Jenkins

What is jenkins

Jenkins is a automation tool used to automate and monitor various tasks

For jenkins we need to tell what it has to do, when it has to do and where it has to do.

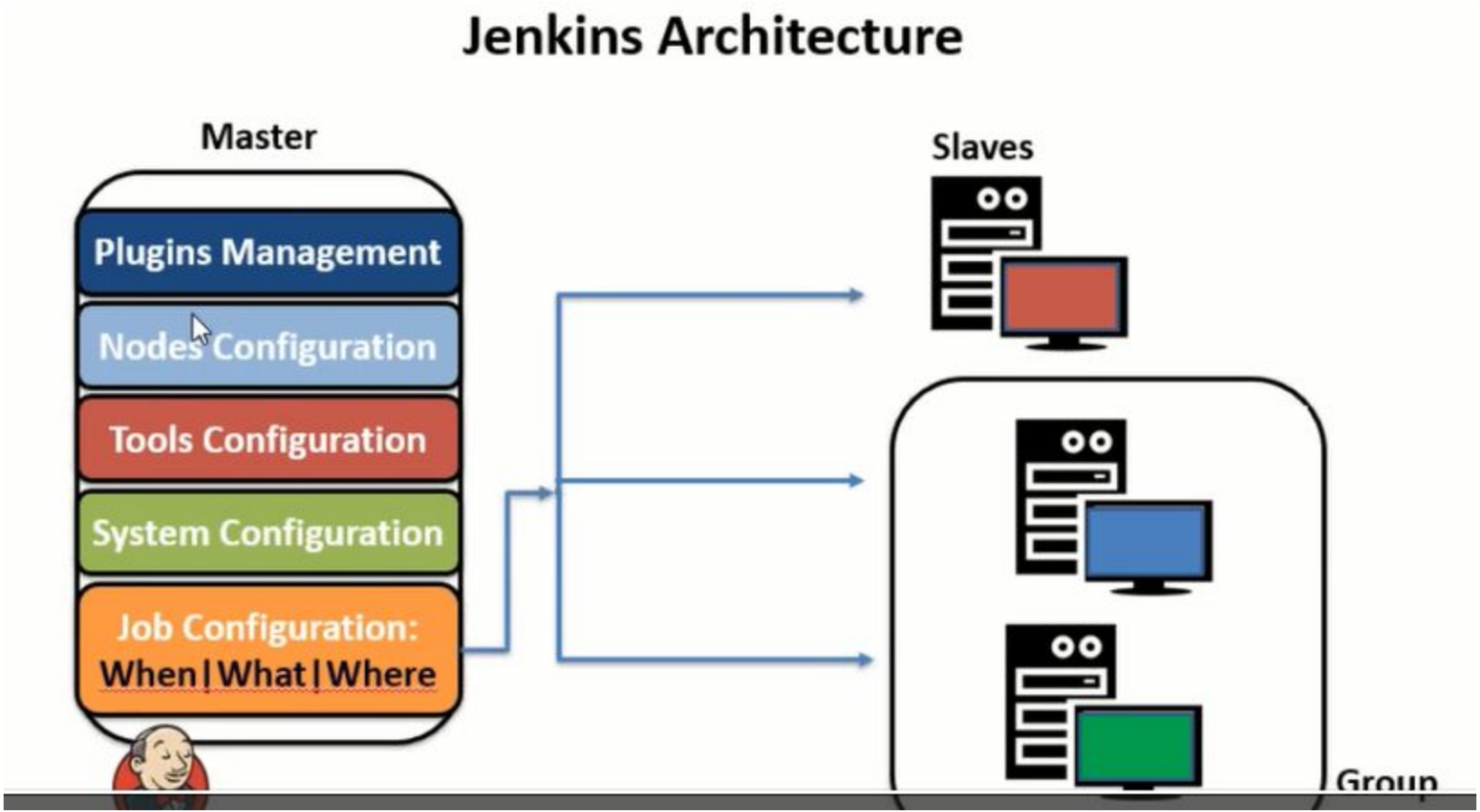
That job will be like infrastructure automating job or configuration management job or it will build job or deployment job.

Advantages- dashboard(to automate and monitor will be at one place and we can know job are running and which jobs are not running status also we can find.

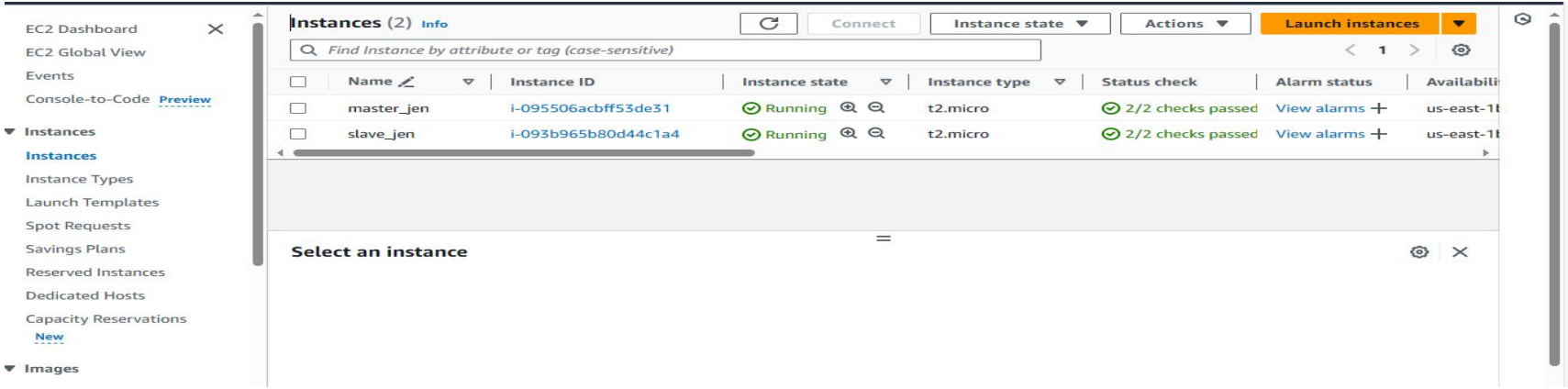
Group of machines to run the job- create label for that

Different plugins are available

Jenkins Architecture



Creating 2 instances in aws and by through ip address login to putty and install Java and all by using the link as reference: [Linux (jenkins.io)] and commands as well



Download the Jenkins key and save it to /usr/share/keyrings/jenkins-keyring.asc

sudo wget -O /usr/share/keyrings/jenkins-keyring.asc https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key

Add the Jenkins repository to the list of trusted keys

echo "deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc] https://pkg.jenkins.io/debian-stable binary/" | sudo tee /etc/apt/sources.list.d/jenkins.list > /dev/null

Update the package list

sudo apt-get update

Install Jenkins

sudo apt-get install jenkins

1. Install jdk
2. Add repo key to the system(from above links)
3. Append the debian package
4. Install jenkins
5. Check the status of it –all these steps are common to both master and slave
6. To communicate master with slave we need to generate ssh from master
7. We need pem file for that but we have ppk file
8. With in master ,exit the root dir and give below command to generate private key
9. ssh-keygen -t rsa
10. Now copy that authorized key and go to slave and paste that key in below file
11. vi ~/.ssh/authorized_keys
12. To get host name to connect with master→ hostname -i

13. Now come back to master to connect that slave within master

Sudo apt install putty → create file to get ppk file that name must be matched

vim new_key.ppk

puttygen new_key.ppk -O private-openssh -o key.pem

Now file got converted from ppk to pem

ssh -i key.pem ubuntu@172.31.23.2 →slave come into master

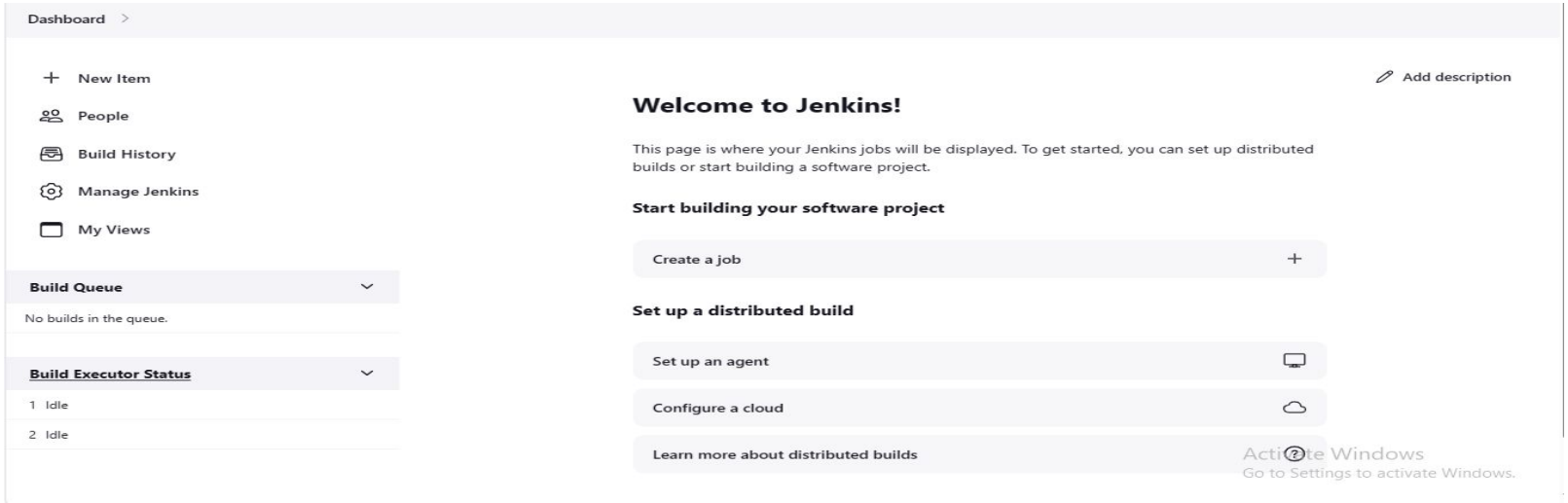
After completion of operation exit from slave to master.

Once refer the steps in below page

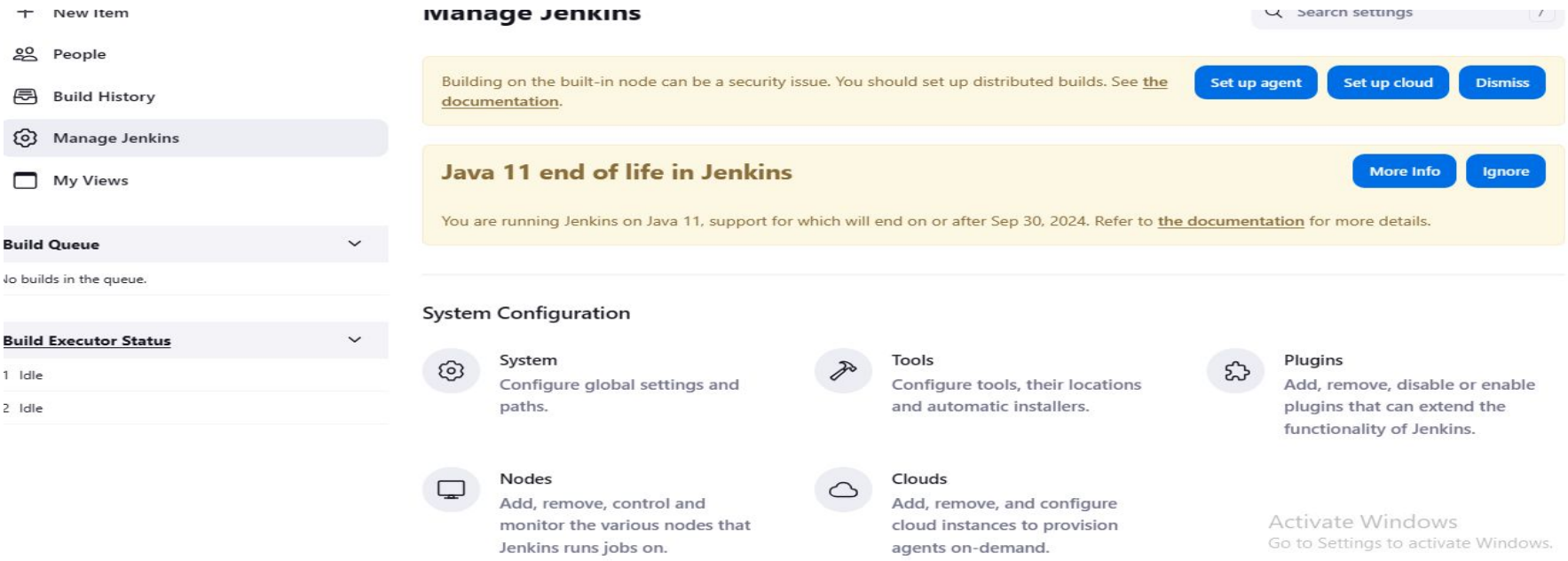
```
with in master
    1  exit
    2  pwd
    3  ssh-keygen -t rsa
    4  ls -al
    5  cd .ssh/
    6  ls
    7  cat authorized_keys   copy it and paste it in slave

with in slave
    1. exit
    2. vi ~/.ssh/authorized_keys  ---> append the key from master
    3. hostname -i

with in master

   1  sudo apt update
   2  sudo apt install putty
   3  vim new_key.ppk   --> new_key is downloaded name only we need to mention
   4  puttygen new_key.ppk -O private-openssh -o key.pem
   5  ssh -i key.pem ubuntu@172.31.23.2
```

Login to jenkins page

By through public ip address:8080 we can login to jenkins home page through user name and password.



Click on manage page



plugins

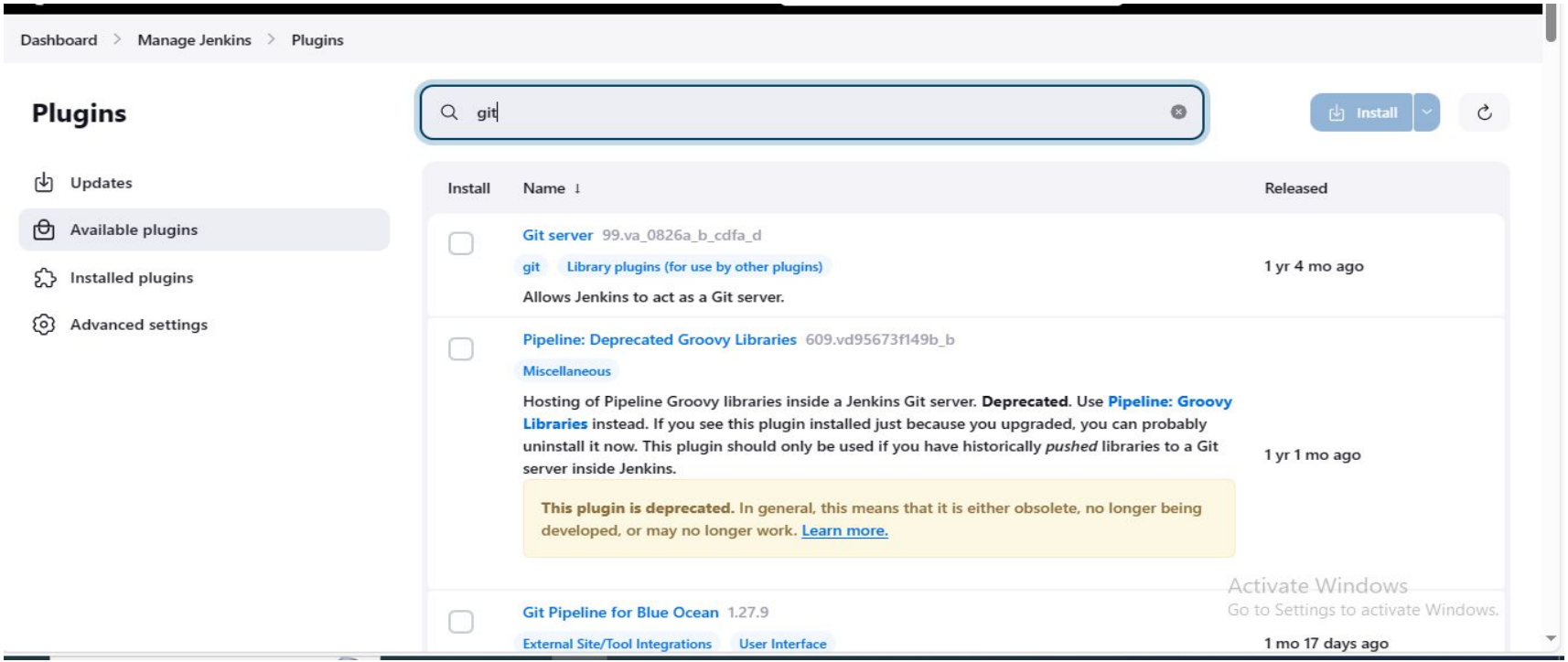
To manage the plugins

Go to plugins

Advanced- if network is not available at hat time we need to upload jenkins through http proxy. Directly upload from downloads.so we need to download it before from jenkins page.

Installed- what are the plugins we already installed

Available- available plugins within jenkins we can install based on necessary

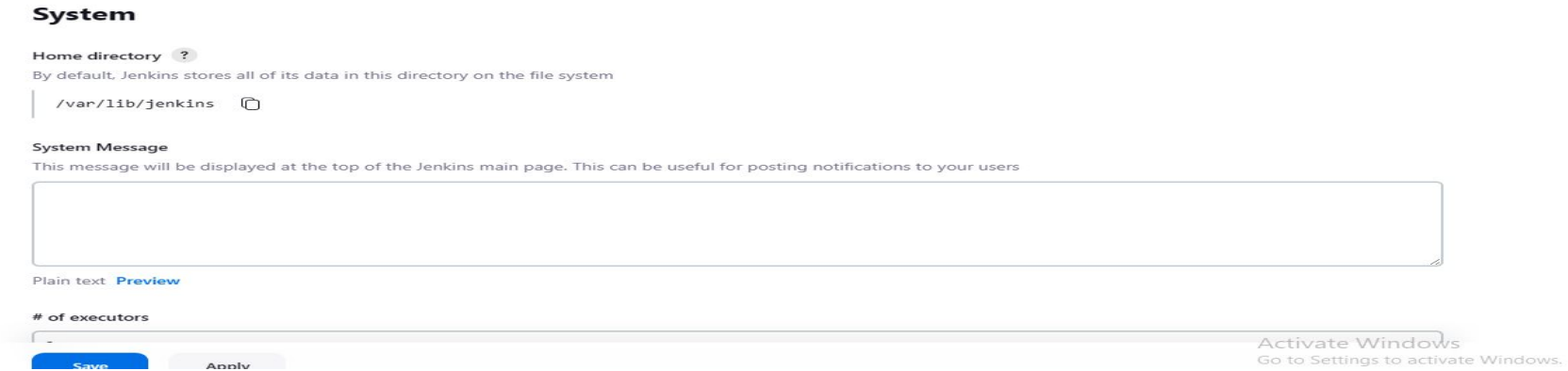

Dashboard > Manage Jenkins > Plugins
Plugins
Updates
Available plugins
Installed plugins
Advanced settings
git
Install
Install
Name ↓
Released
Git server 99.va_0826a_b_cdfa_d
git
Library plugins (for use by other plugins)
Allows Jenkins to act as a Git server.
1 yr 4 mo ago
Pipeline: Deprecated Groovy Libraries 609.vd95673f149b_b
Miscellaneous
Hosting of Pipeline Groovy libraries inside a Jenkins Git server. Deprecated. Use Pipeline: Groovy Libraries instead. If you see this plugin installed just because you upgraded, you can probably uninstall it now. This plugin should only be used if you have historically pushed libraries to a Git server inside Jenkins.
This plugin is deprecated. In general, this means that it is either obsolete, no longer being developed, or may no longer work. Learn more.
1 yr 1 mo ago
Activate Windows
Go to Settings to activate Windows.
Git Pipeline for Blue Ocean 1.27.9
External Site/Tool Integrations
User Interface
1 mo 17 days ago

System configurations

If we want to change any configurations like

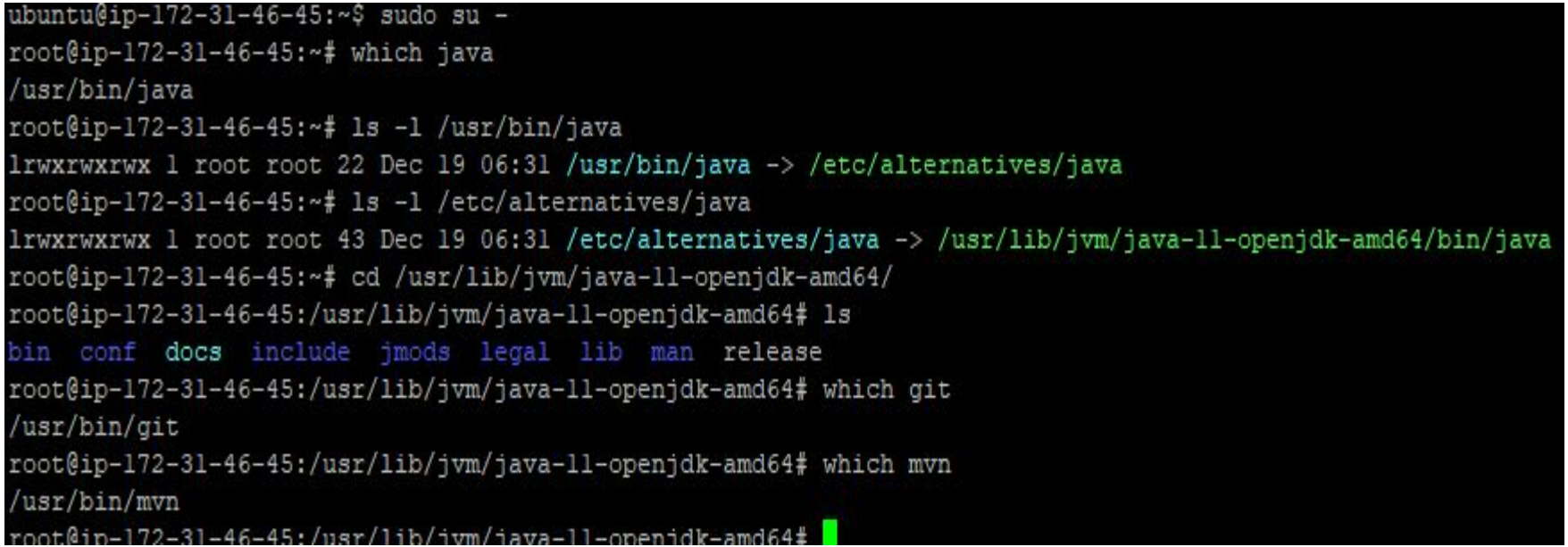
Url of jenkins, urls of gitlab and environment variables etc.,

What ever be the changes we made those will be reflected globally to all jobs, nodes etc.



tools

We need to add tools like git,jdk and maven as below commands



JDK installations

Add JDK

JDK

Name

jdk-11

JAVA_HOME

/usr/lib/jvm/java-11-openjdk

/usr/lib/jvm/java-11-openjdk is not a directory on the Jenkins controller (but perhaps it exists on some agents)

Install automatically ?

Git installations

Git

Name

mygit

Path to Git executable ?

/usr/bin/git

Install automatically ?

Add Git

Maven

Name

mvn_file

MAVEN_HOME

/usr/bin/mvn

/usr/bin/mvn is not a directory on the Jenkins controller (but perhaps it exists on some agents)

Install automatically ?

Add Maven

Save Apply

nodes

We can also add nodes to jenkins

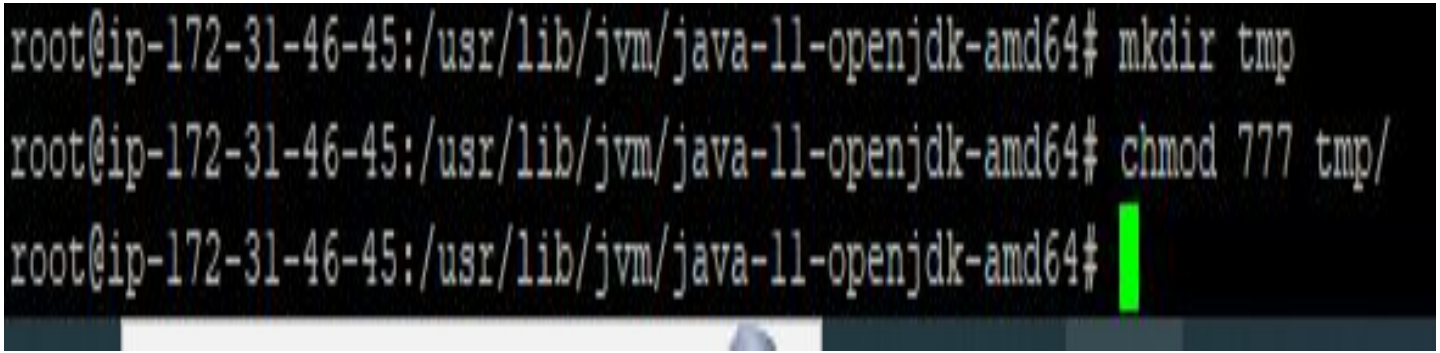
Defaultly it has master , if we didnot connect to any server then jenkins will run job in master itself.

Here server means node (machine) to run job in jenkins

Now create the node

No. of executors - how many no. of jobs need to be executed in a machine

Remote root directory - folder where slave machines are there which is used by jenkins.create as below in this folder jenkins will run that job



Jenkins connect to machine and it checks executors are available or not if available then job runs otherwise it wont even though jenkins connected to machine.

Create label means group of machines in a single group with name label

If any one of the job wants machine to run is possible only when that machine under the same demo group otherwise it wont run the job.

Click on new node – new name – no. of executors – labels – remote root directory

Launch method through ssh

Host name —- hostname -i from master

Credentials - (jenkins)

Kind-ssh with private key

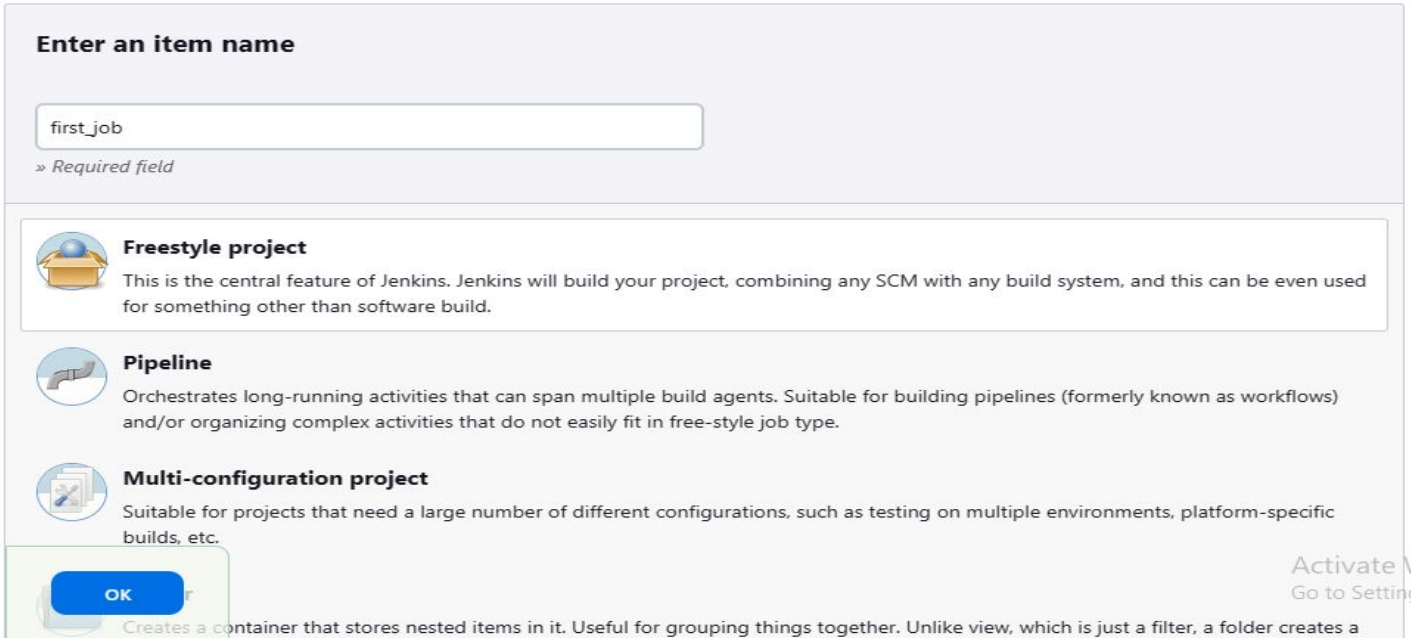
And give name and add pem.key(private key) in credentials add it finally

Select manually trusted key verification.save it

We created one node click on that to get sync

If we want to create another node again tahe new node and use node1 in it to get all info to node1 which node 1 have

Creating jobs



Where we want to run job — general

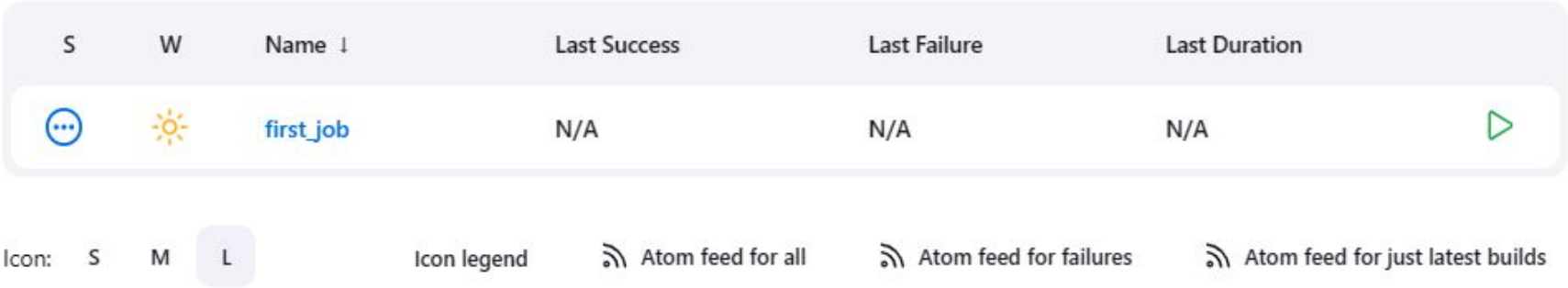
If we want to run the job of jenkins to connect any version control systems – SCM

When we want run the job (periodically,some scenarios) -- build trigger

What exactly we have to run – build

After u run the task what task we need to do – post build action

Job is created ….. Build now ….. Build history

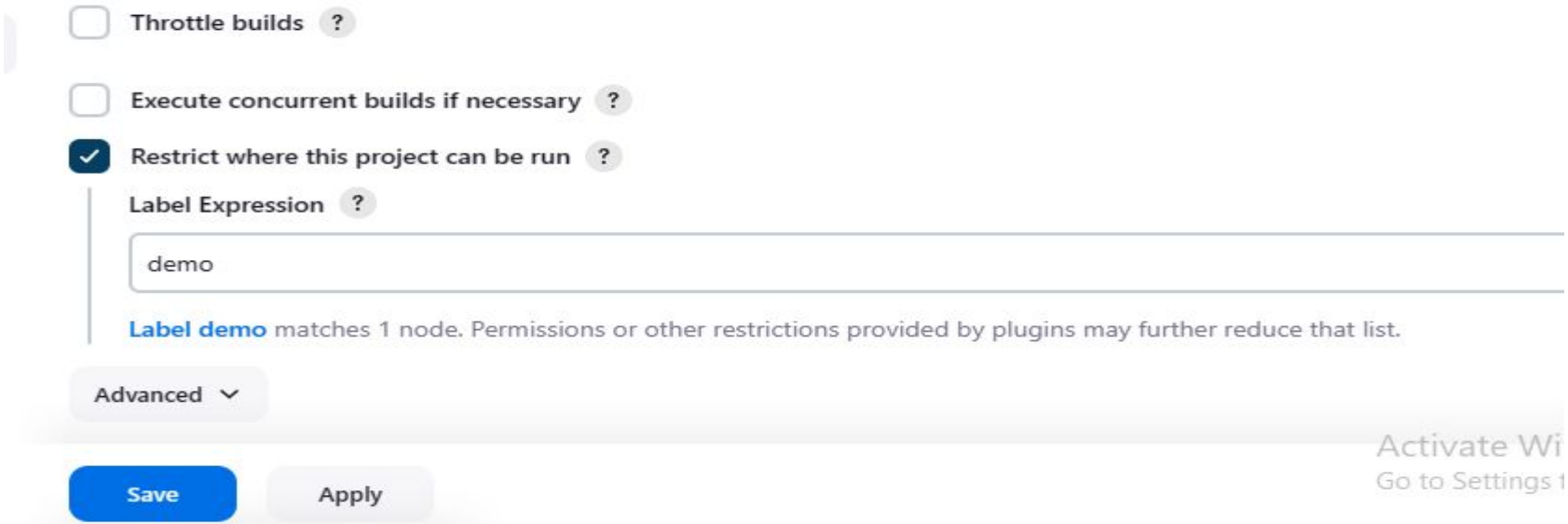


Click on build now to get console output

Console Output

```
Started by user admin
Running as SYSTEM
Building on the built-in node in workspace /var/lib/jenkins/workspace/first_job
[first_job] $ /bin/sh -xe /tmp/jenkins4146319082096168097.sh
+ echo ---------------
---------------
+ echo hi friends
hi friends
+ echo ---------------
---------------
Finished: SUCCESS
```

If we didnot assign to any machine means it run on master and we can also assign as below where it will run

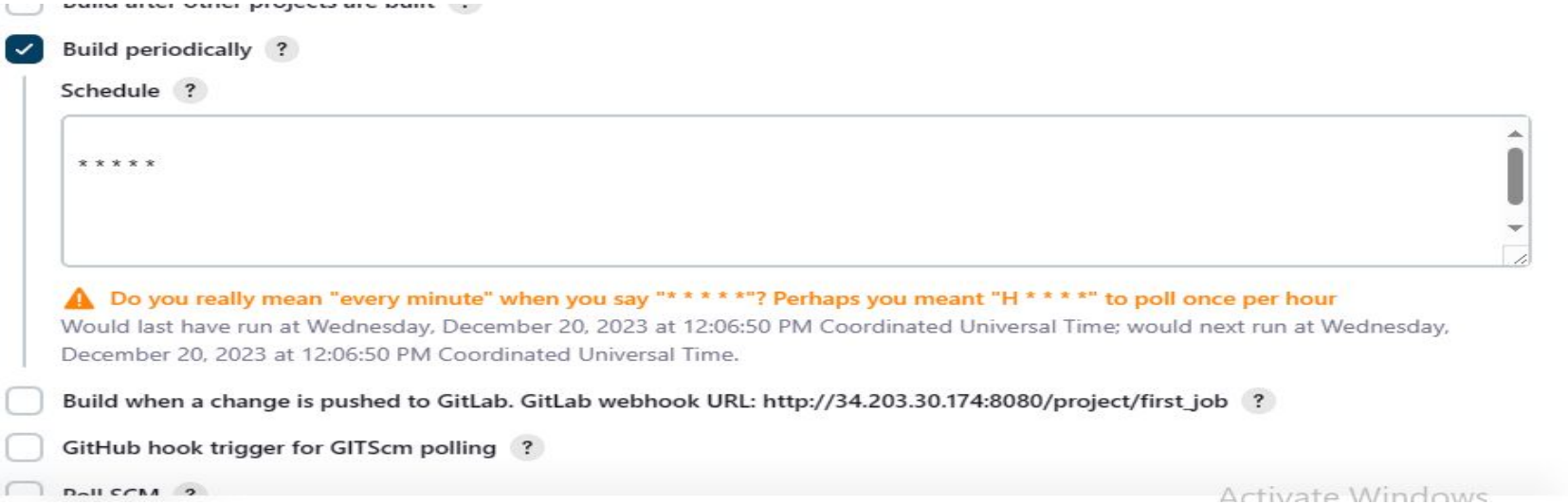


Now the console output be like

```
Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/first_job
[first_job] $ /bin/sh -xe /tmp/jenkins15762561790500283325.sh
+ echo ---------------
---------------
+ echo hi friends
hi friends
+ echo ---------------
---------------
Finished: SUCCESS
```

When it will be run is decided by build triggers

Periodically



0 12 21 1 1 ——-----> 0 min 12 hour 21 date 1 month monday

0 12 21 1 1,2,3,4,5 ——-----> 0 min 12 hour 21 date 1 month mon to fri

0 12 21-28 1 0-6 ——-----> 0 min 12 hour 21 to 28 date 1 month all week days

0 12 21-28 1 * ——-----> as above

0 12 * 1 * ——----->0 min 12 hour all days in a 1 month in all weeks

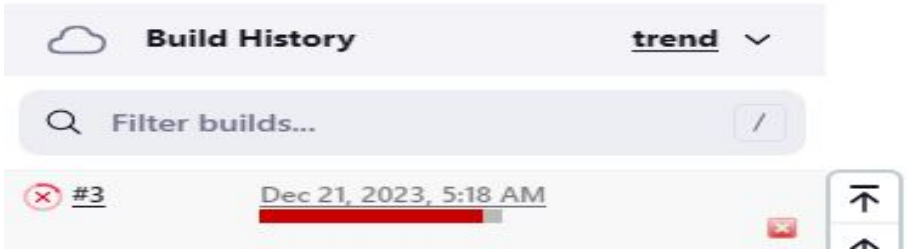
0 9,16 * 1* ——----->o min 9 and 4 time all days in a 1 month in all weeks

0 * * * * ——-----> 0 min every hour

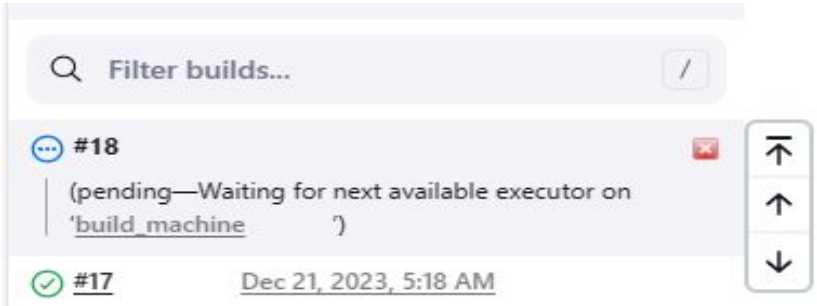
*/5 * * * * ——-----> every min once

* * * * * ——-----> every min

I have created one new job with sleep 30 statement in build … if i run that second job as below

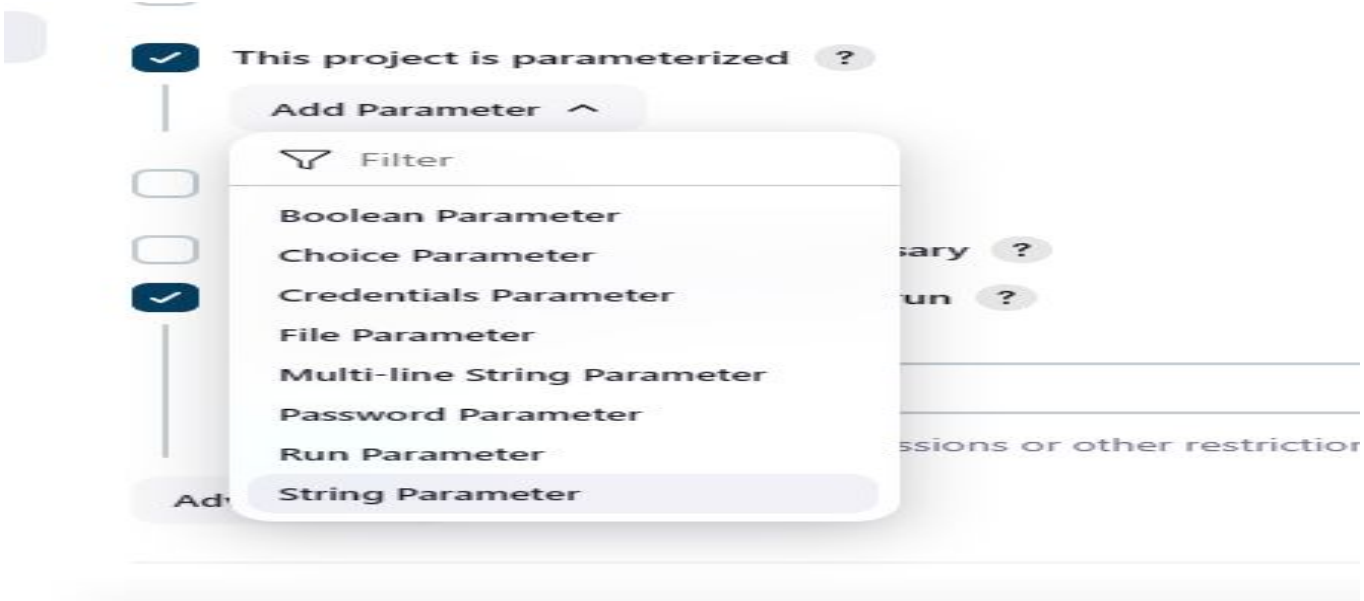


At the same time iam running first job i got below thing

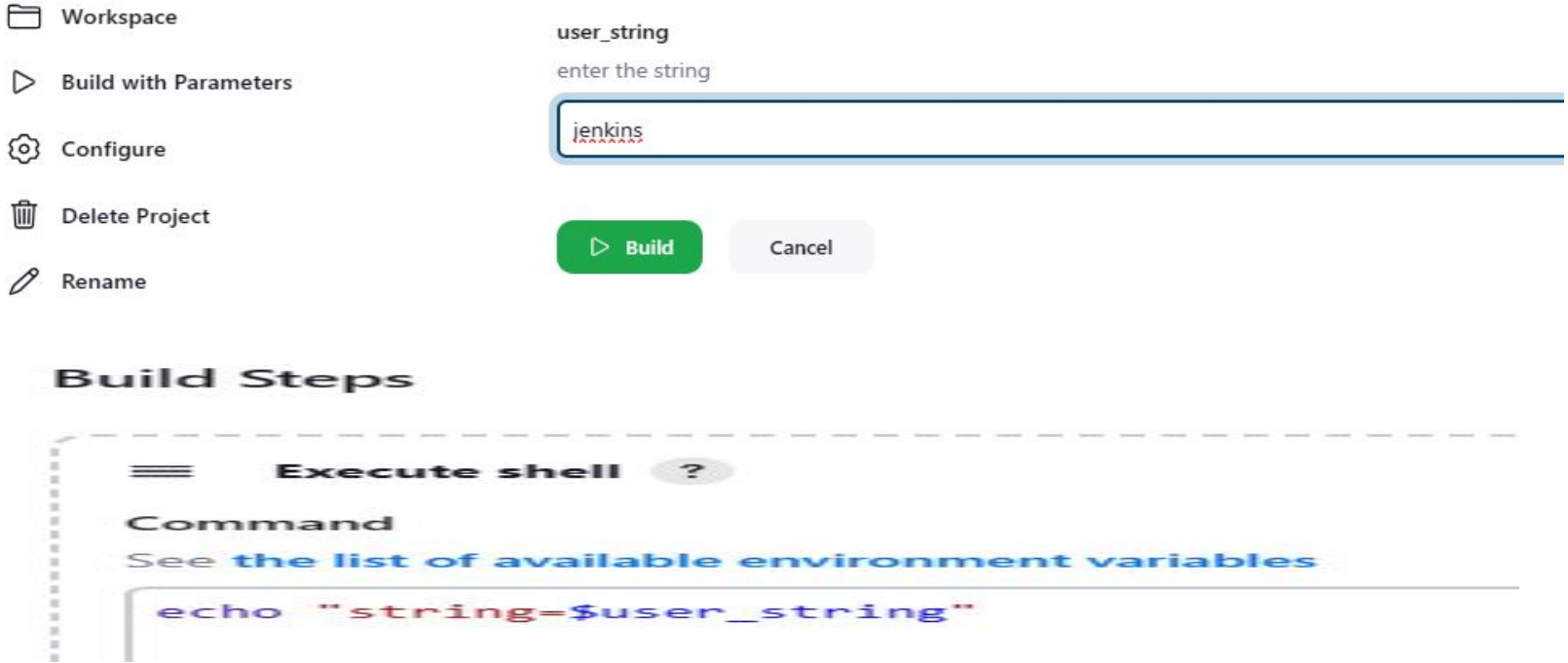


If machine is not available then job need to be wait for use that machine to run the job

Now taking inputs from user and build or run the job With in general



If the job is periodic then we cant give input all the time so it takes default name


Workspace
Build with Parameters
Configure
Delete Project
Rename
user_string
enter the string
jenkins
Build
Cancel
Build Steps
Execute shell
Command
See the list of available environment variables
echo "string=$user_string"

The output will be like this

Console Output

```
Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/first_job
[first_job] $ /bin/sh -xe /tmp/jenkins8503828154197154283.sh
+ echo string=jenkins
string=jenkins
Finished: SUCCESS
```

We can also give choice as input by selecting choice parameterized

Choice Parameter ?

Name ?

state

Choices ?

Possible
not possible

Description ?

enter the state

user_string

enter the string

default_string

state

enter the state

Possible

Possible
not possible

Build Cancel

The output will be like this

Console Output

```
Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/first_job
[first_job] $ /bin/sh -xe /tmp/jenkins8201237542472561967.sh
+ echo string=default_string --extra-vars state=Possible
string=default_string --extra-vars state=Possible
Finished: SUCCESS
```

Now select boolean to give true or false defaultly it is true …and edit it in build for print the output

Project first_job

This build requires parameters:

user_string

enter the string

default_string

state

enter the state

Possible

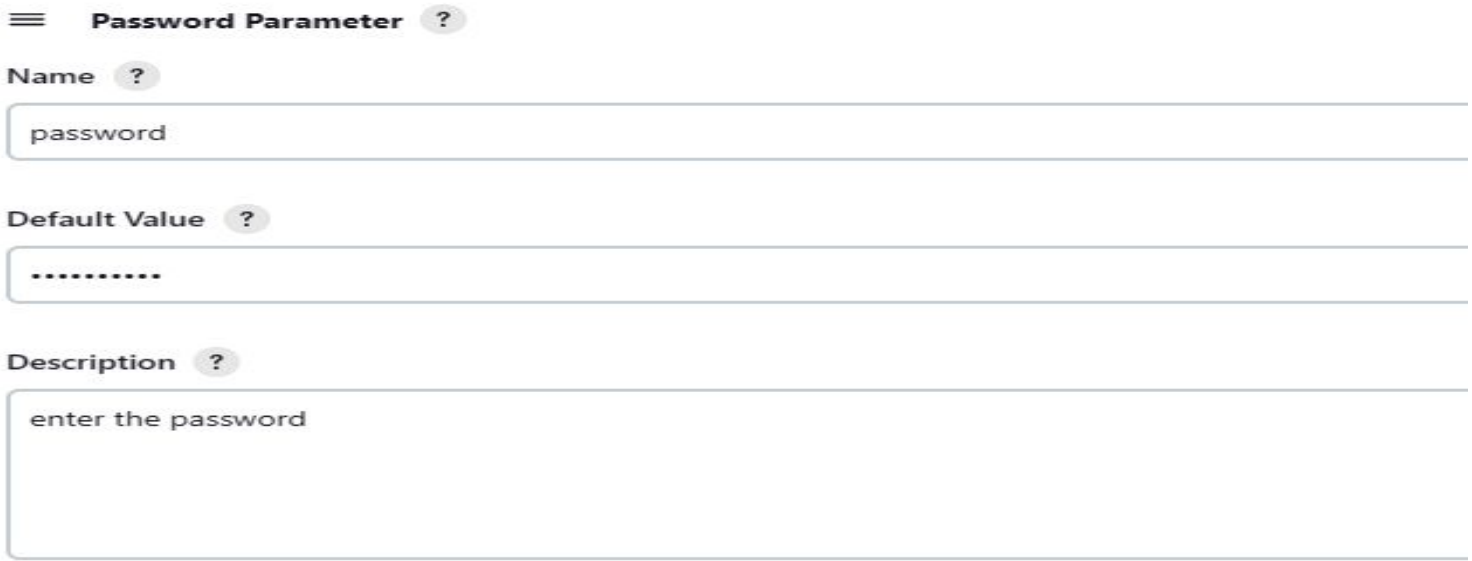
☑ **option**

want to dispaly true or false

The output will be like this

```
Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/first_job
[first_job] $ /bin/sh -xe /tmp/jenkins15871549887388270544.sh
+ echo string: default_string --extra-vars state=Possible
string: default_string --extra-vars state=Possible
+ echo option : true
option : true
Finished: SUCCESS
```

We can also give password



This build requires parameters:

user_string

enter the string

default_string

state

enter the state

Possible

option

want to dispaly true or false

password

enter the password

Concealed

Change Password

Build

Cancel

The output will be like this

```
Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/first_job
[first_job] $ /bin/sh -xe /tmp/jenkins3377500542970597465.sh
+ echo string: default_string --extra-vars state=Possible
string: default_string --extra-vars state=Possible
+ echo option : true
option : true
+ echo password : nopassword
password : nopassword
Finished: SUCCESS
```

Post build actions

Select build other projects

→If the first build is not stable then the second build will not run depends upon given condition it will works.

→With in build option, if we give exit 1 as command then 1st build will not execute because exit 0 command only will represent that 1st build is stable other than that it will assume like 1st job will not stable.

→ we can call other job within present job in this way

→here 2nd job is downstream

The output will be like this

Console Output

```
Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/first_job
[first_job] $ /bin/sh -xe /tmp/jenkins17540549000082588895.sh
+ echo string: default_string --extra-vars state=Possible
string: default_string --extra-vars state=Possible
+ echo option : true
option : true
+ echo password : nopassword
password : nopassword
Triggering a new build of second_job
Finished: SUCCESS
```

→let us assume that we 2 jobs , as we know that 1st job called 2nd job to execute.

→if 2nd job has parameterized ,individually we can give parameters while build 2nd job only but here we downstream it with 1st job

→ we need parameterized trigger plugin so install it in dashboard

→ first of all do string parameterized for second job

→ after installed above plugin ,on post build actions select trigger parameterized build on other projects and select predefined parameters , give name to it based on second job variable name then it reflects it in that job.

Trigger parameterized build on other projects ?

Build Triggers

Projects to build ?

second_job,

No such project 'second'. Did you mean 'second_job'?

Trigger when build is ?

Stable

Trigger build without parameters ?

Predefined parameters

Parameters ?

new_name=suma

The output will be like this for 2nd job

```
Started by upstream project "first_job" build number 26
originally caused by:
 Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/second_job
[second_job] $ /bin/sh -xe /tmp/jenkins15247226639377715764.sh
+ echo its running
its running
+ echo my name is suma
my name is suma
Finished: SUCCESS
```

→we can also dynamically call the parameter which is declared in 1st job here user_string is 1st job parameter

→ the output will be like this

```
+ echo its running
its running
+ echo my name is suma-default_string
my name is suma-default_string
Finished: SUCCESS
```

→whatever the parameters in 1st job those will be copied to second job but both parameters names must be matched with in 1st and 2nd jobs. For this select current build parameters in 1st job

→ we need to remove predefined parameters in 1st job and copy the parameter in 1st job

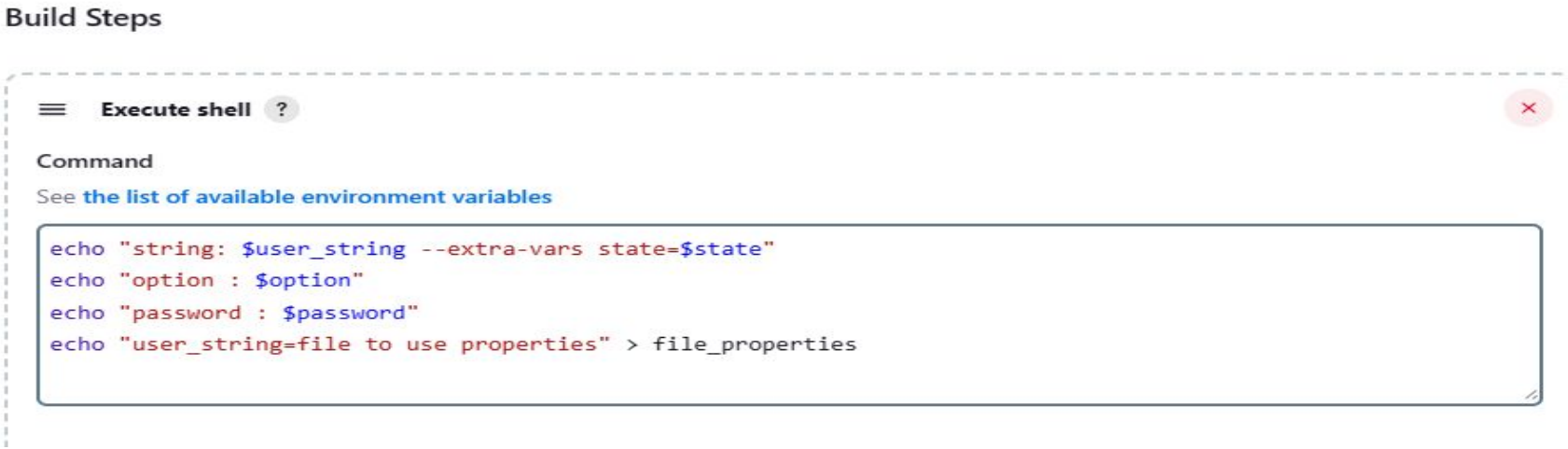
→ now add that parameter to 2nd job and update the build for printing statement.

2nd job output will be like this

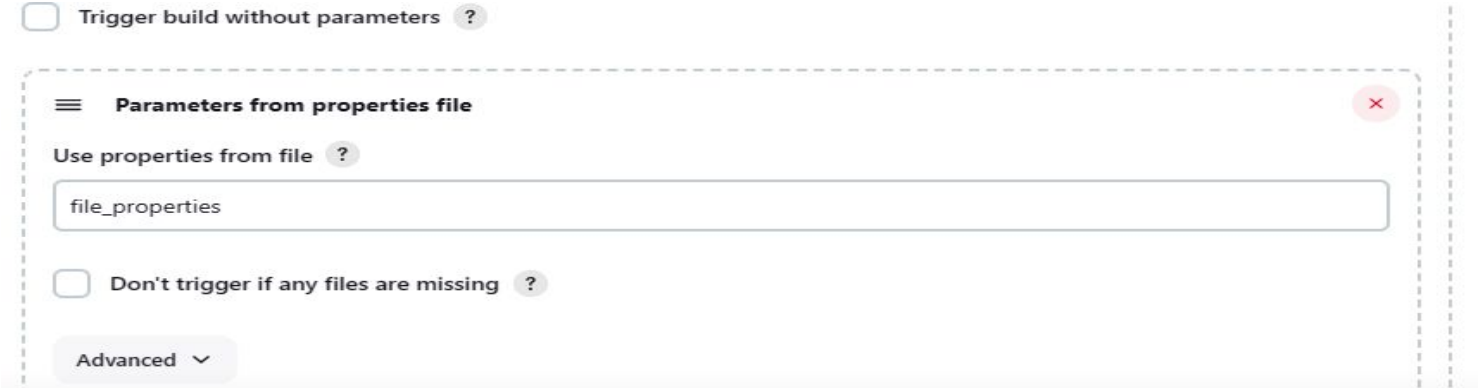
```
Started by upstream project "first_job" build number 31
originally caused by:
 Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/second_job
[second_job] $ /bin/sh -xe /tmp/jenkins6095129031414225303.sh
+ echo its running
its running
+ echo my name is noname
my name is noname
+ echo my name is hema
my name is hema
Finished: SUCCESS
```

By through file properties we can call parameters from 1st job to 2nd job

I dont have any file so create a file dynamically as below



Now select that option in post build actions



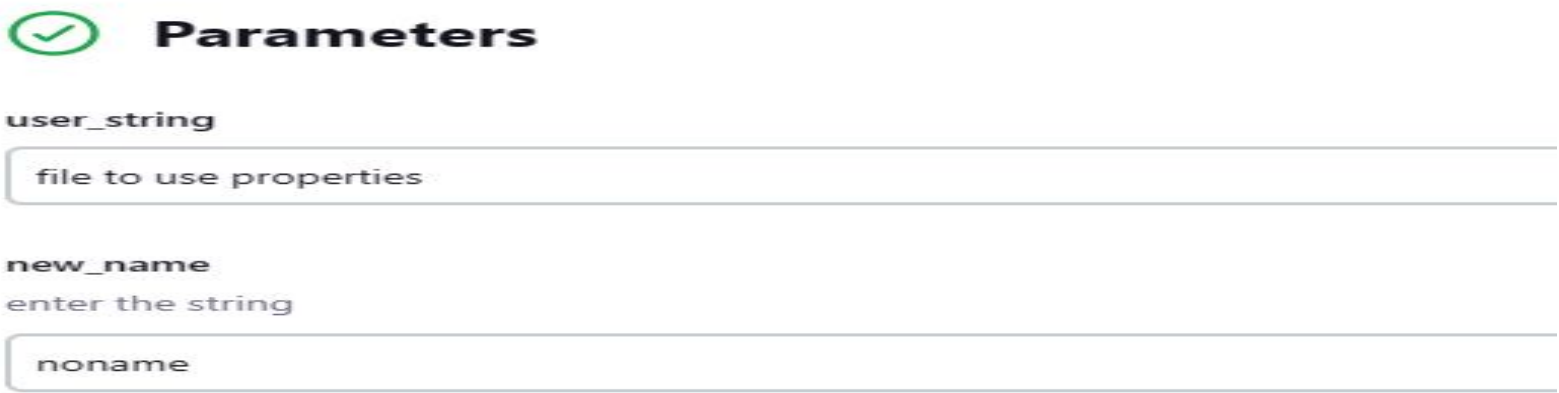
Now run 1st job that is reflected to 2nd job and output will be

Console Output

```
Started by upstream project "first_job" build number 34
originally caused by:
 Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/second_job
[second_job] $ /bin/sh -xe /tmp/jenkins7439065573024615741.sh
+ echo its running
its running
+ echo my name is noname
my name is noname
+ echo my name is file to use properties
my name is file to use properties
Finished: SUCCESS
```

Within workspace we can see that file

First we have single parameter in 2nd job but after creating file and invoked it to 2nd job then 2nd job will have 2 parameters



Build on same node option is also available in post build action

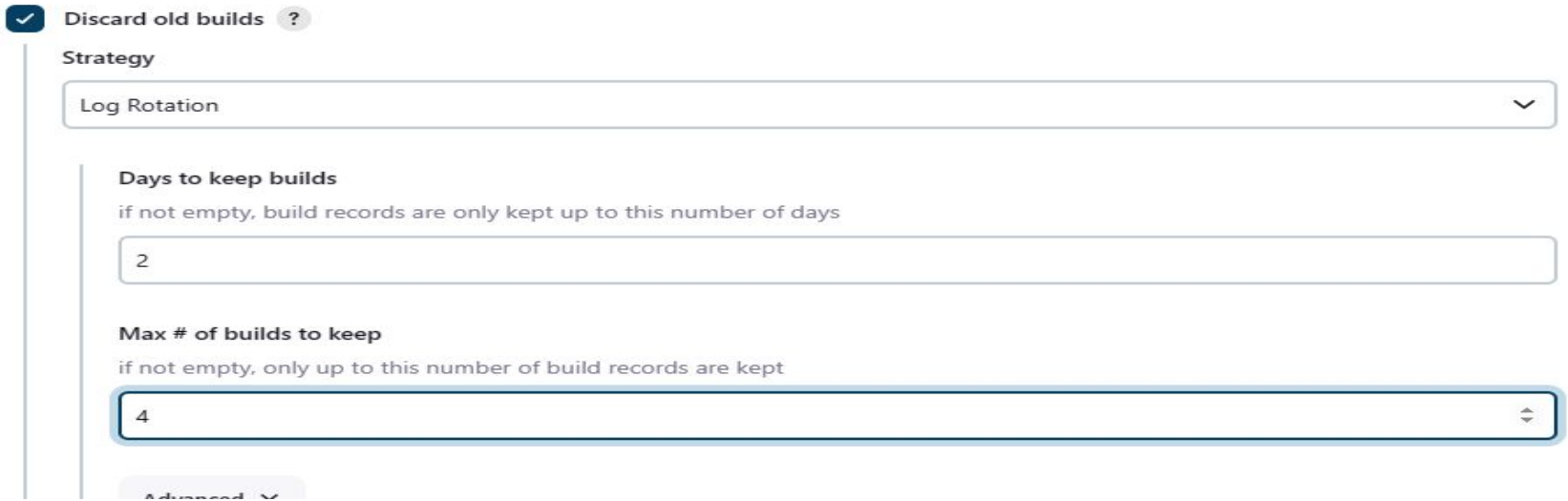
It is used to run the jobs which are in parent as well as child (1st and 2nd)on a same machine.

→the advantage of jenkins is to store all the history logs of the builds.

→go to putty and give cd var/lib/jenkins then we can get all folders, files plugins everything —- to get only folders—ls -l |grep ^d

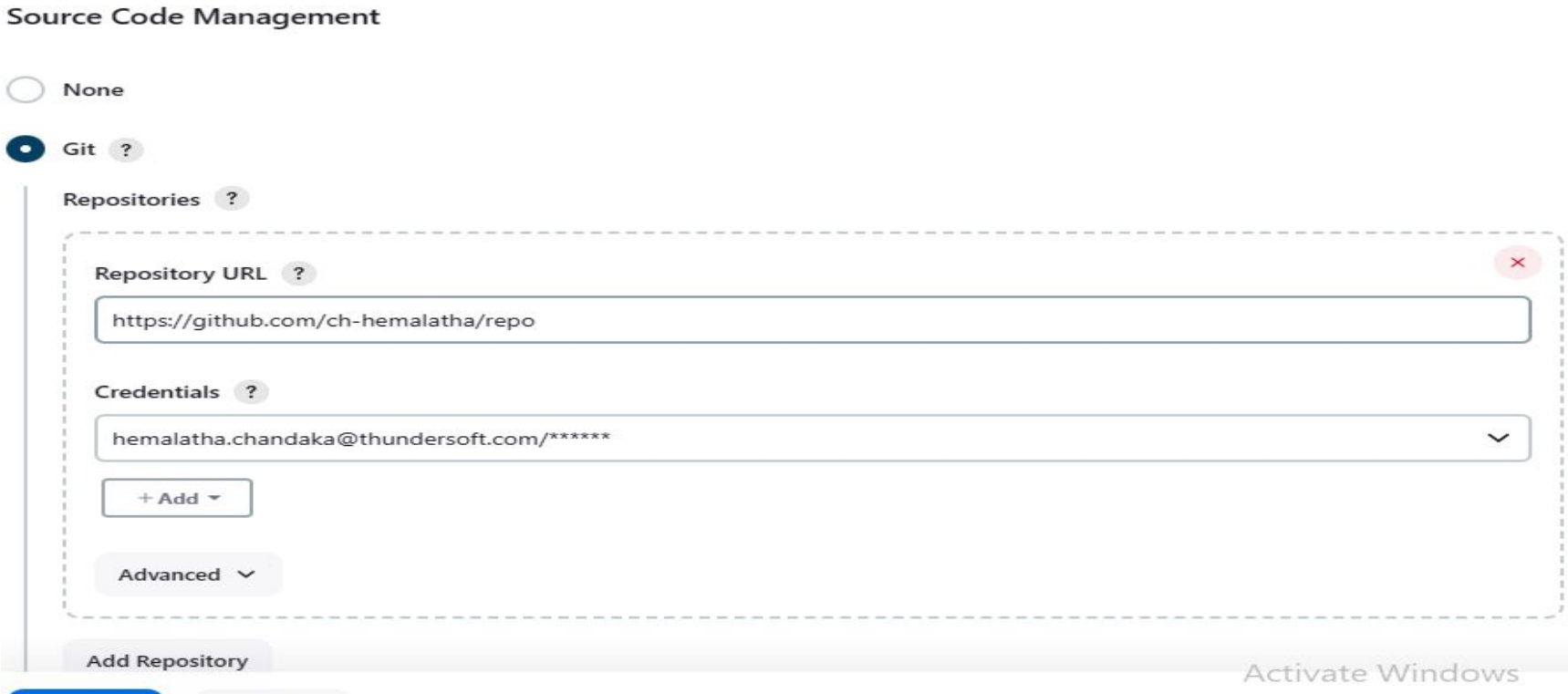
→we can see all jobs,plugins ,builds, logs , configuration files etc.,

Within general we can decide how many days build can be visible and how many latest build s can be visible as below



scm(source code management)

→it is used to clone the data from git hub or git lab and those data will be stored in workspace



Give ls in build then output will be as below after ls we get no of files in that folder

```
Started by user admin
Running as SYSTEM
Building remotely on build_machine (demo) in workspace /tmp/jenkins/workspace/scm_job
The recommended git tool is: NONE
using credential git_repo
Cloning the remote Git repository
Cloning repository https://github.com/ch-hemalatha/repo
 > /usr/bin/git init /tmp/jenkins/workspace/scm_job # timeout=10
Fetching upstream changes from https://github.com/ch-hemalatha/repo
 > /usr/bin/git --version # timeout=10
 > git --version # 'git version 2.34.1'
using GIT_ASKPASS to set credentials
 > /usr/bin/git fetch --tags --force --progress -- https://github.com/ch-hemalatha/repo +refs/heads/*:refs/remotes/origin/* #
timeout=10
 > /usr/bin/git config remote.origin.url https://github.com/ch-hemalatha/repo # timeout=10
 > /usr/bin/git config --add remote.origin.fetch +refs/heads/*:refs/remotes/origin/* # timeout=10
Avoid second fetch
 > /usr/bin/git rev-parse refs/remotes/origin/master^{commit} # timeout=10
Checking out Revision ff2a81055e63200608e93c47f5cfc01a01e461b4 (refs/remotes/origin/master)
 > /usr/bin/git config core.sparsecheckout # timeout=10
 > /usr/bin/git checkout -f ff2a81055e63200608e93c47f5cfc01a01e461b4 # timeout=10
Commit message: "dictionary methods"
 > /usr/bin/git rev-list --no-walk ff2a81055e63200608e93c47f5cfc01a01e461b4 # timeout=10
[scm_job] $ /bin/sh -xe /tmp/jenkins16098213995169580453.sh
+ ls
```

→ Now consider one master download java and jenkins in it and generate ssh key in it(ssh-keygen -t rsa).

→copy that id_rsa.pub which is in .ssh folder with in the master

→go to slave and open authorized key file and by append that id_rsa.pub and close it and come back to master

→with in master copy give ssh ubuntu@host id

Or

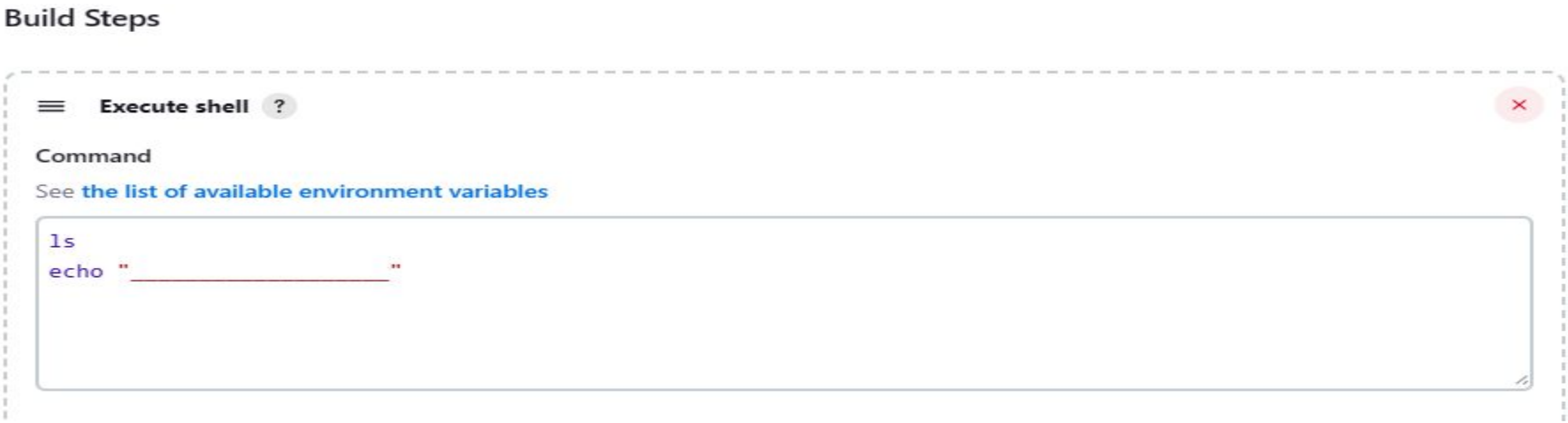
→ instead of above 3 steps just give below command

Ssh-copy-id ubuntu@hostid

→same process for any no. of slaves connected to master …..for suppose i have created 2 slaves (2 machines)

→now coming to jenkins page through master public ip addr to create 2 nodes for 2 slave machines

Now create one job and use scm method by cloning git hub link and perform the operations.



Now save it. The output will be like it is cloned all the files and list them because we have given ls command.

We have given 2 machines(created 2 nodes) for each server instance. Created single label for 2 machines. While running a job it checks for available machine out of 2 machines which are created under same group or label.

Periodically run the build

Specify the branch

We can specify periodically when the job will run

Build Triggers

- [ ] Trigger builds remotely (e.g., from scripts) ?
- [ ] Build after other projects are built ?
- [x] Build periodically ?

Schedule ?

```
0 13 * * *
```

In build statements will be

Execute shell ?

Command

See the list of available environment variables

```
echo "start build"
ls
echo "stop build"
```

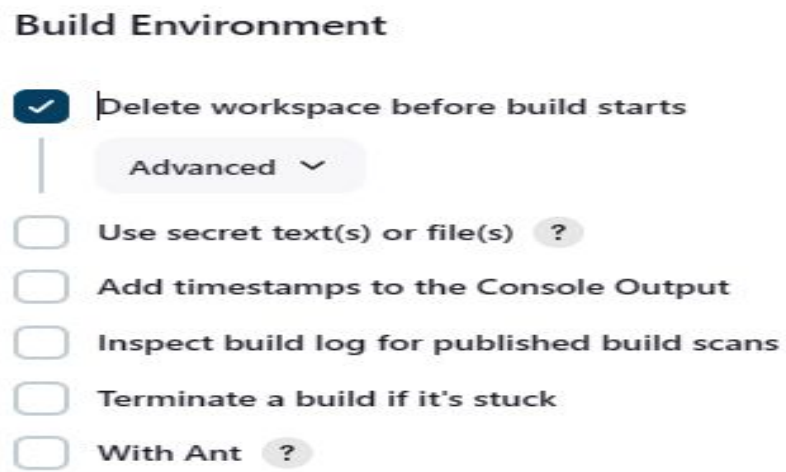
Now output will be

```
Started by user admin
Running as SYSTEM
Building remotely on node1 (label1) in workspace /home/ubuntu/new_jen/workspace/scm_job1
```

```
First time build. Skipping changelog.
[scm_job1] $ /bin/sh -xe /tmp/jenkins9462724087238726 49.sh
+ echo start build
start build
+ ls
add.c
praciced cherry_pick command
practice of git amend command
+ echo stop build
stop build
Finished: SUCCESS
```

Within workspace also we can get all the files within that specifies branch

→normally we get incremental build but we need full build for that we need to enable the option in build environment



Jenkins pipeline

→pipeline is a group of jobs which are interlinked to each other in a sequence manner.

→jenkins pipeline isa combination of plugins that supports integration and implementation of continuous delivery

→pipeline provides a set of tools for simple and complex deliveries as code via pipeline domain specific language(groovy dsl)

→instead of building several jobs just code the entire workflow as single script called pipeline as code.

→jenkinsfile is a text file that stores the entire workflow as code and it can be checked it into a scm, this enables the developers to access, edit and check the code at any time.

→jenkinsfile can written in

1. Scripted - traditional way ,stricter groovy based syntax,written on jenkins UI interface
2. Declarative - more recent features, richer syntatical features,writing and reading pipeline code easier.

Pipeline Concepts

Pipeline:

- This is a user defined block which contains all the processes such as build, test, deploy, etc.
- It is a collection of all the stages in a Jenkinsfile. All the stages and steps are defined within this block.
- It is the key block for a declarative pipeline syntax.

Syntax:

```
pipeline {
        // DSL
}
```

Node/Agent:

- A node is a machine that executes an entire workflow. It is a key part of the scripted pipeline syntax.
- A agent is used on declarative pipeline syntax

Syntax:

```
pipeline {
    agent {    // DSL      }
}
```

Reason for going freestyle to pipeline

→in freestyle we can create multiple job individually but those are not not easily reusable

→maintanence is also a prlbm .dedicated way of running and we cant customize

→instead of giving all job individually we can integrate all the jobs in a single pipeline code . then it will define where and what it has to be run by each job .

→we can decide easily and modify the configurations within the code.

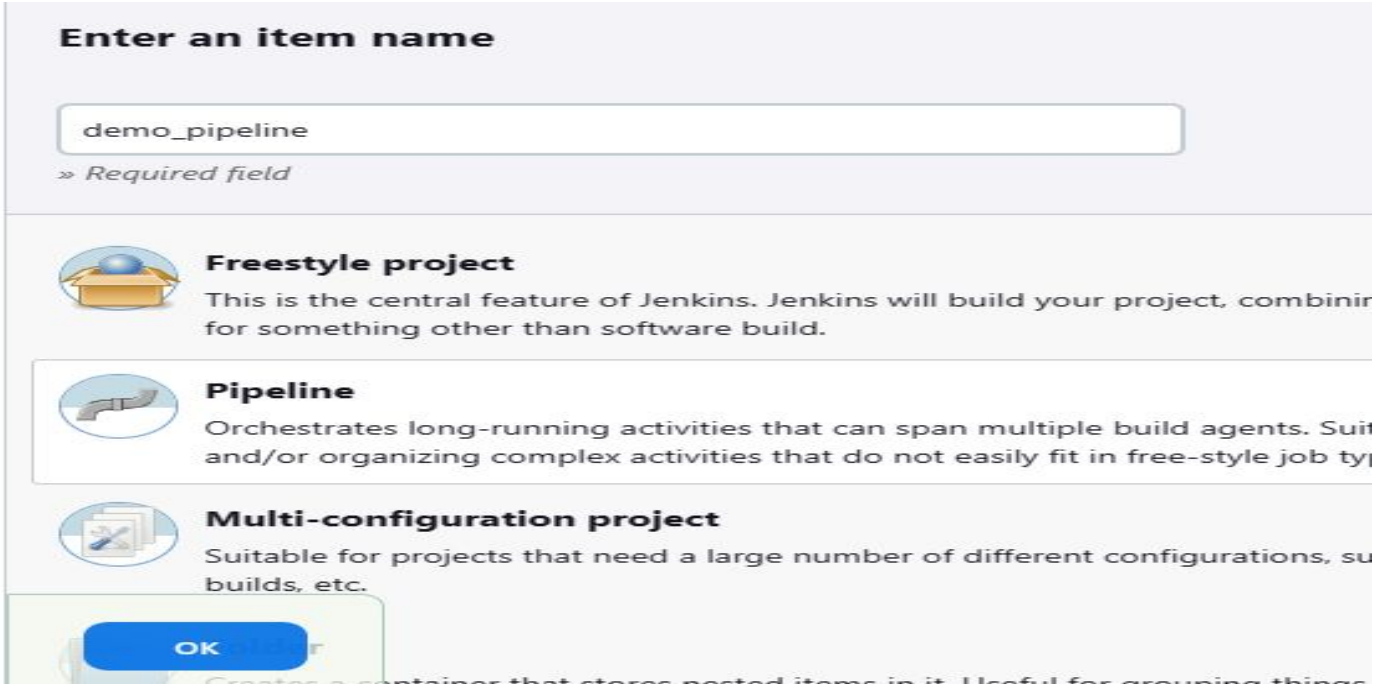
jenkinsfile

```
Pipeline{                          —-        set of freestyle jobs
 Agent { }                         —-        machine where to run the job(it is global block available for all stages
 Stages{                           —-        stages block (within this declare fres style jobs
   stage(“name of the job”){       —-        1st job name
      Steps { }                    —-        what task it will do
     }
   stage(“name of job”){           —         2nd job
      Steps {}                     what task it will do
     }
 }
}
```

If we need to give deff agents for diff job jobs means within stages we have to give agents then it becomes local.

Example for pipeline job

Now create a job (pipeline)

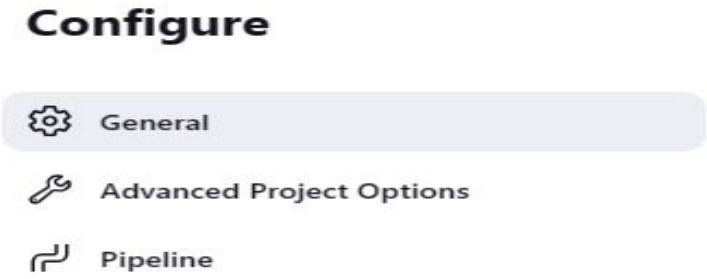


Now we get 3 options only those are

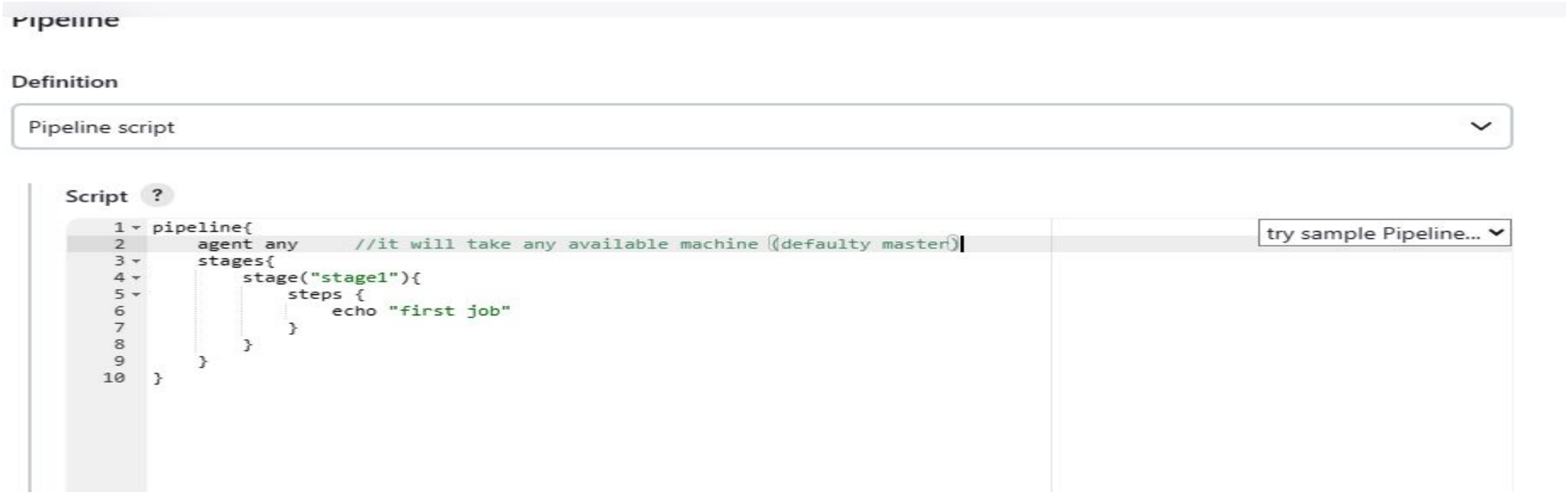
Within pipe line we have 2 options

Through scm means take the jenkinsfile from git hub

Through script means we can directly write the script there only



Now write the script manually. Save it and build now



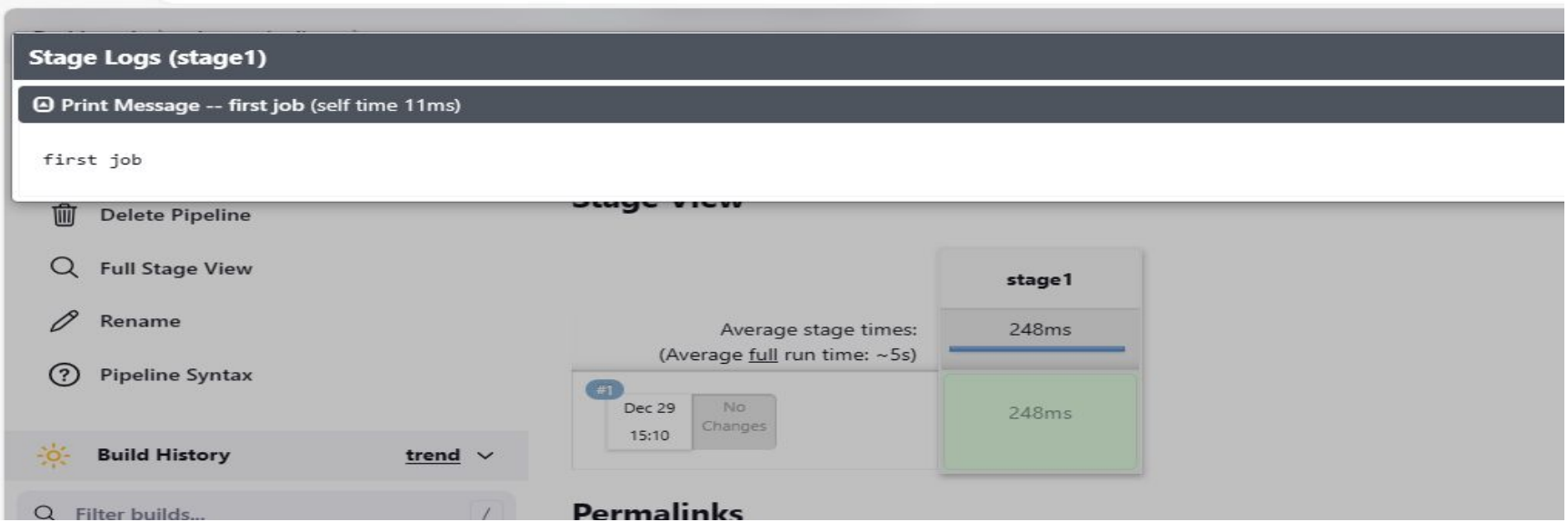
The output will be like this

Each stages indicates each job

The console output will be like


```
Started by user admin
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/demo_pipeline
[Pipeline] {
[Pipeline] stage
[Pipeline] { (stage1)
[Pipeline] echo
first job
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

We can also see the output like below as well



Writing script for 2 jobs

Definition

Pipeline script

Script ?

```
pipeline{
    agent {label "label1"}
    stages{
        stage("stage1"){
            steps {
                echo "first job"
            }
        }
        stage("stage2"){
            steps {
                echo "second job"
            }
        }
    }
}
```

```
Started by user admin
[Pipeline] Start of Pipeline
[Pipeline] node
Running on node2 in /home/ubuntu/new_jen2/workspace/demo_pipeline
[Pipeline] {
[Pipeline] stage
[Pipeline] { (stage1) (hide)
[Pipeline] echo
first job
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (stage2)
[Pipeline] echo
second job
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Diff agents with diff stages

Definition

Pipeline script

Script ?

```
pipeline{
    agent none
    stages{
        stage("stage1"){
            agent {label "label1"}
            steps {
                echo "first job"
            }
        }
        stage("stage2"){
            agent any
            steps {
                echo "second job"
            }
        }
    }
}
```

```
Started by user admin
[Pipeline] Start of Pipeline
[Pipeline] stage
[Pipeline] { (stage1)
[Pipeline] node
Running on node1 in /home/ubuntu/new_jen/workspace/demo_pipeline
[Pipeline] {
[Pipeline] echo
first job
[Pipeline] }
[Pipeline] // node
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (stage2)
[Pipeline] node
Running on node2 in /home/ubuntu/new_jen2/workspace/demo_pipeline
[Pipeline] {
[Pipeline] echo
second job
[Pipeline] }
[Pipeline] // node
[Pipeline] }
[Pipeline] // stage
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Instead of running 1st job on workspace it runs on customworkspace

```
Pipeline{
    agent none
    stages{
        stage("stage1"){
            agent {
                node { label "label1"
                customWorkspace "/tmp"
                }
```

```
}
        steps {
            echo "first job"
        }
    }
    stage("stage2"){
        agent any
        steps {
            echo "second job"
        }
    }
  }
}
```

```
Started by user admin
[Pipeline] Start of Pipeline
[Pipeline] stage
[Pipeline] { (stage1)
[Pipeline] node
Running on node1 in /home/ubuntu/new_jen/workspace/demo_pipeline
[Pipeline] {
[Pipeline] ws
Running in /tmp
[Pipeline] {
[Pipeline] echo
first job
[Pipeline] }
[Pipeline] // ws
[Pipeline] }
[Pipeline] // node
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (stage2)
[Pipeline] node
Running on node2 in /home/ubuntu/new_jen2/workspace/demo_pipeline
[Pipeline] {
[Pipeline] echo
second job
```

Using environmental variables

```
pipeline {
    agent { label 'demo' }
    environment {
        MYNAME = 'Adam'
    }
    stages {
        stage('Stage1') {
            steps {
                sh "echo 'Your name: $MYNAME'"
            }
        }
        stage('Stage2') {
            steps {
                echo env.MYNAME
            }
        }
    }
```

```
[Pipeline] node
Running on node2 in /home/ubuntu/new_jen2/workspace/demo_pipeline
[Pipeline] {
[Pipeline] withEnv
[Pipeline] {
[Pipeline] stage
[Pipeline] { (stage1)
[Pipeline] sh
+ echo my name is hemalatha
my name is hemalatha
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (stage2)
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/demo_pipeline
[Pipeline] {
[Pipeline] echo
hemalatha
[Pipeline] }
```

Example for local and global env variables

Script ?

```
pipeline{
    agent {label "label1"}
    environment{name = "global"}
    stages{
        stage("stage1"){
            environment{name = "local"}
            steps {
                sh "echo 'my name is $name' "
            }
        }
        stage("stage2"){
            agent any
            steps {
                echo env.name
            }
        }
    }
}
```

First preference is given to local , if local is not available then it given to global

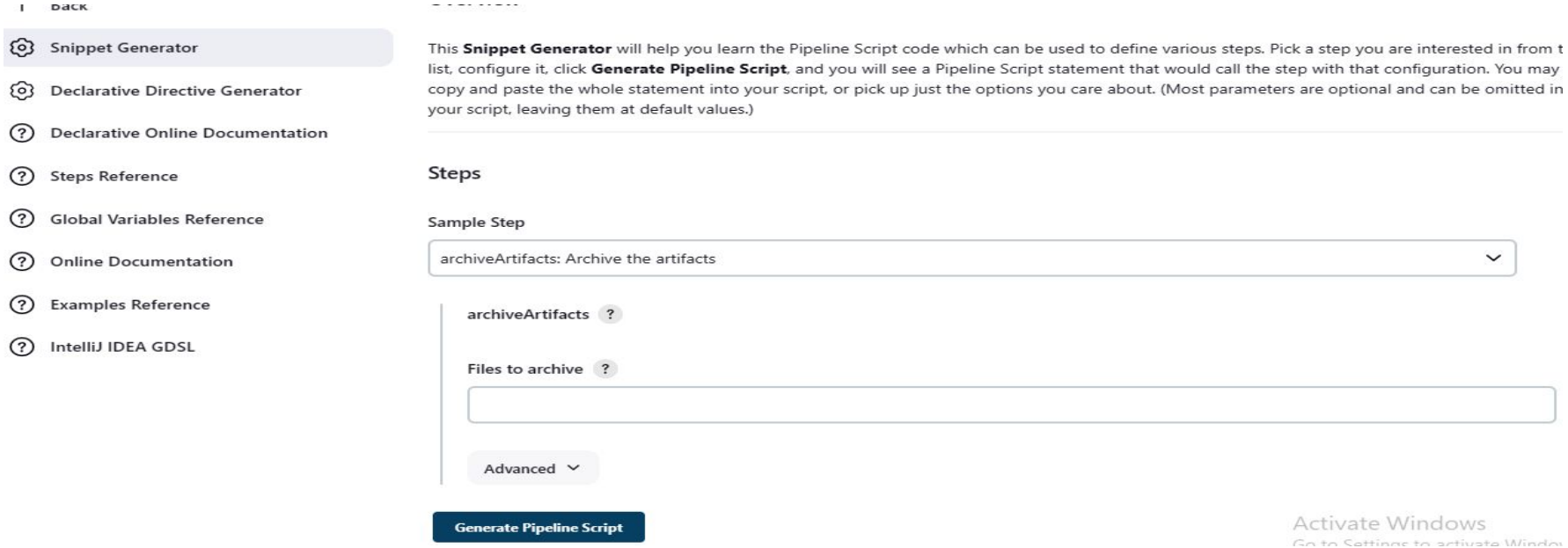
```
[Pipeline] sh
+ echo my name is local
my name is local
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (stage2)
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/demo_pipeline
[Pipeline] {
[Pipeline] echo
global
[Pipeline] }
[Pipeline] // node
```

Using parameters

```
pipeline{
    agent {label "label1"}
    parameters{
        string(name:"person", defaultValue: "hema", description: "enter the name")
        text(name:"biography", defaultValue: " ", description: "enter the name")
        booleanParam(name:"toggle", defaultValue: "true", description: "enter the toggle value")
        choice(name:"CHOICE", choices: ["1","2","3"], description: "enter the choice")
        password(name:"pwd", defaultValue: "no_pwd", description: "enter the password")
        file(name:"file_prop",description: "enter the file name")
    }
    stages{
        stage("stage1"){
            steps {
                echo "hello ${params.person}"
                echo "biography : ${params.biography}"
                echo "boolean option : ${params.toggle}"
                echo "choice : ${params.CHOICE}"
                echo "password : ${params.pwd}"
                echo "filename : ${params.file_prop}"
            }
        }
    }
}
```

```
Running on node2 in /home/ubuntu/new_jen2/workspace/demo_pipeline
[Pipeline] {
[Pipeline] stage
[Pipeline] { (stage1)
[Pipeline] echo
hello hemalatha
[Pipeline] echo
biography : good biography
[Pipeline] echo
boolean option : true
[Pipeline] echo
choice : 2
[Pipeline] echo
Warning: A secret was passed to "echo" using Groovy String interpolation, which is insecure.
                 Affected argument(s) used the following variable(s): [pwd]
                 See https://jenkins.io/redirect/groovy-string-interpolation for details.
password : 98789
[Pipeline] echo
filename : null
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
```

→when we created pipeline job we have seen pipeline syntax,it is used generate syntax only for step block



Option block

It will give lastest 5 builds

```
pipeline {
    agent { label "label1" }
    options {
        buildDiscarder(logRotator(numToKeepStr: '5'))
    }
    stages {
        stage("stage1") {
            steps {
                echo "first job"
            }
        }
    }
}
```

Full Stage View

Rename

Pipeline Syntax

Build History trend

Filter builds... /

#23
Dec 29, 2023, 12:02 PM

#22
Dec 29, 2023, 12:00 PM

#21
Dec 29, 2023, 11:59 AM

#20
Dec 29, 2023, 11:57 AM

#19
Dec 29, 2023, 11:55 AM

Atom feed for all Atom feed for failures

Retry option

→this option is not available in freestyle jobs

It retry for 3 times if stage is failed even

Though it fails it wont try again.

```
pipeline {
    agent { label "label1" }
    options {
       retry(3)
    }
    stages {
        stage("stage1") {
            steps {
                sh "sleep 10;exit 1"
            }
        }
    }
}
```

2nd method

Script ?

```
pipeline {
    agent { label "label1" }
    options {
       retry(3)
    }
    stages {
        stage("stage1") {
            steps {
                sh "echo hello"
            }
        }
        stage("stage2") {
            steps {
                sh "sleep 10;exit 1"
            }
        }
    }
}
```

Timeout option

It runs the stage for species time only after that it automatically terminates

```
pipeline {
    agent { label "label1" }
    options {
        timeout(time: 5,unit: "SECONDS")
    }
    stages {
        stage("stage1") {
            steps {
                sh "sleep 10"
            }
        }
    }
}
```

	stage1	stage2	stage1	stage2	stage1	stage2
Average stage times:	1s	15s	0ms	0ms	0ms	0ms
#29 Dec 29 18:01 No Changes	5s aborted					
#28						

```
Running on node2 in /home/ubuntu/new_jen2/workspace/demo_pipeline
[Pipeline] {
[Pipeline] timeout
Timeout set to expire in 5 sec
[Pipeline] {
[Pipeline] stage
[Pipeline] { (stage1)
[Pipeline] sh
+ sleep 10
Cancelling nested steps due to timeout
Sending interrupt signal to process
Terminated
script returned exit code 143
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // timeout
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Timeout has been exceeded
org.jenkinsci.plugins.workflow.actions.ErrorAction$ErrorId: 7b88686d-d6be-4259-970c-f6c315ac1bb5
Finished: ABORTED
```

2nd method

```
pipeline {
    agent { label "label1" }
    options {
        timeout(time: 15,unit: "SECONDS")
    }
    stages {
        stage("stage1") {
            steps {
                sh "sleep 10"
            }
        }
         stage("stage2") {
            steps {
                sh "sleep 10"
            }
        }
    }
}
```

	stage1	stage2	stage1	stage2	stage1	stage2
Average stage times:	2s	13s	0ms	0ms	0ms	0ms
#31 Dec 29 18:05 No Changes	10s	5s aborted				
#30						

Timestamp option

```
pipeline {
    agent { label "label1" }
    options {
        timestamps()
        timeout(time: 15,unit: "SECONDS")
    }
    stages {
        stage("stage1") {
            steps {
                sh "sleep 10"
            }
        }
         stage("stage2") {
            steps {
                sh "sleep 10"
            }
        }
    }
```

```
Running on node2 in /home/ubuntu/new_jen2/workspace/demo_pipeline
[Pipeline] {
[Pipeline] timestamps
[Pipeline] {
[Pipeline] timeout
12:40:50  Timeout set to expire in 15 sec
[Pipeline] {
[Pipeline] stage
[Pipeline] { (stage1)
[Pipeline] sh
12:40:51  + sleep 10
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (stage2)
[Pipeline] sh
12:41:01  + sleep 10
12:41:05  Cancelling nested steps due to timeout
12:41:05  Sending interrupt signal to process
12:41:06  Terminated
12:41:06  script returned exit code 143
[Pipeline] }
```

Disableconcurrent option

→normal we can execute same job for multiple times simultaneously … to avoid this we can use this option…if we run multiple times same job after given this option … it is under pending only

```
pipeline {
    agent { label "label1" }
    options {
        disableConcurrentBuilds()
        timestamps()
        timeout(time: 25,unit: "SECONDS")
    }
    stages {
        stage("stage1") {
            steps {
                sh "sleep 10"
            }
        }
         stage("stage2") {
            steps {
                sh "sleep 10"
            }
        }
```

Delete Pipeline

Full Stage View

Rename

Pipeline Syntax

Build History trend

Filter builds... /

#39

(pending—Build #38 is already in progress (ETA: 10 sec))

#38

Dec 29, 2023, 12:53 PM

Stage View

	stage1	stage2	stage1	stage2	stage1	stage2
Average stage times: (Average full run time: ~21s)	5s	11s	0ms	0ms	0ms	0ms
#38 Dec 29 18:23 No Changes	2s					
#37 Dec 29 18:23 No Changes	10s	10s				
#36 Dec 29 18:23 No Changes	10s	10s				

Using triggers

We can schedule it when it will run ….. Below job will run every in every hour every date and ever week day in every month

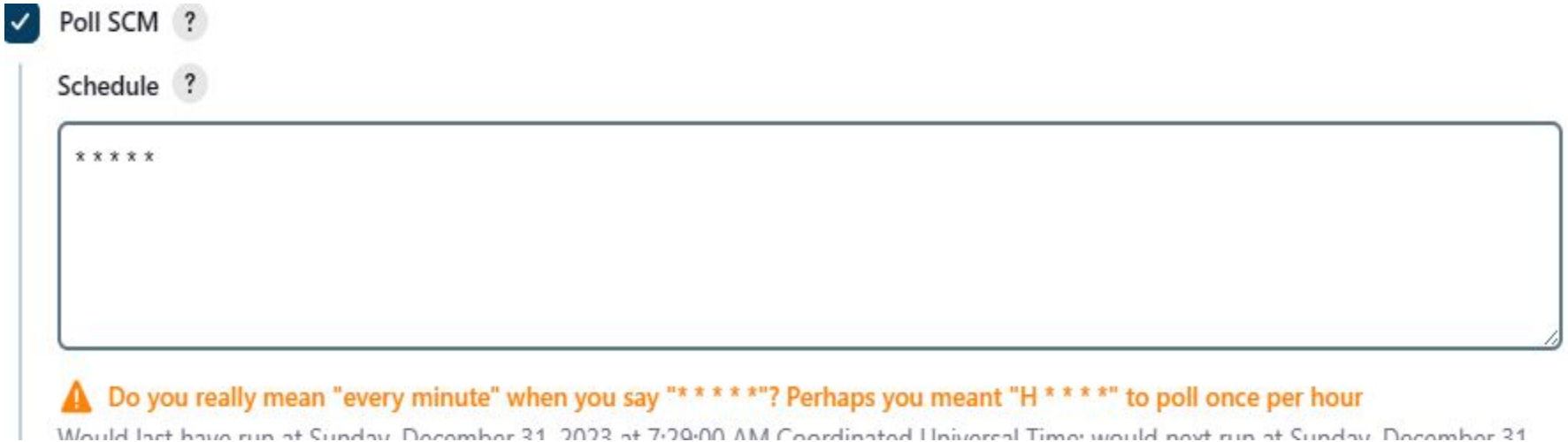
Script ?

```
1  pipeline {
2      agent { label "label1" }
3      triggers {
4          cron('* * * * *')
5      }
6      stages {
7          stage("stage1") {
8              steps {
9                  sh "echo 'hello' "
10             }
11         }
12     }
13 }
14
```

In build triggers(poll scm) for freestyle job

It triggers the job when new commit come in to git hub repository otherwise it wont build the job

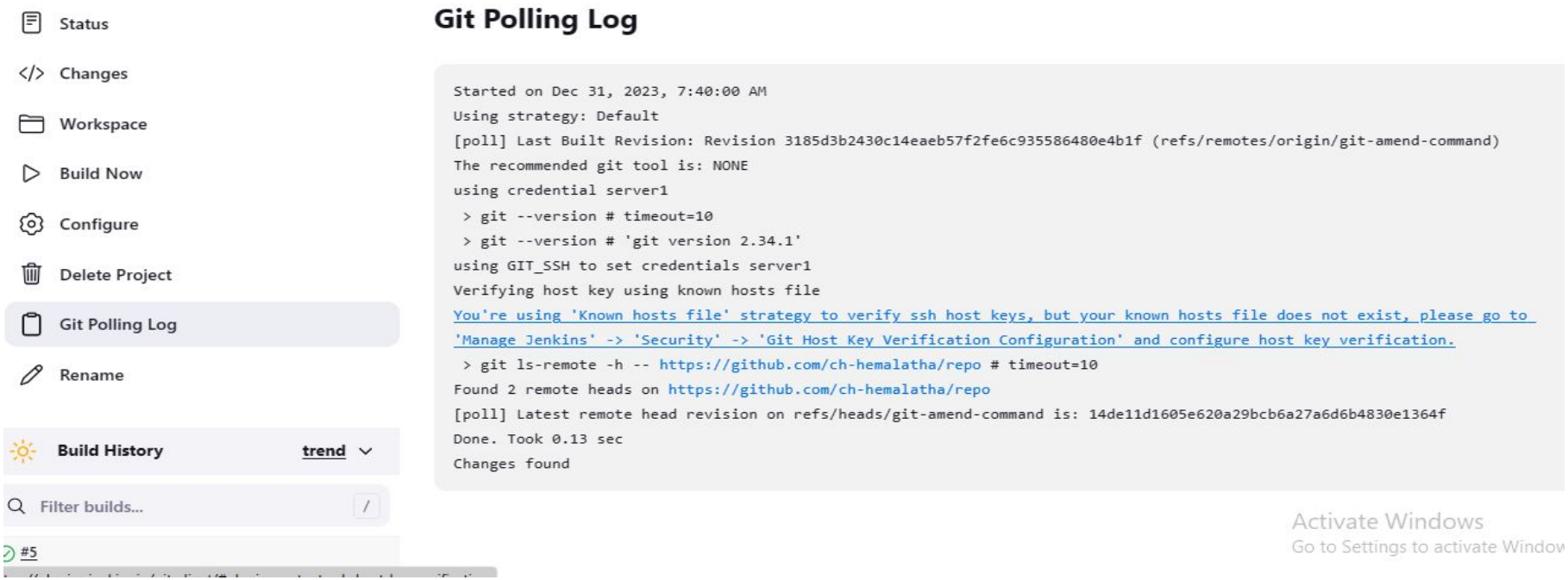
For every min it search for new commit and get logs of it based on it.



Git Polling Log

```
Started on Dec 31, 2023, 7:29:00 AM
Using strategy: Default
[poll] Last Built Revision: Revision 3185d3b2430c14eaeb57f2fe6c935586480e4b1f (refs/remotes/origin/git-amend-command)
The recommended git tool is: NONE
using credential server1
 > git --version # timeout=10
 > git --version # 'git version 2.34.1'
using GIT_SSH to set credentials server1
Verifying host key using known hosts file
You're using 'Known hosts file' strategy to verify ssh host keys, but your known_hosts file does not exist, please go to
'Manage Jenkins' -> 'Security' -> 'Git Host Key Verification Configuration' and configure host key verification.
 > git ls-remote -h -- https://github.com/ch-hemalatha/repo # timeout=10
Found 2 remote heads on https://github.com/ch-hemalatha/repo
[poll] Latest remote head revision on refs/heads/git-amend-command is: 3185d3b2430c14eaeb57f2fe6c935586480e4b1f - already
built by 4
Done. Took 0.15 sec
No changes
```

For suppose if i made any changes in git repo then the next min output will be like this



→similar to freestyle job pollscm option is there in pipeline job

Script ?

```
pipeline {
    agent { label "label1" }
    triggers{
        pollSCM('* * * * *')
    }
    stages {
        stage("stage1") {
            steps {
                sh "echo 'hello' "
            }
        }
    }
}
```

Upstream option

It checks the upsteam’s last build is success then it build the downstream build

Scm_job1 is upstream job it is successful then this pipeline job is triggerred

Script ?

```
pipeline {
    agent { label "label1" }
    triggers{
        upstream(upstreamProjects:'scm_job1',threshold:hudson.model.Result.SUCCESS)
    }
    stages {
        stage("stage1") {
            steps {
                sh "echo 'hello' "
            }
        }
    }
}
```

→in freestyle we can clone the git hub repo and build the job

→in same way pipeline also have an option to clone the git hub link

→but in freestyle first we need to clone and build but in pipeline we can clone anywhere or anytime based on req …..

→in pipeline we have pipeline syntax go through it to give url and all and get syntax of it.. In pipeline we have flexibility to call the steps wherever we want.

Now paste that syntax in which job u want that url.

In this we can generate script for git hub

```
pipeline {
    agent { label "label1" }
    triggers{
        upstream(upstreamProjects:'scm_job1',threshold:hudson.model.Result.SUCCESS)
    }
    stages {
        stage("stage1") {
            steps {
                sh "echo 'hello' "
            }
        }
        stage("stage2") {
            steps {
                git changelog: false, credentialsId: 'server1', poll: false, url: 'https://github.com/ch-hemalatha/repo'
                sh 'ls'
            }
        }
    }
}
```

1st job completes then only it executes 2nd job

```
pipeline {
    agent { label "label1" }

    stages {
        stage("stage1") {
            steps {
                echo "1st job starts"
                build 'scm_job1'
                echo "1st job completed"
            }
        }
        stage("stage2") {
            steps {
                echo "running"
            }
        }
    }
}
```

2nd job executes even though 1st job will not

```
pipeline {
    agent { label "label1" }

    stages {
        stage("stage1") {
            steps {
                echo "1st job starts"
                build job:'scm_job1' , wait:false
                echo "1st job completed"
            }
        }
        stage("stage2") {
            steps {
               echo "running"
            }
        }
    }
}
```

Automatic mail

```
pipeline {
    agent { label "label1" }
    stages {
        stage("mail") {
            steps {
                mail bcc:'',hi hema",cc:'',from:'',replyTo:'',subject:'Test Mail',to:


            }
        }
    }
}
```

Changing directory

Normally jobs are executed or build under jenkins workspace folder if we want to change the folder as per our req then go to change the directory in steps

```
pipeline {
    agent { label "label1" }

    stages {
        stage("stage1") {
            steps {
               sh 'mkdir dir1'  //this directory will be created in jenkins workspace
              dir('/tmp/lenkins/'){     //this will be created in new directory
                   sh 'mkdir dir2'
               }
               sh 'mkdir dir3'  //this directory will be created in jenkins workspace
            }
        }
    }
}
```

Catch error option

It is like exception handling in python

→within first job if we got any error means it exit from pipeline it wont execute 2nd job

→so avoid it we have catcherror block ….we can see the syntax in pipeline syntax as well.

→in the below way we can generate syntax

Sample Step

catchError: Catch error and set build result to failure

catchError ?

Message ?

Error

Build result on error ?

UNSTABLE

Stage result on error ?

FAILURE

Catch Pipeline interruptions ?

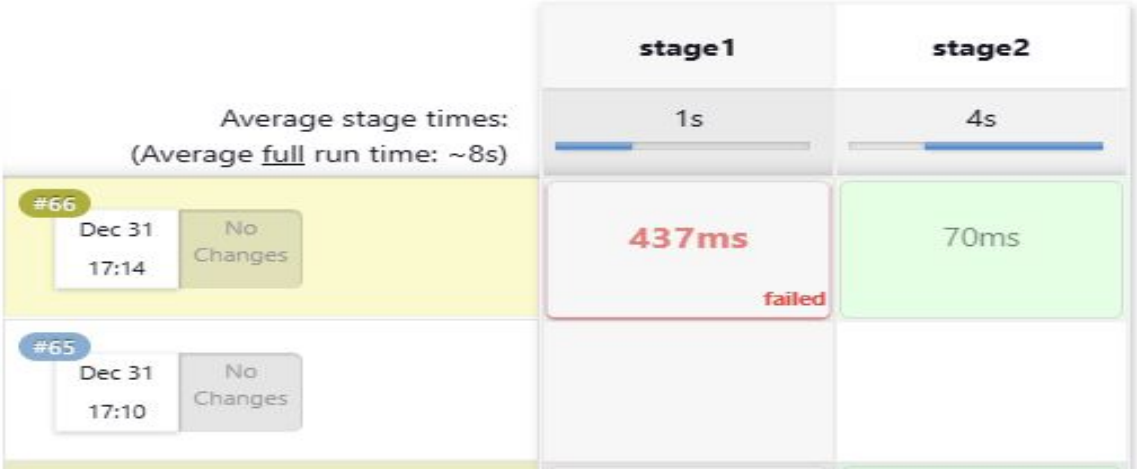
Generate Pipeline Script


```
catchError(buildResult: 'UNSTABLE', message: 'Error', stageResult: 'FAILURE') {
    // some block
```

```
pipeline {
    agent { label "label1" }

    stages {
        stage("stage1") {
            steps {
                //if we comment out below line then entire build will not trigger
                //if we uncomment below line then stage1 failes it thoroughs error msg and it builds stage2 as well
                //catchError(buildResult: 'UNSTABLE', message: 'Error', stageResult: 'FAILURE'){
                    sh "exit 1"
                }
            }
        }
          stage("stage2") {
            steps {
                echo "this is 2nd stage"
            }
        }
    }
}
```

65 -without catcherror block

66 - with catcherror block



Based on when condition env variables are printed

```
pipeline {
    agent { label "label1" }
    environment { deploy_to = "dep"}
    stages {
        stage("stage1") {
            when {
               environment name: "deploy_to",value:"dep"
            }
            steps {
                echo "1st job starts"
            }
        }
        stage("stage2") {
            when {
               environment name: "production",value:"pro"
            }
            steps {
               echo "2nd jobrunning"
            }
        }
    }
}
```

Only first stage got executed if we change the condition means 2nd stage got executed in above scripts.

```
[Pipeline] {
[Pipeline] stage
[Pipeline] { (stage1)
[Pipeline] echo
1st job starts
[Pipeline] }
[Pipeline] // stage
[Pipeline] stage
[Pipeline] { (stage2)
Stage "stage2" skipped due to when conditional
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
```

When condition based on boolean parameters

```
pipeline {
    agent { label "label1" }
    parameters {
      booleanParam(name:"toggle",defaultValue:false,description:"toggle this value")
      //if it is true means build normally, false means it wont build
    }
    stages {
        stage("stage1") {
            when {
               expression{return params.toggle}
            }
            steps {
                echo "1st job starts"
            }
        }
    }
}
```

Output will be like this based on false condition

```
Running on node2 in /home/ubuntu/new_jen2/workspace/demo_pipeline
[Pipeline] {
[Pipeline] stage
[Pipeline] { (stage1)
Stage "stage1" skipped due to when conditional
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

When condition based on string parameters

Based on condition (string matches) it is executed ..if it doesnot match stage got skipped.

```
pipeline {
    agent { label "label1" }
    parameters {
        string(name:"person",defaultValue:"hema",description:"who r u?")
    }
    stages {
        stage("stage1") {
            when {
               equals expected:"hemalatha",actual:params.person
            }
            steps {
                echo "hi hemalatha"
            }
        }
    }
}
```

If strings are not match then stage got executed otherwise if strings got matched stage wont execute

```
pipeline {
    agent { label "label1" }
    parameters {
        string(name:"person",defaultValue:"hema",description:"who r u?")
    }
    stages {
        stage("stage1") {
            when {
               not{equals expected:"hemalatha",actual:params.person}
            }
            steps {
                echo "hi hemalatha"
            }
        }
    }
}
```

When condition with allOf block

→if we are giving number of parameters like boolean string etc., we r going to use all those at a time with some condition..all those will be keep in allof block then it executed when all the parameters condition is satisfied ..if any one of the condition fails then entire build will not done

→in below scenario both conditions true then only build performs

allOf — and operator

Anyof —- or operator if any one condition satisfies it generate the build

For that step

```
pipeline {
    agent { label "label1" }
    parameters {
        string(name:"person",defaultValue:"hema",description:"who r u?")
        booleanParam(name:"toggle",defaultValue:false,description:"toggle this value")
    }
    stages {
        stage("stage1") {
            when {
                allOf{
                    equals expected:"hemalatha",actual:params.person
                    expression{return params.toggle}
                }
            }
            steps {
                echo "hi hemalatha"
            }
        }
    }
}
```

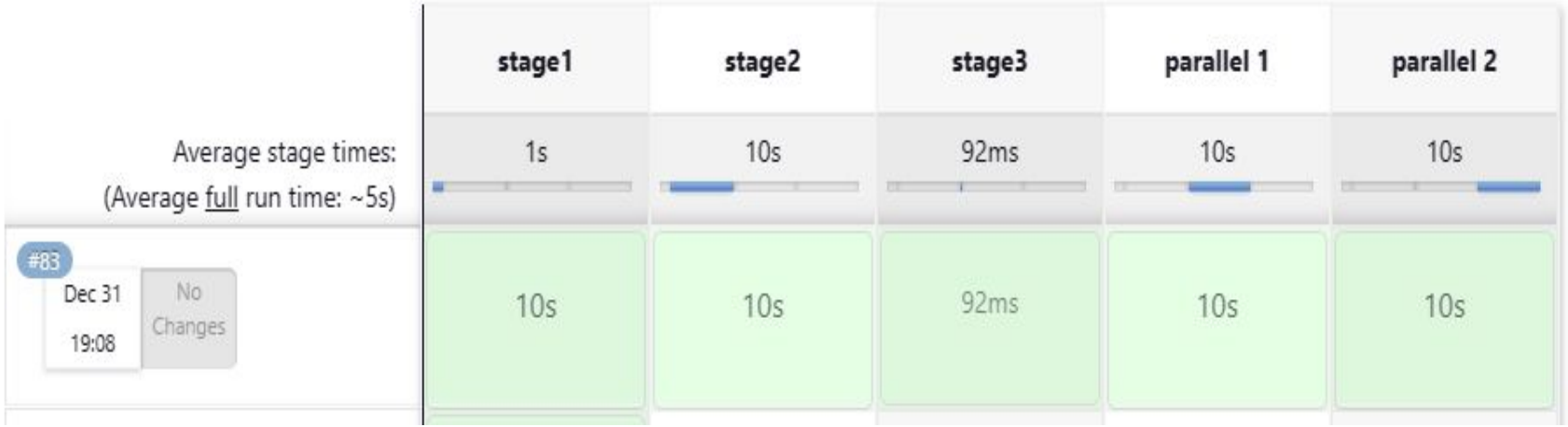
anyOf option

```
pipeline {
    agent { label "label1" }
    parameters {
        string(name:"person",defaultValue:"hema",description:"who r u?")
        booleanParam(name:"toggle",defaultValue:false,description:"toggle this value")
    }
    stages {
        stage("stage1") {
            when {
                anyOf{
                    equals expected:"hemalatha",actual:params.person
                    expression{return params.toggle}
                }
            }
            steps {
                echo "hi hemalatha"
            }
        }
    }
}
```

Parallel execution of stages

→normally stages with in pipeline are executed in sequential manner

→if we want to execute stages in parallel manner then proceed the below way



```
pipeline {
    agent { label "label1" }
    stages {
        stage("stage1") {
            steps {
                sh "sleep 10"
            }
        }
        stage("stage2") {
            steps {
                sh "sleep 10"
            }
        }
        stage("stage3") {
            parallel {
               stage("parallel 1") {
                  steps {
                      sh "sleep 10"
                  }
               }
                stage("parallel 2") {
                  steps {
                      sh "sleep 10"
                  }
               }
            }
        }
    }
}
```

Post build actions

Post

- The post section defines one or more additional steps that are run upon the completion of a Pipeline's or stage's run (depending on the location of the post section within the Pipeline)
- Post can support any of the following post-condition blocks:
  - ❑ **always**: Steps are executed regardless of the completion status.
  - ❑ **changed**: Executes only if the completion results in a different status than the previous run.
  - ❑ **fixed**: Executes only if the completion is successful and the previous run failed
  - ❑ **regression**: Executes only if current execution fails, aborts or is unstable and the previous run was successful.
  - ❑ **aborted**: Steps are executed only if the pipeline or stage is aborted.
  - ❑ **failure**: Steps are executed only if the pipeline or stage fails.
  - ❑ **success**: Steps are executed only if the pipeline or stage succeeds.
  - ❑ **unstable**: Steps are executed only if the pipeline or stage is unstable.

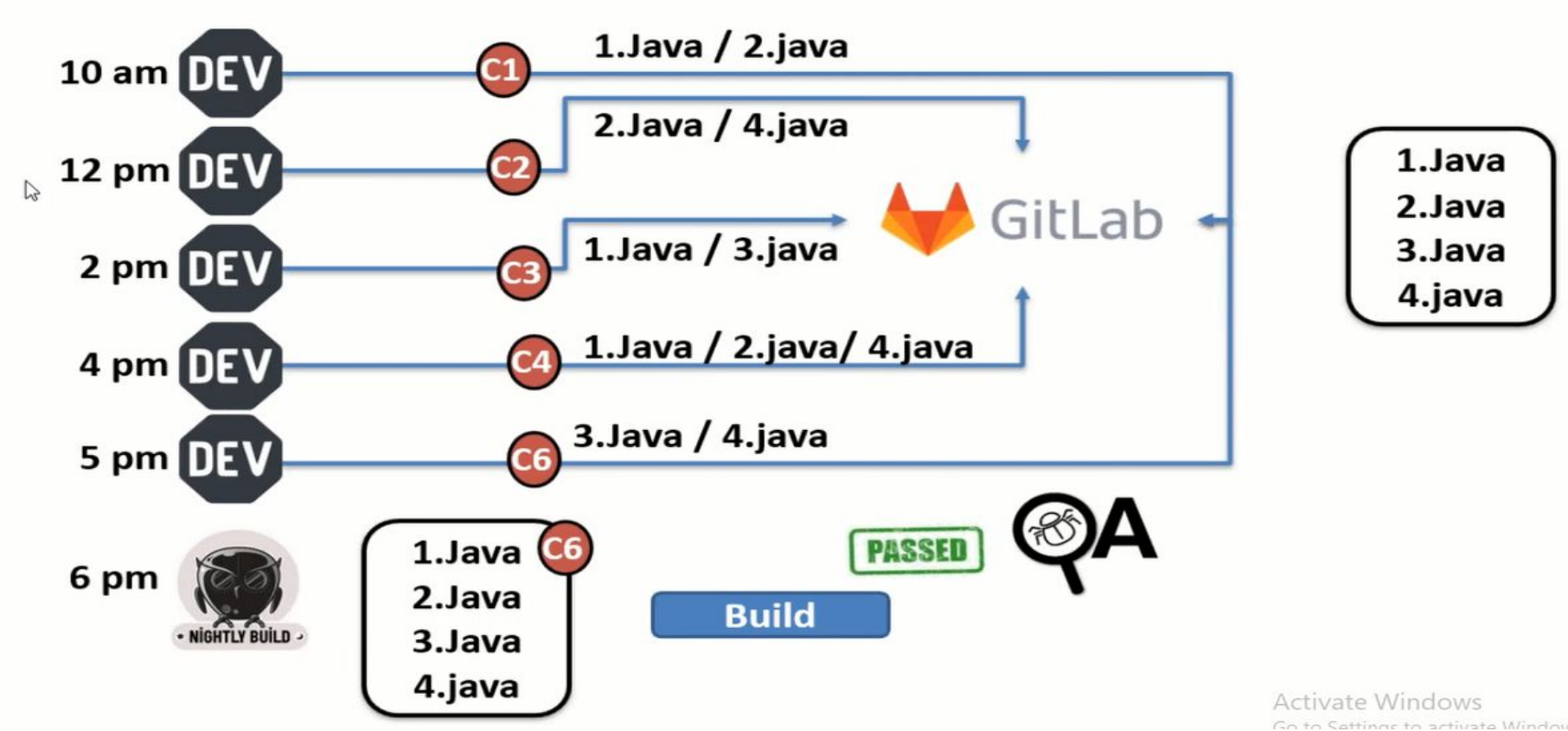
Post build with always option for entire pipeline


```
pipeline {
    agent { label "label1" }
    stages {
        stage("stage1") {
            steps {
                echo "2nd stage"
            }
        }
        stage("stage2") {
            steps {
                echo "2nd stage"
            }
        }
    }
    post {
        always {
            echo "post build actions"
        }
    }

}
```

Always option for individual stages


```
pipeline {
    agent { label "label1" }
    stages {
        stage("stage1") {
            steps {
                echo "2nd stage"
            }
            post {
                always {
                    echo "post build actions"
                }
            }
        }
        stage("stage2") {
            steps {
                echo "2nd stage"
            }
            post {
                always {
                    echo "post build actions"
                }
            }
        }
    }

}
```

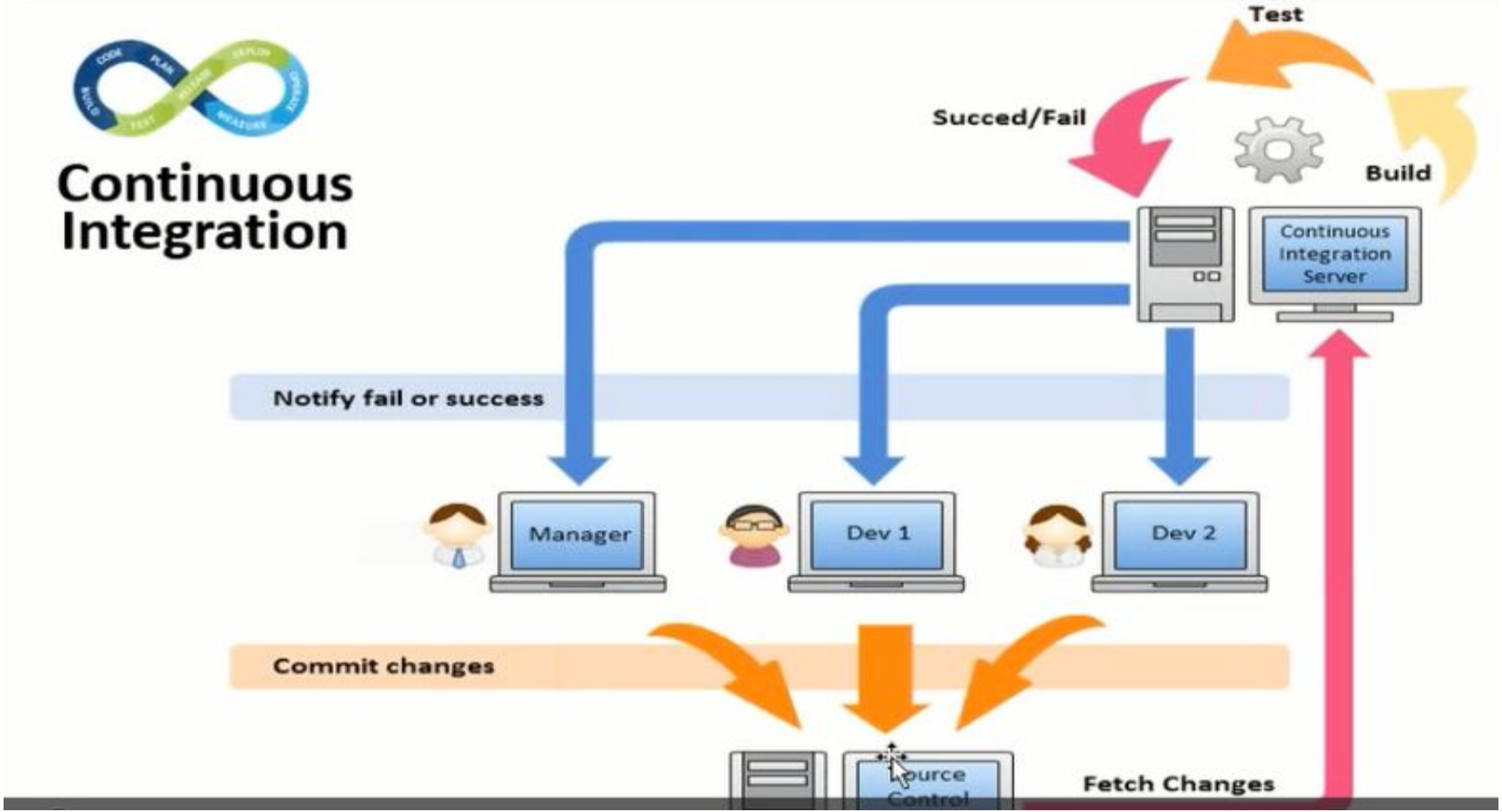
Continuous integration



→whenever the developer checks in ,how we are going to tell him that his code is a good code which can be integrated with other code , that same thing will be given to QA.so that process where continuously integrate the developer codes into the actual repo is called as continuous integration.

→instead of doing a build once or twice a day and giving to QA ,in order to findout a bad commit or error in a code,do the build immediately whenever new code changes are check in or new push come within a repo.

→continuous integration helps us to identify error early,it helps us to do faster releases(qa team will not wait), developers have more time tofix the code


Continuous Integration
Test
Succed/Fail
Build
Continuous Integration Server
Notify fail or success
Manager
Dev 1
Dev 2
Commit changes
Source Control
Fetch Changes

Continuous Integration

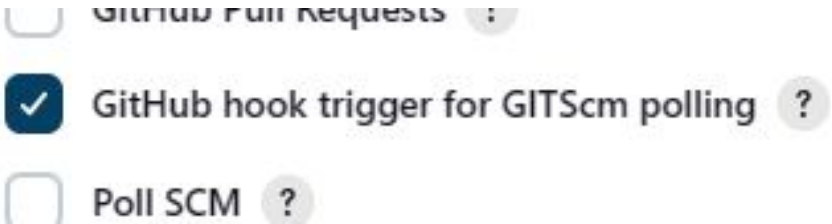
- Build Automation
- Developer Builds and QA Builds
- Implement Unit Tests
- Setup CI System
- Generate Build Artifacts
- Generate Code Coverage & Analysis
- Setup Build Artifactory System
- Publish results
- Maintenance

Tools: Gitlab – Git - JDK – Maven – Jenkins – JIRA – SonarQube - Artifactory – Scripting

Process to configure jenkins with github

→create webhook url by going into project settings and webhook and click on add webhook ——---- http://54.164.43.157:8080/github-web(webhook) –within project setting–webhook

In build triggers enable it

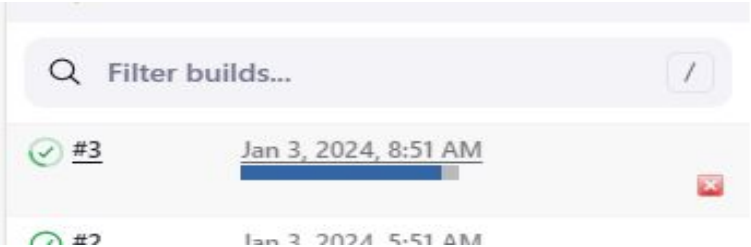


New commits checkin then build automatically

→ write any script(lets simple echo script) in the pipeline option and save it

→now do the new commit in git hub then automatically build takes place

→the output will be as below




```
Started by GitHub push by ch-hemalatha
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/webhook_pipeline
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Build)
[Pipeline] git
```

Overview for CI

Code checkout from github repo

Any part of pipeline will take more than 1 hour for execution then it aborted.

Script

```
pipeline {
  agent none
  options {
    timeout(time: 1, unit: 'HOURS')
  }
 stages {
  stage('Checkout')
  {
    agent { label 'demo' }
    steps {
     git credentialsId: 'GitlabCred', url: 'https://gitlab.com/scmlearningcentre/wezvatech-cicd.git'
    }
  }

 }
}
```

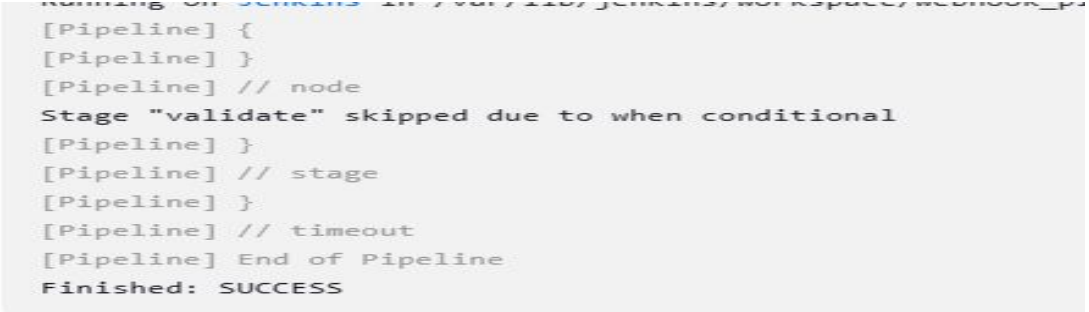
Scenerio —-validate

Let us assume that take a project which checkout before

In that let us assume pom.xml and file1 are a dev codes then if we made any new changes with those files then only pipeline should trigger

Out of these files any other files may get new changes then pipeline will not trigger

If i did changes in read me file then output will be



If i did changes in file1

```
Running on Jenkins in /var/lib/jenkins/workspace/webhook_pipeline
[Pipeline] {
[Pipeline] script
[Pipeline] {
[Pipeline] }
[Pipeline] // script
[Pipeline] }
[Pipeline] // node
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // timeout
[Pipeline] End of Pipeline
Finished: SUCCESS
```

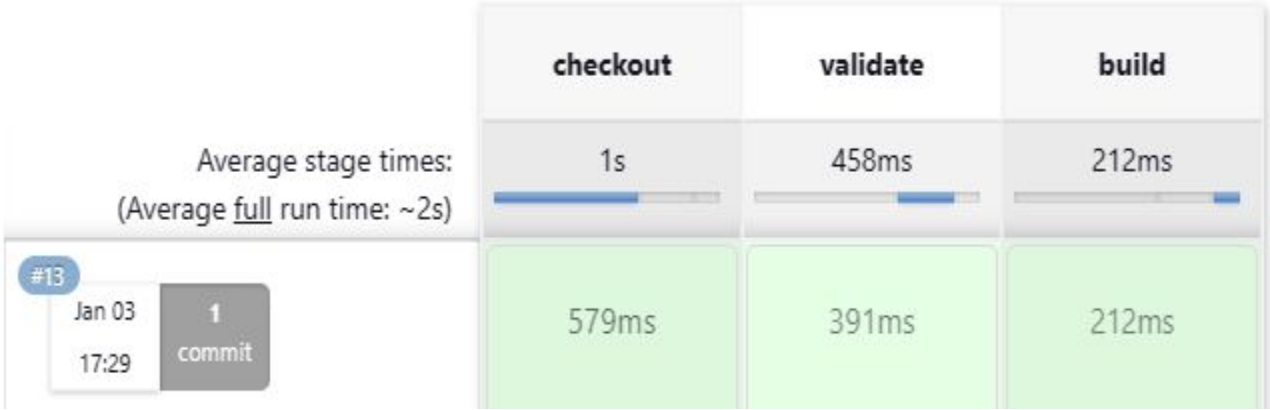
If there is no new commits then

```
Warning, empty changelog. Have you run checkout?
[Pipeline] }
[Pipeline] // node
Stage "validate" skipped due to when conditional
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // timeout
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Build artifacts

To check the validation whether it is working or not we r using build artifacts

If validation stage execute then only build stage executes which is ntng but build artifacts



Using directory build artifacts

It enter into directory and run clean command

```
stage('Build')
{
  when {environment name: 'BUILDME', value: 'yes'}
  agent { label 'demo' }
  steps {
       echo "Building Jar Component ..."
       dir ("./samplejar") {
         sh "mvn clean package"
       }
       echo "Building War Component ..."
       dir ("./samplewar") {
          sh "mvn clean package "
       }
  }
 }
```

For maven packages

Instead of maven clean command just give parameter and execute it

```
$ mvn package
 1. compile
 2. unit test
 3. package

$ mvn package -Dmaven.test.skip=true
 1. compile
 2. pack
```

Without unit test in maven packages we need to create parameters as below

```
parameters {
  booleanParam(name: 'UNITTEST', defaultValue: true, description: 'Enable UnitTests ?')
}
```

Within build we need to modify as below and compare with before scenario maven packages

…. pto…..

```
steps {
    script {
        if (params.UNITTEST) {
              unitstr = ""
        } else {
              unitstr = "-Dmaven.test.skip=true"
        }

        echo "Building Jar Component ..."
        dir ("./samplejar") {
          sh "mvn clean package ${unitstr}"
        }

        echo "Building War Component ..."
        dir ("./samplewar") {
         sh "mvn clean package "
        }
    }
```

Multibranching pipeline

→create new multi branching job

→create new git hub repo

→in repo with in main/master create Jenkinsfile which is available for all branches

As like readme file

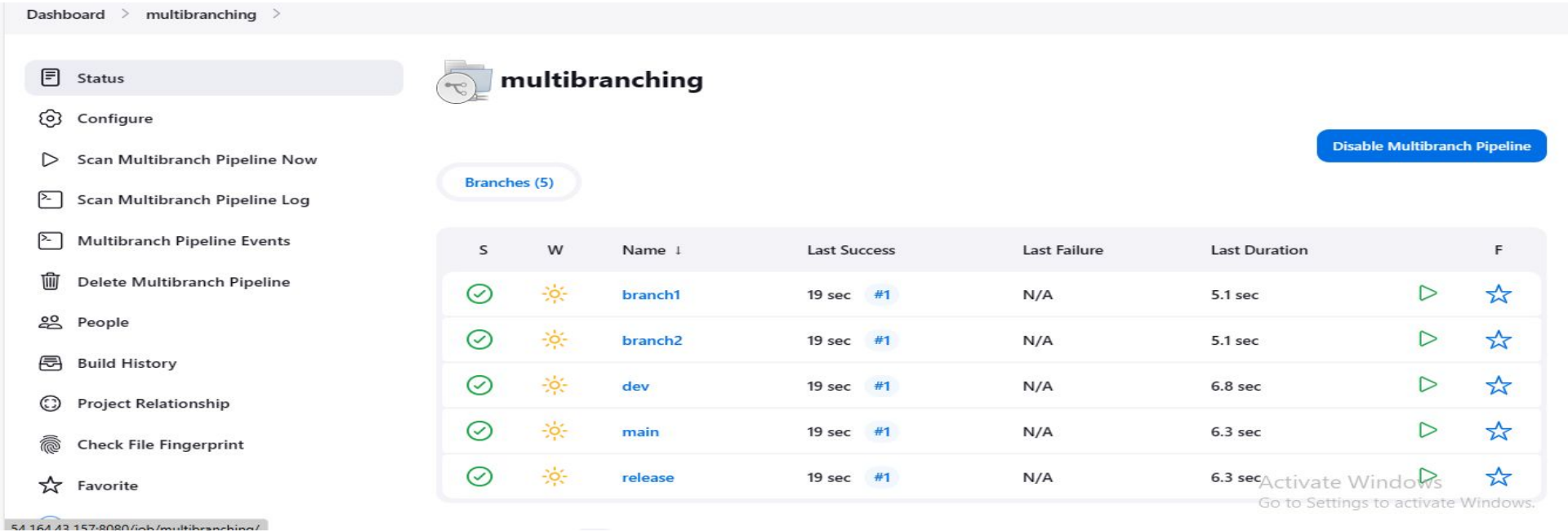
→ within jenkinfile just write some pipeline code as per our requirement.

→create 5 branches within main ,all branches may contain readme and jenkins file as well

→configure the multibranches pipeline as below, copy the url from git hub project and paste it as below

Save it

Automatically it got trigger the jobs



→within status we can see above triggered jobs

For example lets create a branch and rename jenkinsfile then it will not get trigger

Because jenkins file is not there

Refresh it check the status then that job wil not trigger in jenkins.

Code coverage

- **CodeCoverage** is a measure used to describe the degree to which the source code of a program is executed when a particular test suite runs
- It is a measurement of how many lines/blocks/arcs of your code are executed while an application is running

Benefits:

- ❑ Determine the amount of code being tested & not tested
- ❑ Eliminate Dead code, remove code which doesn't affect the program results
- ❑ Identifying additional test cases which might have been missed in the test suite
- ❑ Program with high code coverage has a lower chance of containing undetected bugs

Code-Coverage Tools : **JTest, Cobertura, Emma, JCov, JaCoCo**