

Day 3

Git

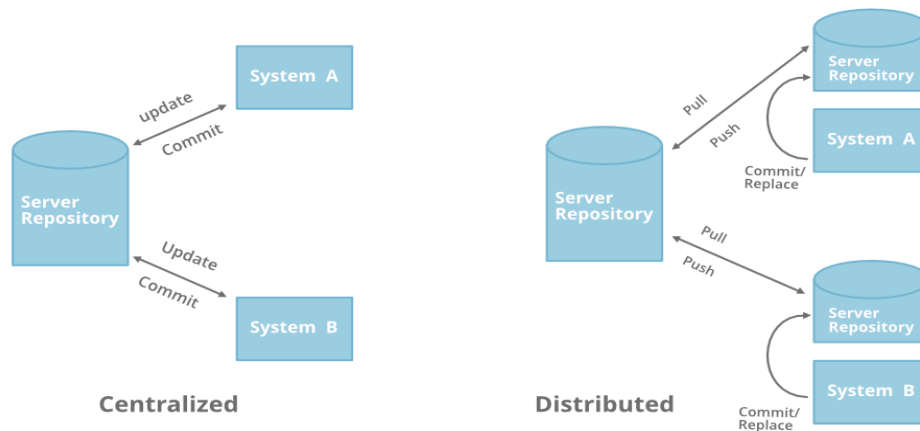
VCS foundation

What is VCS?

- a. Version Control System tracks the history of changes as people and teams collaborate on projects together.
- b. What , who, when, why were changes made?

Centralized vs Distributed VCS

- a. CVCS
 - i. The server is the master repository that contains all of the versions of the code.
 - ii. To work on any project, firstly user or client needs to get the code from the master repository or server.
 - iii. The basic workflow involves in the centralized source control is getting the latest version of the code from a central repository that will contain other people's code as well, making your own changes in the code, and then committing or merging those changes into the central repository.
- b. DVCS
 - i. Here every single developer or client has their own server and they will have a copy of the entire history or version of the code and all of its branches in their local server or machine.
 - ii. you clone the code from the master repository in your own hard drive, then you get the code from your own repository to make changes and after doing changes, you commit your changes to your local repository
 - iii. Getting the new change from a repository is called "pulling" and merging your local repository's 'set of changes' is called "pushing".



- iv. allows you to work offline and gives flexibility.
- v. DVCS is faster than CVCS because you don't need to communicate with the remote server for each and every command

Git

- a. Git is the most popular distributed version control system.

Repository

- a. A repository, or Git project, encompasses the entire collection of files and folders associated with a project, along with each file's revision history
- b. The file history appears as snapshots in time called commits
- c. The commits can be organized into multiple lines of development called branches.

SSH

What is SSH

- a. access, control, and modify their remote servers over the internet.
- b.
- c.

How SSH works

- a. `ssh {user}@{host}`
 - i. Ssh : instructs your system that you want to open an encrypted Secure Shell Connection
 - ii. User : represents the account you want to access.

- iii. Host : refers to the computer you want to access [can be IP address or domain name]

```

supersuyan@supersuyan:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; disabled; preset: enabled)
   Active: inactive (dead) since Thu 2024-06-06 11:39:37 +0545; 21s ago
 Duration: 3min 52.933s
 TriggeredBy: ● ssh.socket
            Docs: man:sshd(8)
                  man:sshd_config(5)
   Process: 7752 ExecStart=/usr/sbin/sshd -D $SSH_OPTS (code=exited, status=0/SUCCESS)
  Main PID: 7752 (code=exited, status=0/SUCCESS)
    CPU: 99ms

ju 06 11:35:44 supersuyan systemd[1]: Starting ssh.service - OpenBSD Secure Shell server...
ju 06 11:35:44 supersuyan sshd[7752]: Server listening on :: port 22.
ju 06 11:35:44 supersuyan systemd[1]: Started ssh.service - OpenBSD Secure Shell server.
ju 06 11:36:32 supersuyan sshd[7787]: Accepted password for supersuyan from 10.10.100.101 port 57654 ssh2
ju 06 11:36:32 supersuyan sshd[7787]: pam_unix(sshd:session): session opened for user supersuyan(uid=1000) by supersuyan(uid=0)
ju 06 11:39:37 supersuyan sshd[7752]: Received signal 15; terminating.
ju 06 11:39:37 supersuyan systemd[1]: Stopping ssh.service - OpenBSD Secure Shell server...
ju 06 11:39:37 supersuyan systemd[1]: ssh.service: Deactivated successfully.
ju 06 11:39:37 supersuyan systemd[1]: Stopped ssh.service - OpenBSD Secure Shell server.
supersuyan@supersuyan:~$ sudo systemctl start ssh
supersuyan@supersuyan:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; disabled; preset: enabled)
   Active: active (running) since Thu 2024-06-06 11:40:18 +0545; 2s ago
 TriggeredBy: ● ssh.socket
            Docs: man:sshd(8)
                  man:sshd_config(5)
   Process: 8498 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
  Main PID: 8499 (sshd)
    Tasks: 1 (limit: 9112)
   Memory: 1.2M (peak: 1.5M)
     CPU: 34ms
    CGroup: /system.slice/ssh.service
            └─8499 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

ju 06 11:40:18 supersuyan systemd[1]: Starting ssh.service - OpenBSD Secure Shell server...
ju 06 11:40:18 supersuyan sshd[8499]: Server listening on :: port 22.
ju 06 11:40:18 supersuyan systemd[1]: Started ssh.service - OpenBSD Secure Shell server.
supersuyan@supersuyan:~$

```

```

supersuyan@supersuyan:~$ ls
Ddrive Desktop Documents Downloads dump Music node_modules package.json package-lock.json
supersuyan@supersuyan:~$ ssh svarnimn@svarnimn-comp
ssh: Could not resolve hostname svarnimn-comp: Temporary failure in name resolution
supersuyan@supersuyan:~$ ssh svarnimn@10.10.100.101
svarnimn@10.10.100.101's password:
Last login: Thu Jun 6 11:37:45 2024 from 10.10.100.75
svarnimn@svarnimn-comp:~$ ls
Desktop Documents Downloads Music new_file Pictures project_101 Public Templates Videos
svarnimn@svarnimn-comp:~$ cd Downloads/
svarnimn@svarnimn-comp:~/Downloads$ ls
63965936.png New_Syllabus_-_COMP_482_Data_Mining1674216496.pdf open
mattermost-desktop-5.8.0-linux-x86_64.rpm Noto_Sans_Newa.zip swor
svarnimn@svarnimn-comp:~/Downloads$ cd ..
svarnimn@svarnimn-comp:~$ exit
logout
Connection to 10.10.100.101 closed.
supersuyan@supersuyan:~$ ifconfig -a
eth0: flags=4163<UP,BROADCAST,MULTICAST> mtu 1500
    inet 10.10.100.75 netmask 255.255.255.0 bcast 10.10.100.255 link-local all

```

Adding SSH key to Gitlab account

- a. `ssh-keygen -t rsa -b 4096 -C "suyan.shrestha@bajratechnologies.com"`
 - i. `-t` specifies the type of key
 - ii. `-b` represents the number of bits
 - iii. `-C` represents the label/comment, usually the email address of gitlab account
- b. `cat ~/.ssh/id_rsa.pub`
- c. To ensure that it is correctly configured
 - i. `ssh -T git@gitlab.com`

- ii. "Welcome to GitLab, @suyan.shrestha!" will be the result if its correctly configured.

```
supersuyan@supersuyan:~$ ssh-keygen -t rsa -b 4096 -C "suyan.shrestha@bajratechnologies.com"
Generating public/private rsa key pair.
Enter file in which to save the key (/home/supersuyan/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/supersuyan/.ssh/id_rsa
Your public key has been saved in /home/supersuyan/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:kjKeJGYHlGYQ0IFqBS1N29FFpr6Rrxc3kZmZP7KEs7w suyant.shrestha@bajratechnologies.com
The key's randomart image is:
+---[RSA 4096]-----+
|=*B+ .. o+|
|.o=+o ..o|
|.o+. . . *|
|.. . ... B|
|. + = o+S . o|
|o = + .++ = o|
|o ...* + .|
|..+ .|
|..E.|
+-----[SHA256]-----+
supersuyan@supersuyan:~$ cat ~/.ssh/id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQADermB2cG5B+6gS+P50er0GUenGBIuThCzEmmrUkR+dwspwliXJy3VsEVX4
1n2B9tC1Be/016B/h6MxXkVIEZ/9yWqFuG6Cd6wrGifuGi8msdWSQw3k8EFiDuiFRP0kMNXSbUyz2nwRrw/0lh66VgEYDost
TTq9m/fDEsMHZWUI4z+Xg7ds0upRxxz5pSVv31TWTCkr1X+NYqNal9m7vnS2Hghw5Z8LSI4PkCynAC1XXT5lpG1ijWWku/UGY
LFZplhzX51hxEDlXMY5Q5+hYmMc7Q+W5vWk0n+bQI+C4cYmldIPnCxtIYBcjy8UMR5eYcVzAnvRchktMf/xsXdnUoX5NX+8s
GMkwaQC86ZvktjjGgjBh/HMbSf4dNY+63b40QQ== suyant.shrestha@bajratechnologies.com
supersuyan@supersuyan:~$ ssh -T git@gitlab.com
The authenticity of host 'gitlab.com (172.65.251.78)' can't be established.
ED25519 key fingerprint is SHA256:eUXGGM1YGsMAS7vkcx6JOJd0GHPem5gQp4taiCfCLB8.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'gitlab.com' (ED25519) to the list of known hosts.
Welcome to GitLab, @suyan.shrestha!
supersuyan@supersuyan:~$
```

Git basic commands

- Git init : start a new repo
- Git clone <repo> : obtain repo from existing url
- git add <file> : adds file to staging area
- git commit -m "<Message>" : records or snapshots the file permanently in the version history with a message <Message>.
- Git status : shows the list of files that have been changed along with the files that are yet to be added or committed.
- Git checkout branchname : to just switch to a branch
- Git checkout -b branchname : to actually create a branch and then switch to that branch
- git branch -d branchname : to delete the branch
- Git reset filename : undo a git add filename