# Objective: Recover the Elfen Ring—Questions Only

More adventures await in the Elfen Ring, which takes us into the world of the cloud and the [Git](https://www.w3schools.com/git/git_intro.asp?remote=github) version control system. Git maintains your software repository and logs all changes you make. It can quickly revert to earlier versions if needed. [Git hosted runners](https://docs.github.com/en/actions/using-github-hosted-runners/about-github-hosted-runners) can automatically deploy changes to servers as soon as they are pushed to the Git repository. You will get a brief peek into the world of [CI/CD](https://about.gitlab.com/topics/ci-cd/).

You can manage a Git repository through a web interface or through a command line interface (CLI) which [can be installed](https://git-scm.com/book/en/v2/Getting-Started-Installing-Git) on most any operating system. Don’t worry though, it is already installed in the terminals that need it.

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## Clone with a Difference

The point of this objective is to practice cloning a Git repository. There are several ways to do this, but the predominant ones are HTTPS and SSH. The HTTPS method is often used for public repositories and can be used without authentication. The SSH method usually requires public/private keys and may allow you to push changes; it always uses git as the SSH username, as in [git@github.com](mailto:git@github.com)....

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<https://github.com/git-guides/git-clone>

### Question

What is the command to clone the repository using HTTPS?

There are two steps: replace the SSH-style git@ with https:// and change the ‘:’ with a ‘/’ to keep the web server happy.  
git clone <https://haugfactory.com/asnowball/aws_scripts.git>

## Prison Escape

Much of your work in the cloud will be with [containers](https://cloud.google.com/learn/what-are-containers) that separate your applications from others in the cloud. Examples of containers are [Docker](https://aws.amazon.com/docker/#:~:text=Docker%20is%20a%20software%20platform,tools%2C%20code%2C%20and%20runtime.) and [Kubernetes](https://cloud.google.com/learn/what-is-kubernetes). In this challenge you will be working in a Docker container. A primary advantage of containers is that they isolate applications from the host running Docker, and from each other. As a penetration tester, your goal is to execute code or examine files in the host operating system. This is called container escape and can be quite complicated. Fortunately, it is simple in this challenge.

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You also received some great hints from Bow Ninecandle as a reward for completing his Clone with a Difference challenge.

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The hint, Mount Up, is key. Have you ever [mounted a CDROM in Linux](https://linuxhint.com/mount-cd-rom-centos-8/)? Remember that you will need to run your [commands with root privileges](https://xkcd.com/149/).

### Question 1

The objective asks for the contents of a file on the host file system. Gain access to the host file system.

### Question 2

Now that you have access, find the flag, and enter it in the objective. Remember that .ssh is a hidden directory.

## Jolly CI/CD

Here you will have your own environment with multiple servers. Once you have cloned their public repository (Tinsel Upatree has the link), pillage the repo for information leaks.

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Tinsel has goodies once you solve the Prison Escape.Text

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The link to the repo from Tinsel, which only works inside the terminal, is  
<http://gitlab.flag.net.internal/rings-of-powder/wordpress.flag.net.internal.git>

Depending on the load on the terminal, it may take 5 minutes or more to spin up all the servers. You can tell if they are up by  
ping gitlab.flag.net  
If you get an error message, the servers aren’t up yet.

### Question 1

Clone the public repo with HTTP. Then examine it using the git log command to find secrets. The command git show <hash value> may also be helpful.

What secrets did you find?

### Question 2

The next step is to delete the repo you just cloned and clone it again with the credentials you stole so that you can push changes to the repo. There are several steps you need to complete before you can clone the repo with SSH. This was the most troublesome part for the people I helped with this challenge and is the reason the instructions are more detailed than usual.

1. Delete the old repo. Unless you specify a new path when you clone the repo again, it will generate an error if the old repo still exists.
2. Git needs to be [configured](https://git-scm.com/book/en/v2/Getting-Started-First-Time-Git-Setup) with a username and email address.
3. If you want to clone without modifying any configuration files for SSH, you need to name your keys as the default, ~/.ssh/id\_rsa and ~/.ssh/id\_rsa.pub. If it bothers you that the keys are ED\_25519 and you are calling them RSA, you can name the keys as you like and create a ~/.ssh/config file to tell SSH what your keys are. [See this article](https://build-me-the-docs-please.readthedocs.io/en/latest/Using_Git/SetUpSSHForGit.html), step 3. Remember to protect your private key with chmod 600 id\_rsa, or SSH will fail.
4. Check your keys for validity with [this procedure](https://support.cpanel.net/hc/en-us/articles/360056952833-How-to-verify-if-a-public-and-private-RSA-SSH-key-match-).
5. Test your keys against the SSH server with [this procedure](https://docs.github.com/en/authentication/connecting-to-github-with-ssh/testing-your-ssh-connection).
6. Finally, [clone the repo](https://ralphjsmit.com/git-custom-ssh-key) using the SSH format. I had to [prefix my URL](https://git-scm.com/book/en/v2/Git-on-the-Server-The-Protocols) in git clone with ssh:// to get it to work. Remember that the username in the SSH git clone is always git.

Clone the repo with your stolen credentials.

### Question 3

You can now add or change anything in the repo that you want to. Also, this site uses CI/CD, so anything that is pushed to the repository is automatically deployed to the wordpress.flag.internal webserver. You may remember this from when the terminal first came up:  
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You should be cackling and rubbing your hands together at this point. You can put anything on the PHP webserver that you want to. I recommend keeping it simple.

What will you push to the wordpress.flag.net.internal server?

### Question 4

Now push your evil payload to the server. There are [instructions in this link](https://www.datacamp.com/tutorial/git-push-pull); you can start at step 5 because the repository is already established. Also, when you get to the step to push, all you need to do is use git push. Everything else is stored in your configuration (see git remote -v, above.)

Note: It is also possible to pwn the gitlab server using the gitlab yml file in the repository. The flag is not available on the gitlab server, alas.

### Question 5

Now, use your access to pillage the file system and find the flag. Most Linux commands work through the simple backdoor, although you may have to enclose them in single quotes. Note that any space character should be replaced with ‘+’. Remember the usage instructions,  
  
You don’t have access to a web browser, so use curl. Note that the command above will not work through curl unless you enclose it in single quotes, 'cmd=cat+/etc/passwd'.

Be careful with the change directory (cd) command. It locked up my terminal and I had to start over.

Find the flag! Good luck!