Assignment: Self-Hosted Git Service on AWS EC2

CSC 410 / 510

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Overview

In this assignment, you will deploy your own **self-hosted Git service** using **Gitea** on a **free-tier Amazon EC2 instance**. This mirrors the video demo, but you will perform the entire setup independently.

We're doing today's topic in a **flipped format**. You will not submit a written report or screenshots. Instead, you will demonstrate a *working system* during class.

The emphasis of this assignment is on:

- Understanding cloud infrastructure and services
- Deploying and managing a Linux-based service
- Demonstrating functional correctness.

Learning Objectives

By completing this assignment, you will be able to:

- Launch and configure a free-tier EC2 virtual machine
- Use SSH to administer a remote Linux system
- Install and manage a long-running service using `systemd`
- Deploy a production-style web service with persistent storage
- Explain basic cloud security concepts (keys, ports, users)
- Host and use Git repositories without relying on GitHub

Prerequisites

You will need:

- An AWS account with Free Tier access
- A local machine with:

- An SSH client
- Git
- A terminal (macOS, Linux, or Windows with WSL)

Part 1: Provisioning the EC2 Instance

1. Create a new EC2 instance with the following settings:
   - **AMI:** Ubuntu 24.04 LTS
   - **Instance type:** `t3.micro` (free-tier eligible)
   - **Storage:** 20 GB gp3 root volume
   - **Key pair:** ED25519 (download and store securely)
2. Configure the security group to allow inbound traffic on:
   - SSH (port 22)
   - HTTP (port 80)
   - Gitea web interface (port 3000)

Part 2: Initial System Setup

1. SSH into your EC2 instance.
2. Update the system and install required packages:
   - `git`
   - `sqlite3`
   - `curl`
   - `ca-certificates`
3. Verify that Git and SQLite are installed correctly.

Part 3: Gitea Service User and Directories

1. Create a dedicated **system user** for running Gitea.
2. Create directories for application data, logs, and configuration.
3. Set ownership and permissions so Gitea can write its data but configuration files are protected.

Part 4: Installing and Running Gitea

1. Download and install the official Gitea binary.
2. Create a `systemd` service for Gitea.
3. Enable and start the service.
4. Use system logs to verify the service is running.

Part 5: Web Configuration and Repository Creation

1. Access the Gitea web interface at:

   `http://<your-public-ip>:3000`

2. Complete the initial configuration wizard:
   - Use SQLite as the database
   - Set correct repository and data paths
   - Verify server domain and ports
3. Register a user account.
4. Create a new repository.
5. Clone the repository locally, add a file, commit, and push.

Part 6: Lockdown and Teardown

1. Lock down Gitea configuration file permissions.
2. Restart the service to confirm it still works.
3. Terminate the EC2 instance when you are finished.

Completion and Checkoff

This assignment is completed via **live demonstration**, not written submission.

To receive credit, you must:

- Notify the instructor that you are ready for checkoff
- Provide the public IP address of your EC2 instance
- Demonstrate a working Gitea web interface
- Push a new commit to a repository hosted on your Gitea instance

During checkoff, you may be asked brief questions about:

- Why specific ports are open
- Why Gitea runs as a non-root user
- How `systemd` manages the service

Grading

This assignment is graded on a **completion basis**. Credit is awarded for a correctly functioning system and successful live demonstration.

Notes

- You must terminate your EC2 instance after completing the checkoff.
- Do not expose private keys or credentials.
- Debugging and troubleshooting are expected parts of the assignment.