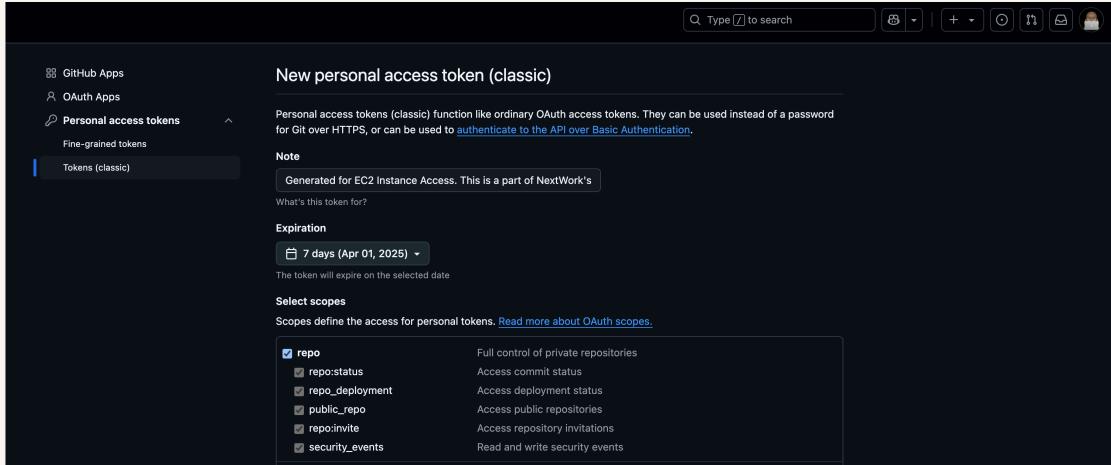
I could set up a GitHub token by navigating to my GitHub account settings, selecting "Developer settings," then "Personal access tokens," and generating a new token with the necessary permissions.



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The screenshot shows the GitHub 'Personal access tokens' page. The left sidebar has 'GitHub Apps' and 'OAuth Apps' collapsed, and 'Personal access tokens' expanded, with 'Tokens (classic)' selected. The main area is titled 'New personal access token (classic)'. It includes a note about personal access tokens functioning like OAuth tokens and can be used instead of a password for Git over HTTPS or for API authentication. A 'Note' box states 'Generated for EC2 Instance Access. This is a part of NextWork's'. Below is an 'Expiration' dropdown set to '7 days (Apr 01, 2025)'. Under 'Select scopes', it says 'Scopes define the access for personal tokens. Read more about OAuth scopes.' A table lists scopes:

Scope	Description
<input checked="" type="checkbox"/> repo	Full control of private repositories
<input type="checkbox"/> repo:status	Access commit status
<input type="checkbox"/> repo_deployment	Access deployment status
<input type="checkbox"/> public_repo	Access public repositories
<input type="checkbox"/> repo:invite	Access repository invitations
<input type="checkbox"/> security_events	Read and write security events

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Making changes again

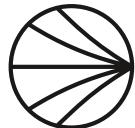
I wanted to see Git working in action, so I updated the index.jsp file within the nextwork-web-project directory. I couldn't see the changes in my GitHub repo initially because I had not yet committed and pushed the changes to the remote repository.

I finally saw the changes in my GitHub repo after I committed the changes locally using git commit -m "Updated index.jsp with appealing content" and then pushed them to the remote repository with git push.

The screenshot shows a GitHub repository interface for 'JavaWebApp-AWS'. The 'Code' tab is selected. On the left, the file structure is shown with 'index.jsp' highlighted. The main pane displays the contents of 'index.jsp':

```
<html>
<body>
<h1>Welcome to Kitstek's NextWork App!</h1>
<h2 style="color: red; font-weight: bold; text-decoration: underline;">ASSUME EVERYTHING!</h2>
<p>This is my NextWork web application, now fully operational!</p>
</body>
</html>
```

A commit message 'Add new lift to index.jsp' by 'GibzB' is visible at the top right, with a timestamp of 'e08ae72 · 1 minute ago'.



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