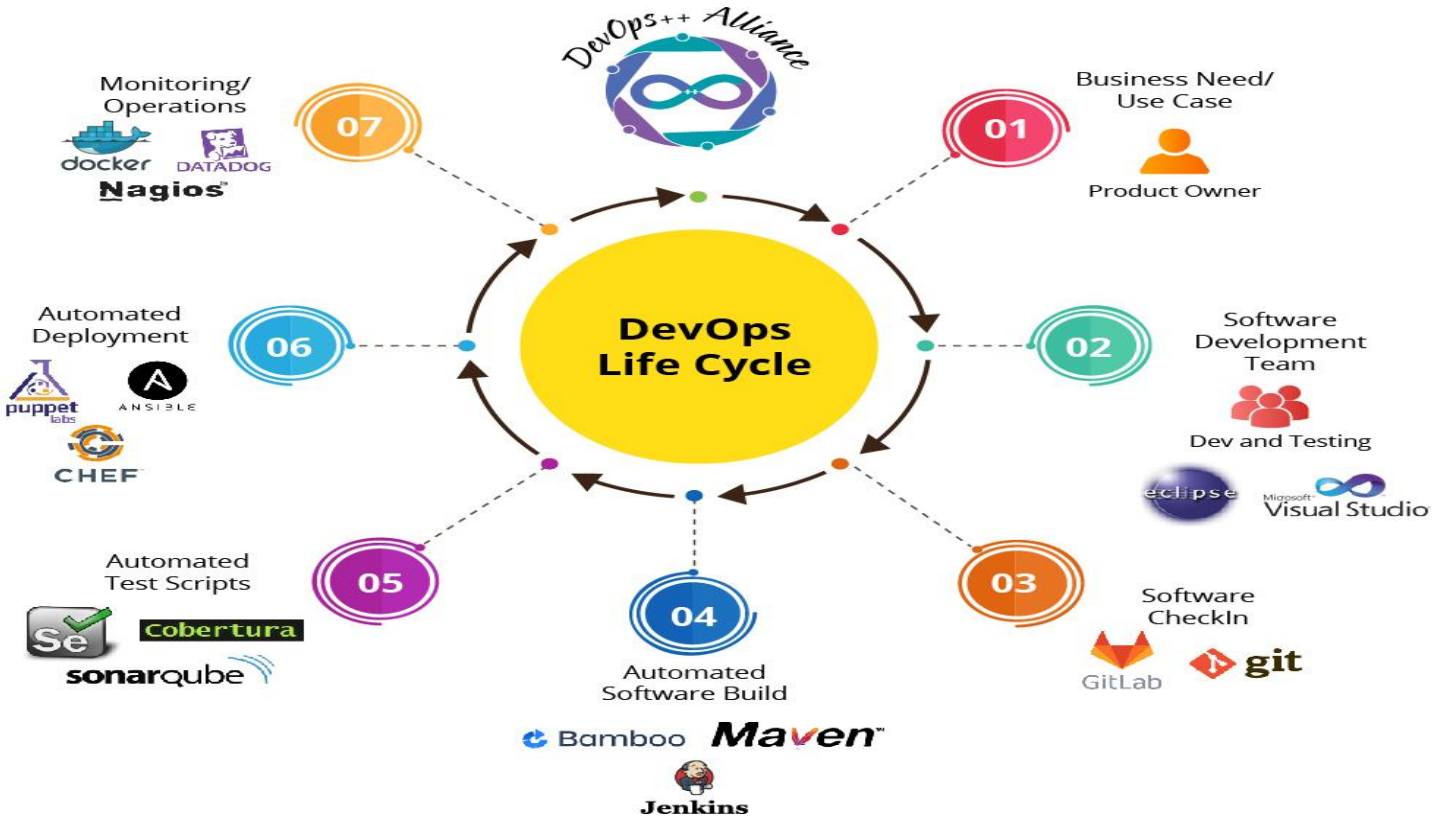
Calculator Assignment, building and deploying using DevOps tools and culture

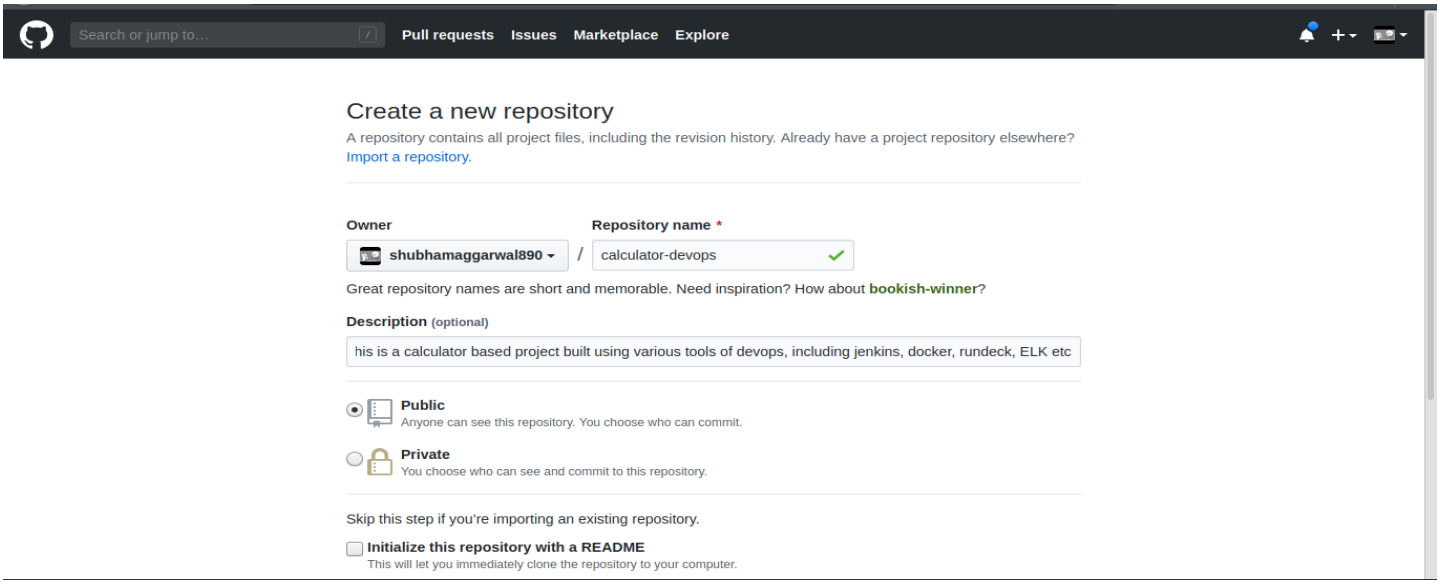
by Shubham Aggarwal (MS2019017)

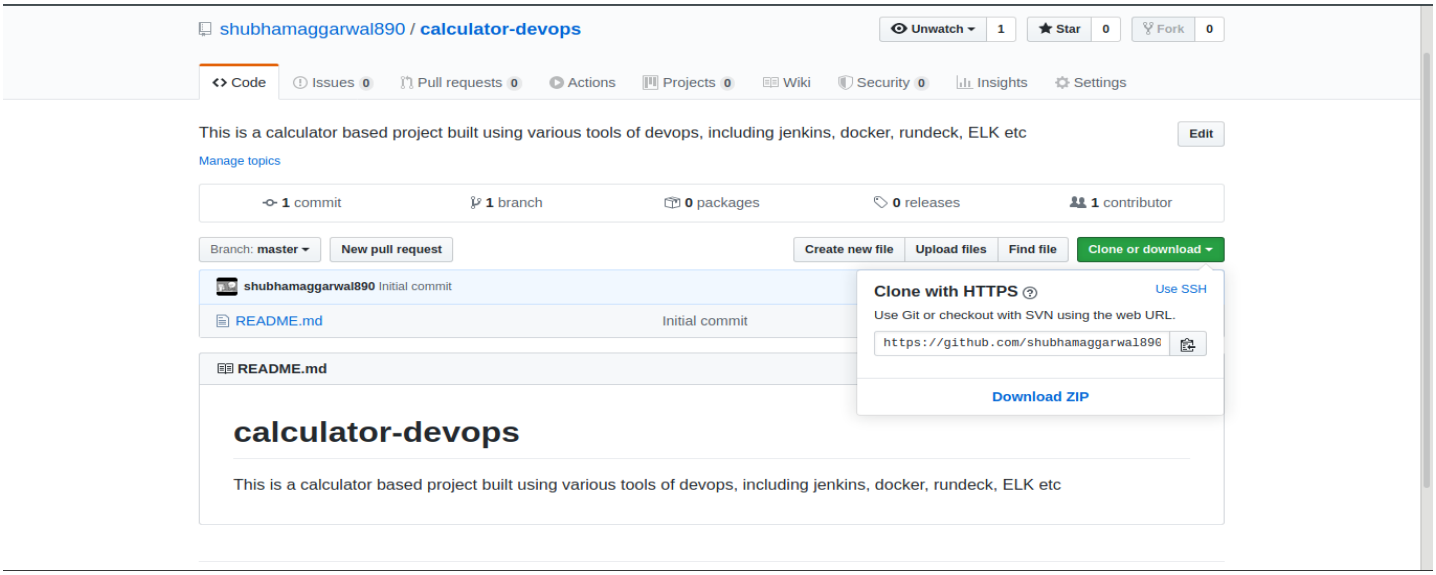


DevOps Pipeline

The plan is to automate the integration and deployment chain which includes source control management, continuous integration and continuous deployment. The cycle would include pushing latest changes to git (GitHub), building code includes using tool (maven), pushing build docker image on to docker hub, this part of continuous automation is called continuous integration. Then we integrate rundeck with jenkins, rundeck here does the continuous deployment. Rundeck pulls the pushed docker image from docker hub and deploys it on a docker container. Tools used includes

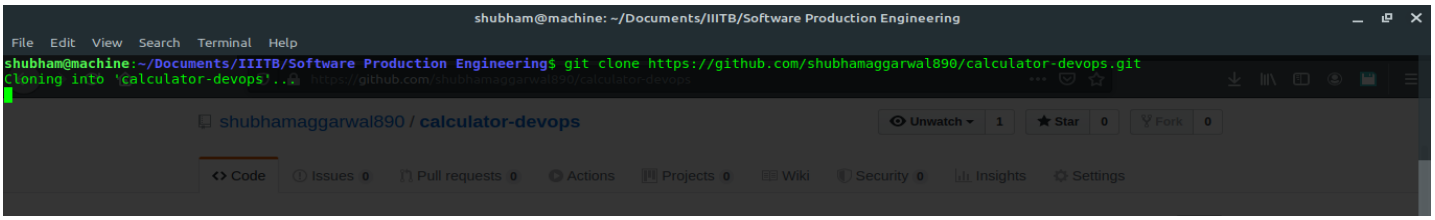
- SCM – GitHub - https://github.com/shubhamaggarwal890/calculator-devops
- Building – maven
- Docker image - https://hub.docker.com/r/shubhamaggarwal890/calculator-devops
- Continuous Integration – Jenkins
- Continuous deployment - rundeck

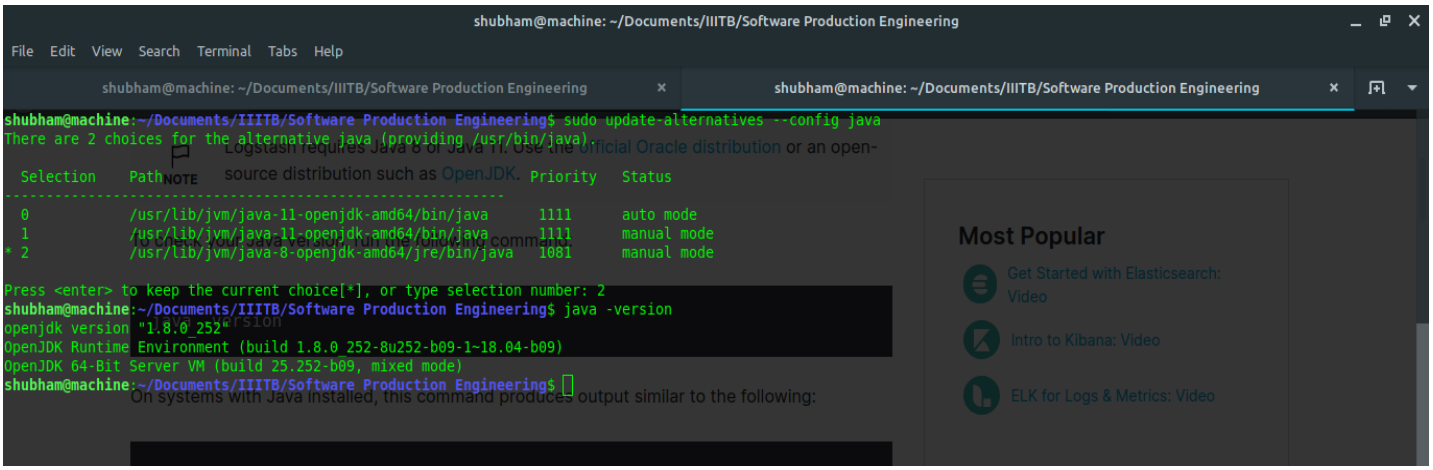




Source Control Management - 1

Creating new repository on to https://www.github.com. This includes adding repository name and description. The repository name should be unique to the signed in user. The similar is done and one such repository is created for the calculator dev-ops project and can be found at https://github.com/shubhamaggarwal890/calculator-devops. The SCM handles our code and is used to connect as input to Jenkins. Other SCM are gitlab, bitbucket.





Source Control Management - 2

Now if you have already developed the project and want to push to yours create repo, you can initiate the current directory –

git init ./

git remote add origin <git_repo_url>

git push -f origin <branch_name>

Or if you creating a new project I suggest doing a **git clone <git_repo_url>**

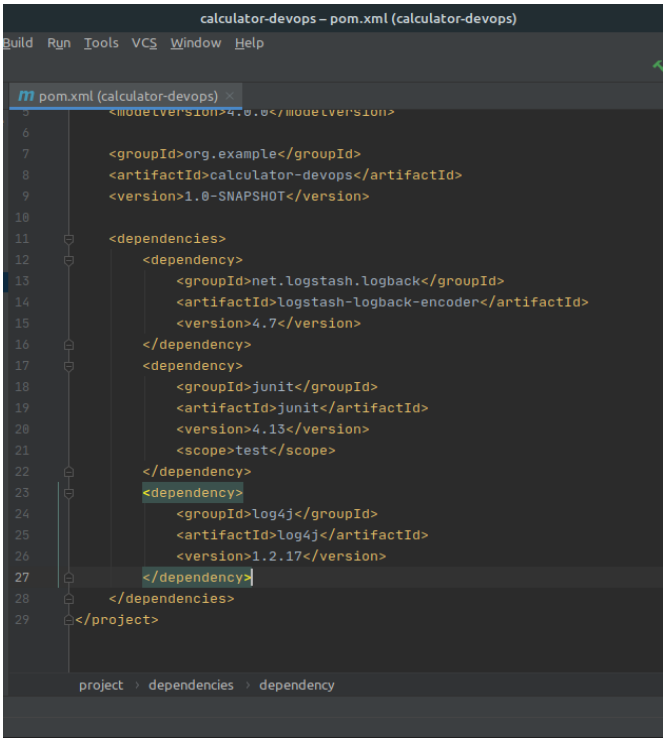
***Here we are using java 8 since rundeck supports only java 8, you can configure to java 8 with sudo update-alternatives --config java after installing it.**

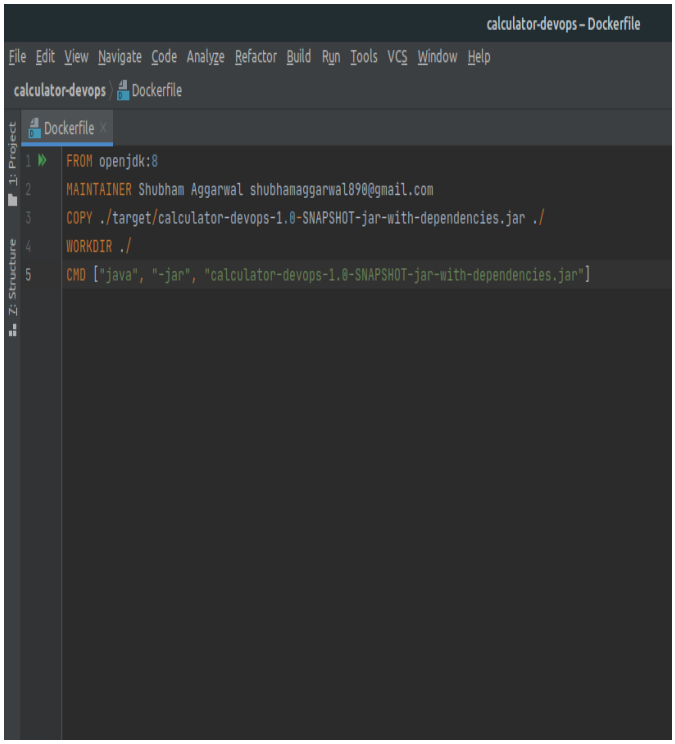
To push the code on to repository follow following commands

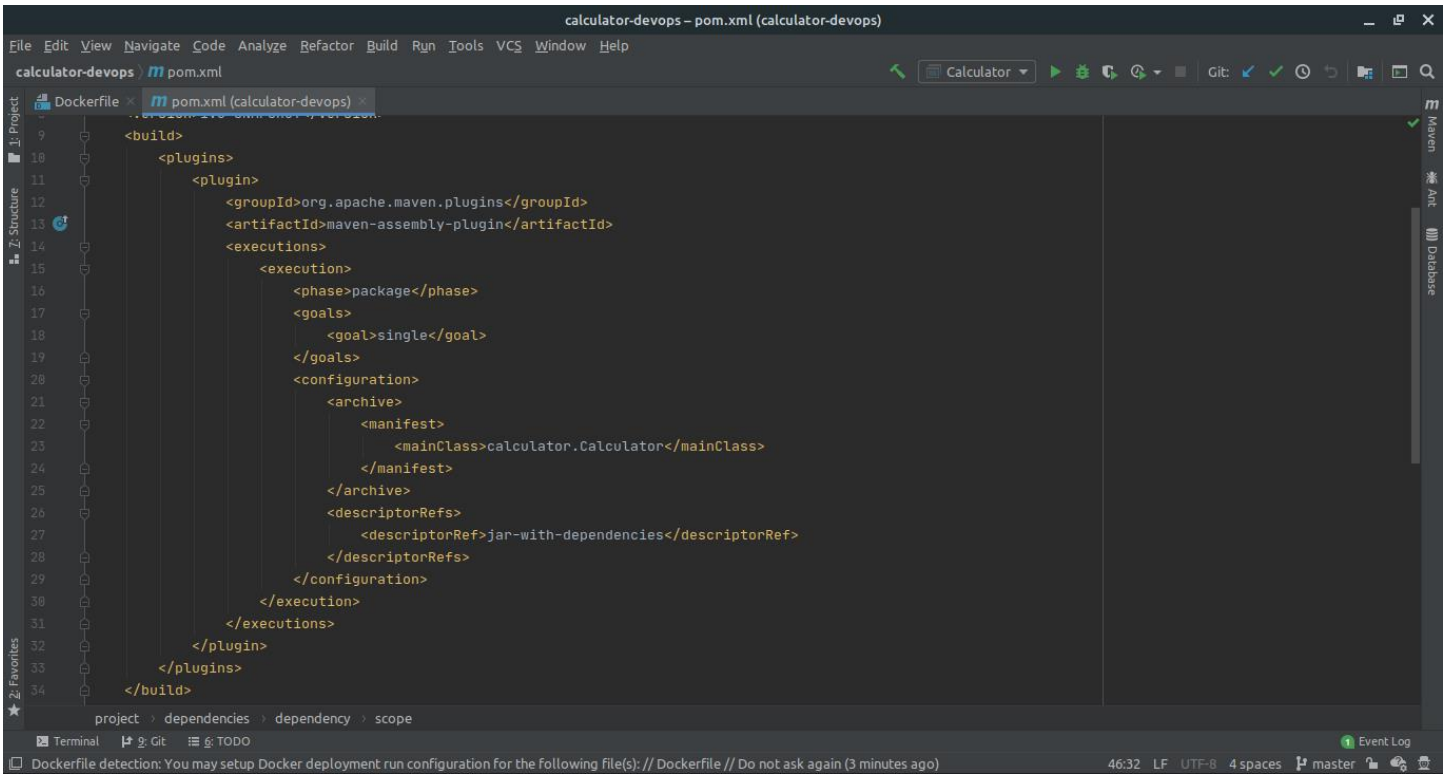
git add <changed_files_path>

git commit -m "Commit message name"

git push (only if you are on master branch, otherwise I suggest merging your branch with master first, resolving conflicts and then do git push)







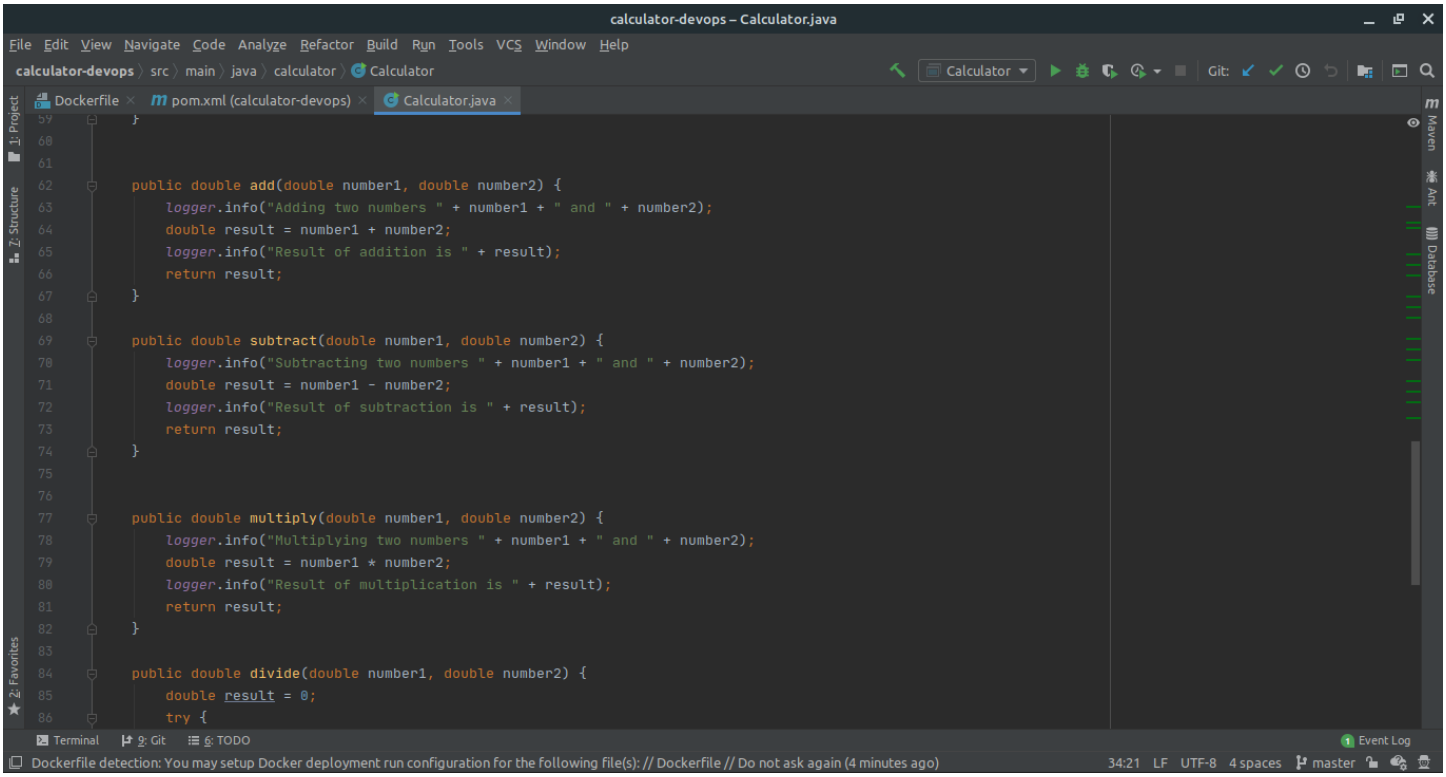
Development and Software Build

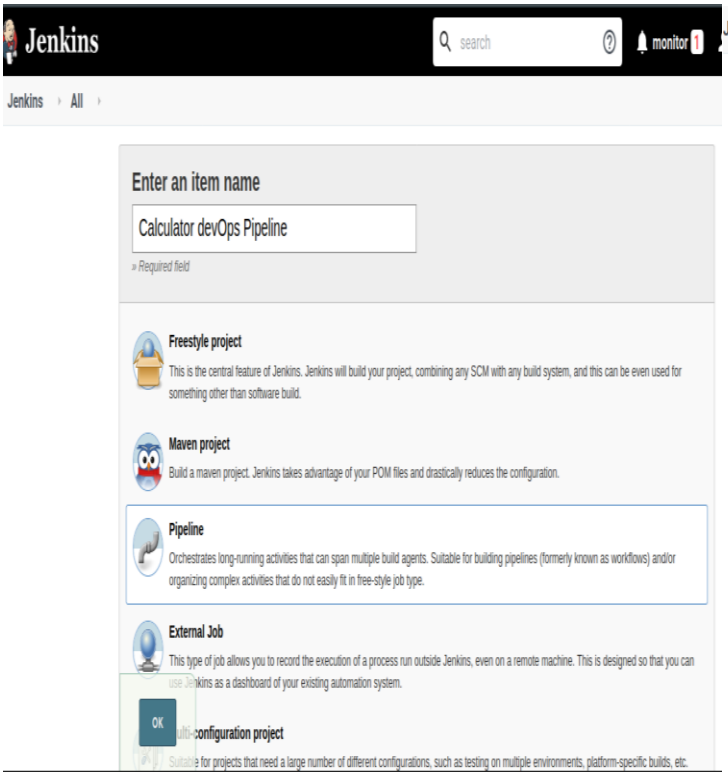
Here to build the code I'm using maven, maven is used to resolve dependencies to the code. Dependencies are external libraries which we use to integrate it with in our code. For development environment I used Intellij. So started with a maven project and added basic functionalities of the calculator program. Also **added log4j.properties which is a must file if using log4j apache jar**. The

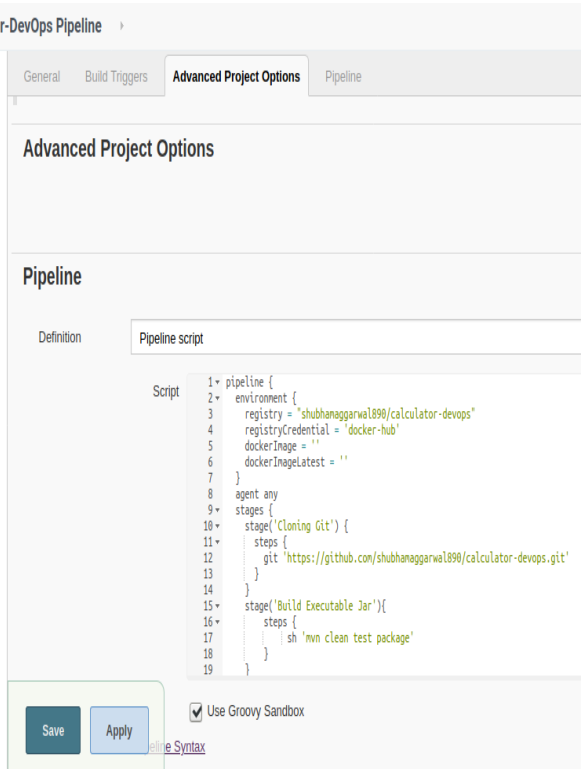
log4j.properties handles projects log functionalities, be its structure or where it should be stored or append or create a new file based on date and time. I also **created my own rollingappender file which creates missing directory and file if the file or directory not present within the specified path**. While adding the log4j I also added necessary **Dockerfile which would be used to create docker image of the build**. The docker file tells the build should be built on what image, **here it is openjdk 8, after that we copy the created jar file and copy it to the working directory, and what command should run when container is running**. For unit testing I have included junit dependency and written true positive and false positive cases to test while we build our project.

***The necessary thing to do is to add manifest within pom.xml which tells java to where to look for main class in project for an executable jar and since we are using dependencies here I also made it a jar with dependencies.**

You can also add Jenkins pipeline script over here in your git repository.







Environment setup - Jenkins

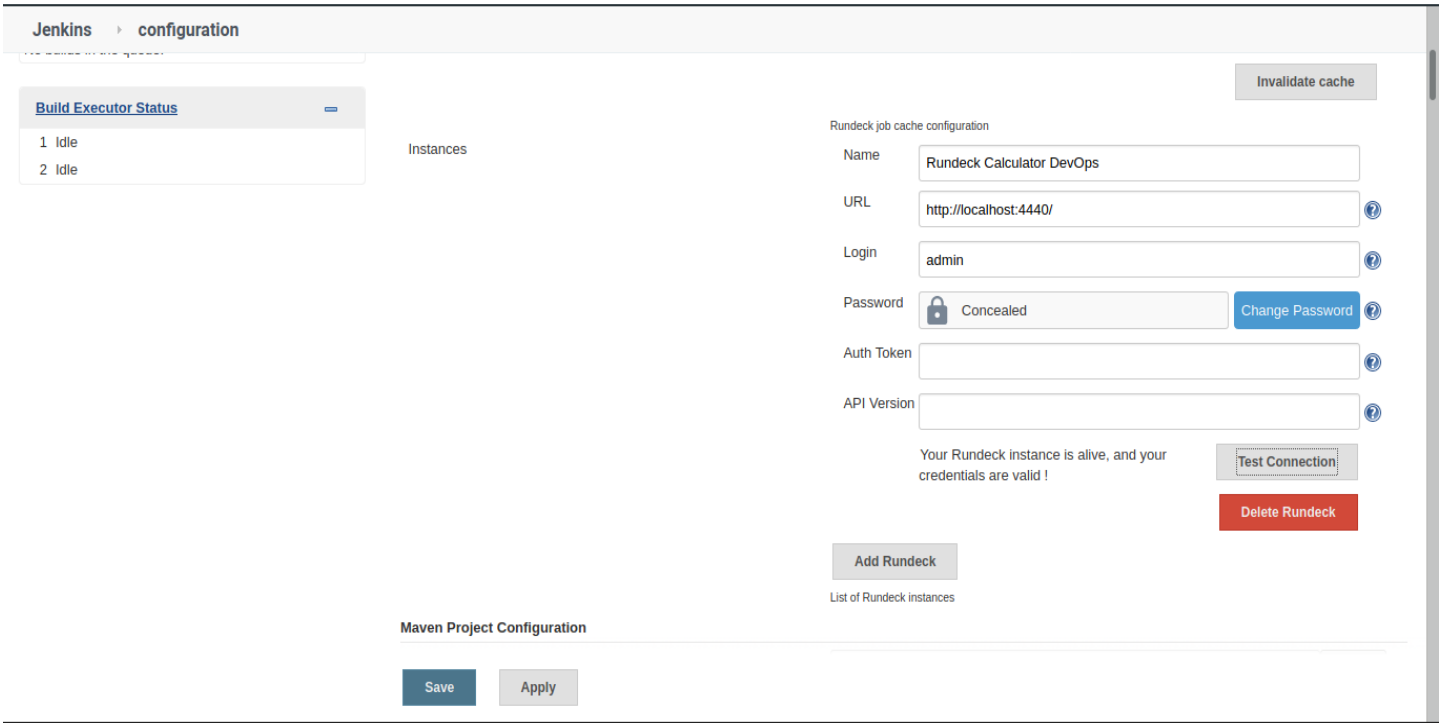
The development process is complete and we have successfully pushed the code on to git, now we setup Jenkins and other plugins of it.

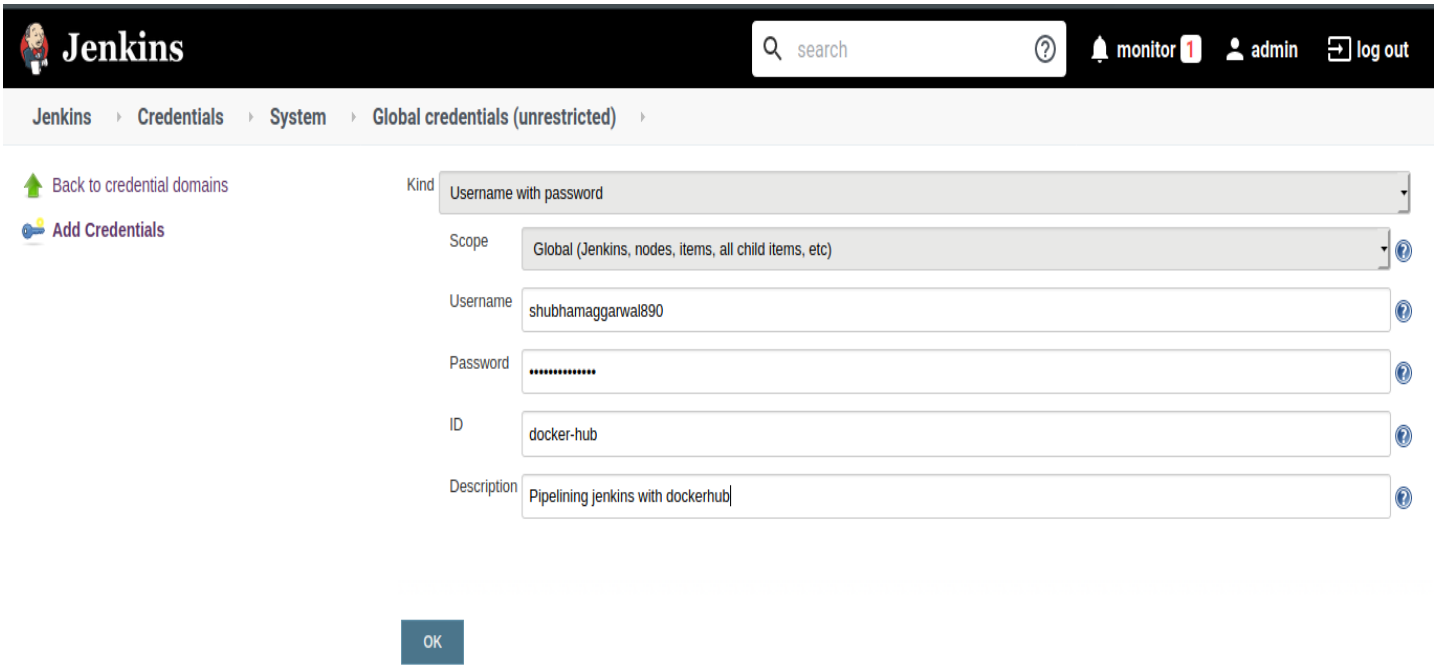
Make sure to add Jenkins to docker group, so that Jenkins can use docker for build docker image. **sudo usermod –aG docker Jenkins**, you can verify it with **sudo grep jenkins /etc/gshadow**

We can now start Jenkins with, by command **sudo systemctl start jenkins,** jenkins starts at port number 8080, so login on to http://localhost:8080 onto your browser.

Now we manage the plugins of jenkins under manage plugins in manage jenkins. We download Build pipeline plugin, Docker plugin, GitHub, Maven integration plugin, Rundeck plugin.

After its done downloading, jenkins will restart and now you can create a new job for jenkins, enter jenkins job name and choose pipeline as job functionality. Properties of pipeline is it is script based and each stage of pipeline script runs one after another. Making it perfect for continuous integration and then deployment. Properties of continuous integration is it includes SCM, unit testing and integration testing.





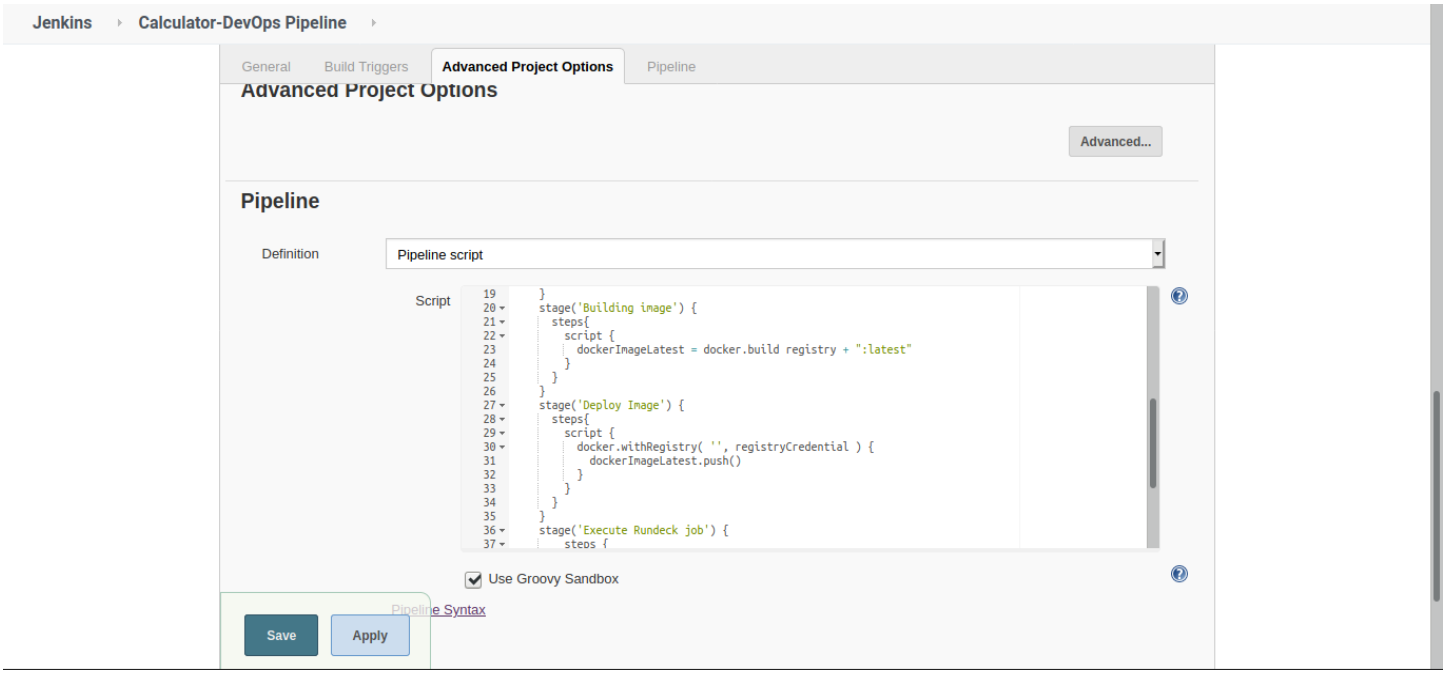
Challenges and Solutions - Jenkins

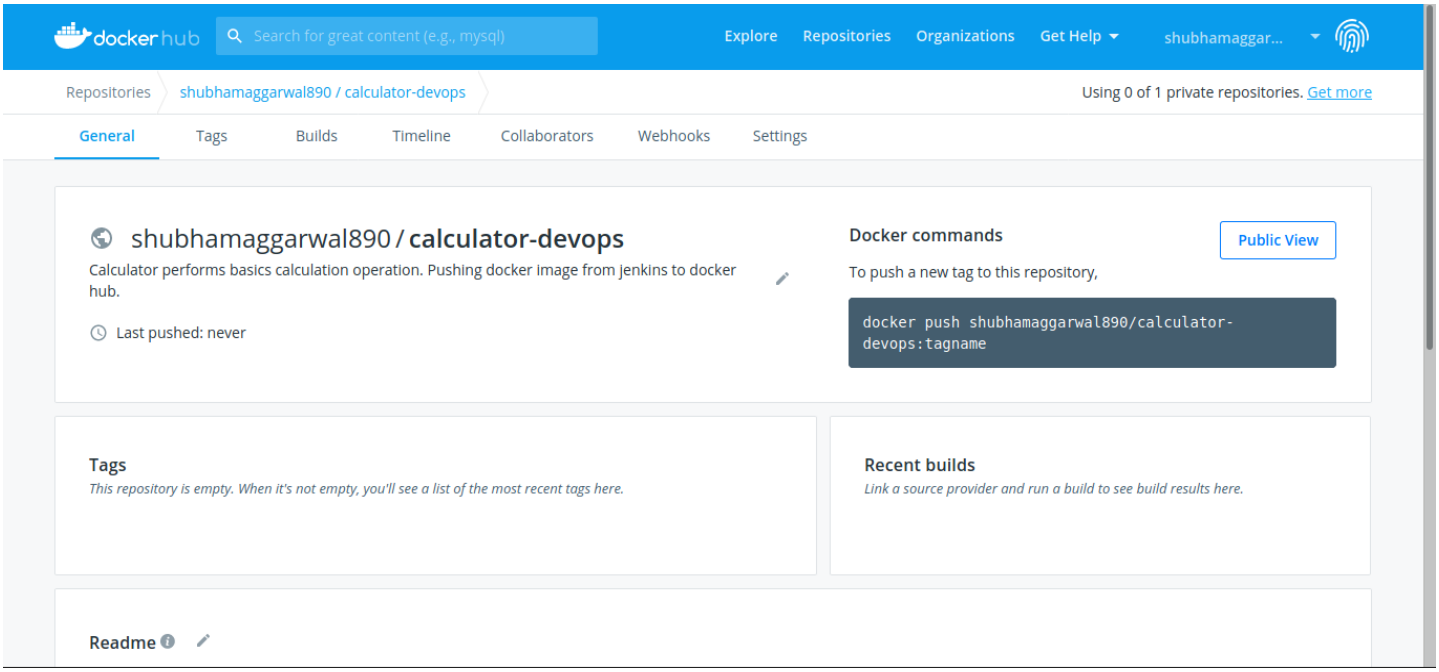
While setting up jenkins there were many challenges I faced which included incorrect docker id, not connecting to git or rundeck, and docker not working. Here's the summary of it all –

1. **Got permission denied while trying to connect to docker daemon** – This usually happens if your docker is not running, you can check it via **sudo systemctl status docker,** it also occurs if your

jenkins user doesn't have docker permission which can be easily given via **sudo usermod –aG jenkins docker.** Don't forget to restart jenkins job after that using **sudo systemctl restart jenkins**

2. **Setting credentials for docker hub** – In the jenkins dashboard add credentials to your docker hub repository and set a unique id to it, this id should be equal to docker with Registry credentials id in pipeline script.
3. **Rundeck instance not running** – If rundeck instance is not alive, this can be configured under jenkins configuration. Add rundeck instance name along with url on which rundeck is running and its credentials.
4. **Rundeck pipeline script not validated** – This I couldn't resolve, I wasn't able to run the proper pipeline script for rundeck, so I created a new job in jenkins and under post build, I created a new instance of rundeck and entered rundeck job id and other related details. And added that jenkins job build script to be built within the pipeline script.
5. **Maven not working** – In many cases maven integration plugin doesn't work, while building the code it would throw the error of **mvn not found**. While we build it on intellij it has inbuilt maven so building over it doesn't require maven to be installed on your machine. So if maven is not installed then mvn won't work on jenkins because its plugin is a maven integration plugin so maven should be there on your host machine, which can be downloaded via **sudo apt maven** (debian only).





Docker Setup

Docker is platform which provides OS level virtualization to deliver software as packages. So the plan is to create a docker image of jar file created after build process and push the latest image on to docker hub. The pushed procedure would be done after every build which would include removing preciously pushed docker image and replace with latest built one. The pushed images can be found at https://hub.docker.com/r/shubhamaggarwal890/calculator-devops

To run docker on your machine, either run it as root or as user. To run it as user you have to enter user to the group of docker which can be done using **sudo usermod –aG docker <username>**

Run the docker on to terminal via command **sudo systemctl start docker**

To pull the docker image use command **docker pull <docker_image_name:tag>**

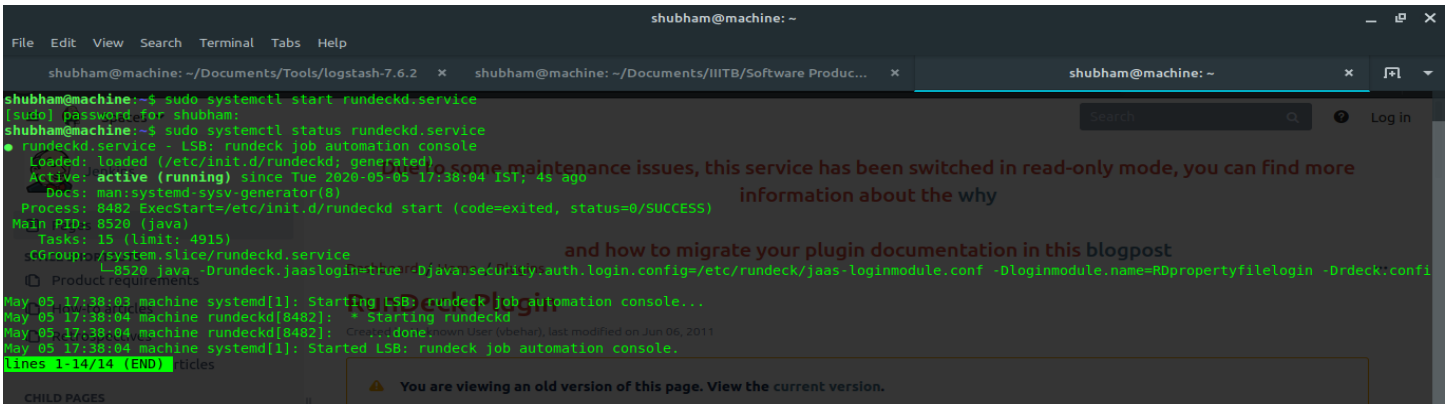
To push the docker image use command **docker push <username>/<repository_name>:tagname**

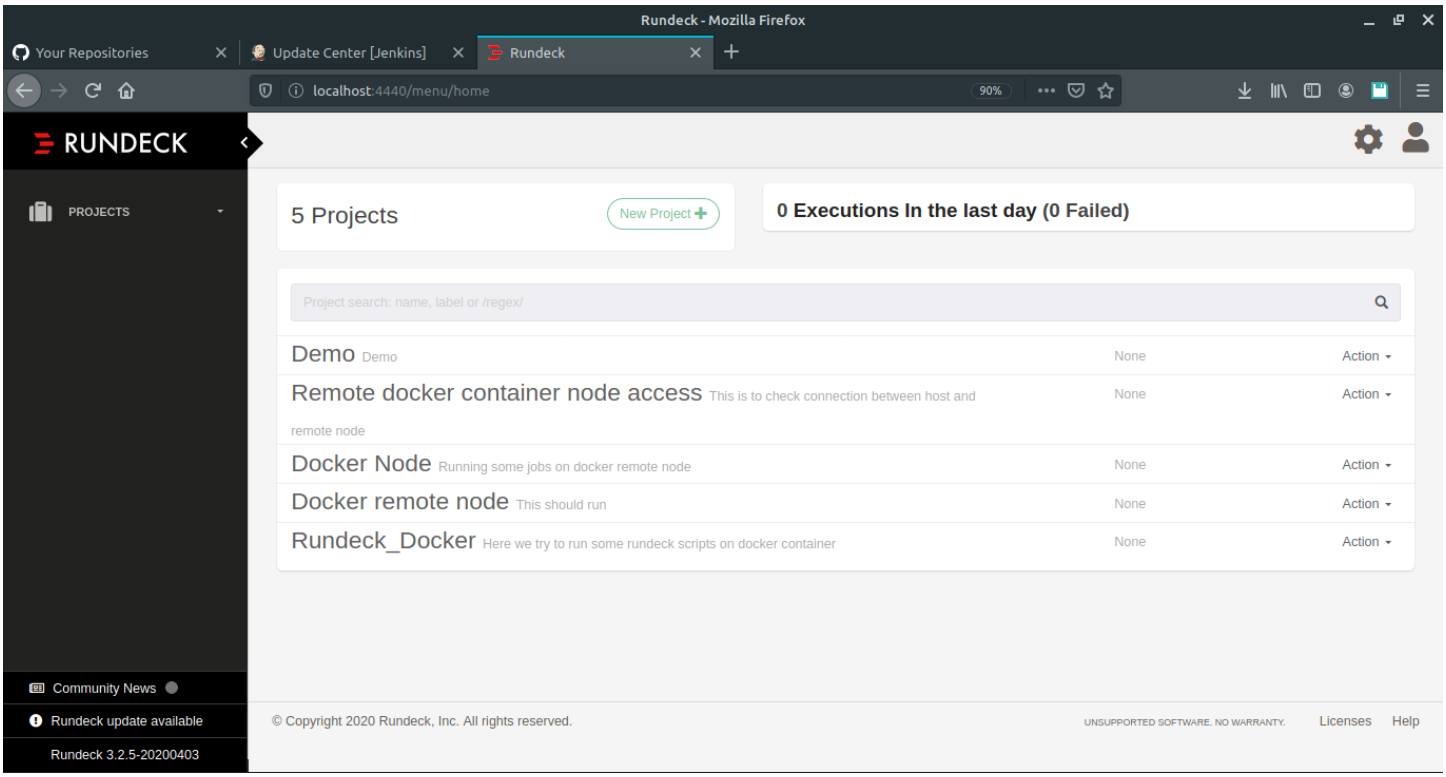
The docker image is pushed from jenkins after the build stage and pulled on from rundeck job. The docker image can be run using command **docker run –i –t <image_name>**

Challenges and Solution – Docker

While experimenting and deciding the architecture of the project there were some hurdles I encountered. Here's the list of it -

1. **Docker within a docker can lead to docker sock issue** – So earlier the plan was to connect rundeck with a docker container started over the image of Ubuntu and then run **docker pull <calculator_image>**. This gave me constant error of **Got permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: Get http://%2Fvar%2Frun%2Fdocker.sock/v1.40/images/json: dial unix /var/run/docker.sock: connect: permission denied** even though I was logged in as root. This issue was then resolved when I ran docker image as **docker run --privileged –t –i <image_name>**
2. **Docker within a docker can lead to file system issues** – After the first docker issue was resolved, I was able to successfully pull the docker image, but after running it, **docker run –t –i <image_name>** within a docker container I was prompted with **docker: Error response from daemon: error creating aufs mount to /var/lib/docker/aufs/mnt/be6e52c353fa0fe27d9c30b6c14e0b596ebf5fa411a93b4661d66c867756a012-init**. After discussion with professor we both concluded that it's not safe to docker within docker and could lead to file system errors and run docker locally, on a local node.
3. **Docker within a docker official image doesn't support ssh** – Now to go a step further I tried docker within a docker official image from docker hub. But upon pulling I realized that you cannot create ssh instance over it and then further cannot connect to rundeck. To resolve such issues, I had three option **either run docker image locally which would still create its own container**, or **connect to a third party node platform such as azure, aws or google cloud and pull docker image over it and run the image over there**, or **change the docker image build of the code over Ubuntu docker image and openjdk and run our created docker image over it.** I chose to pull docker image on local node from rundeck and run it over the created container.





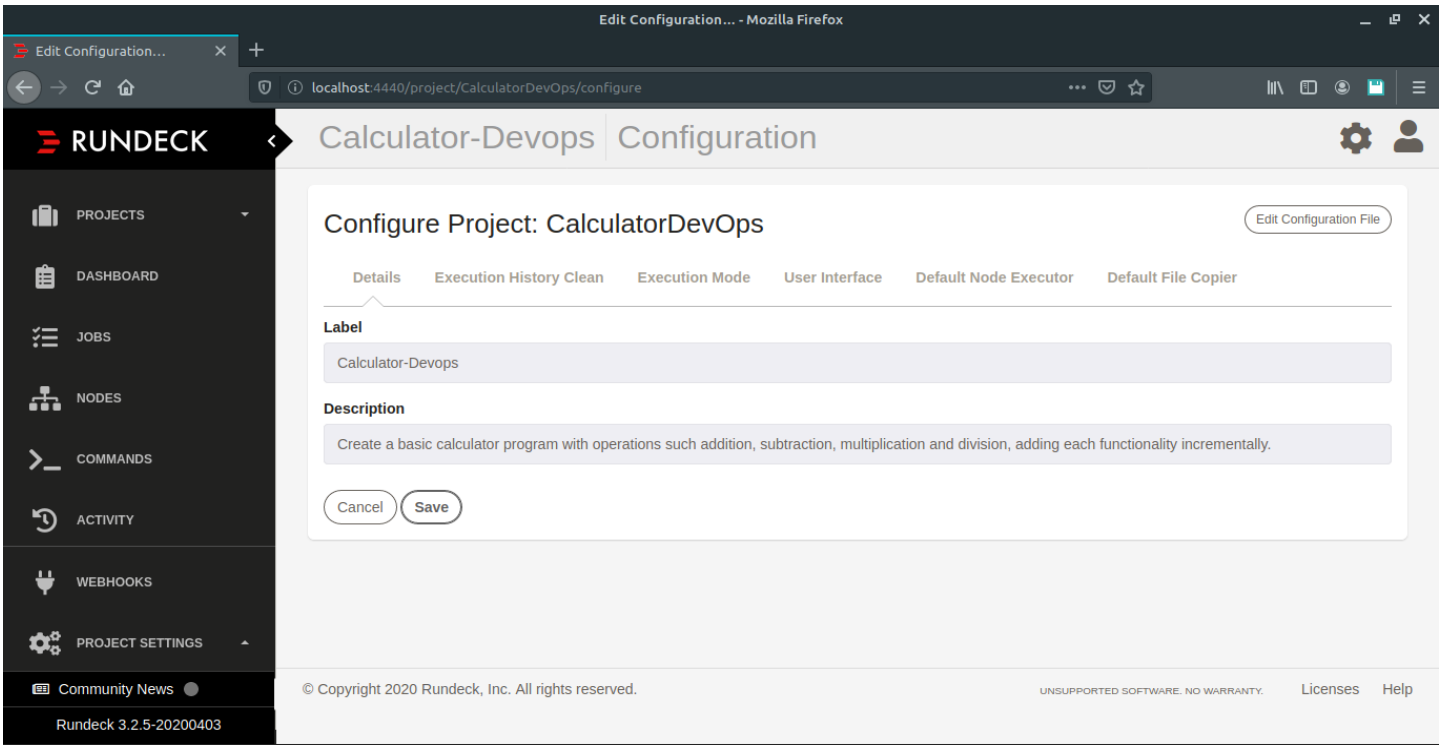
Rundeck Setup - 1

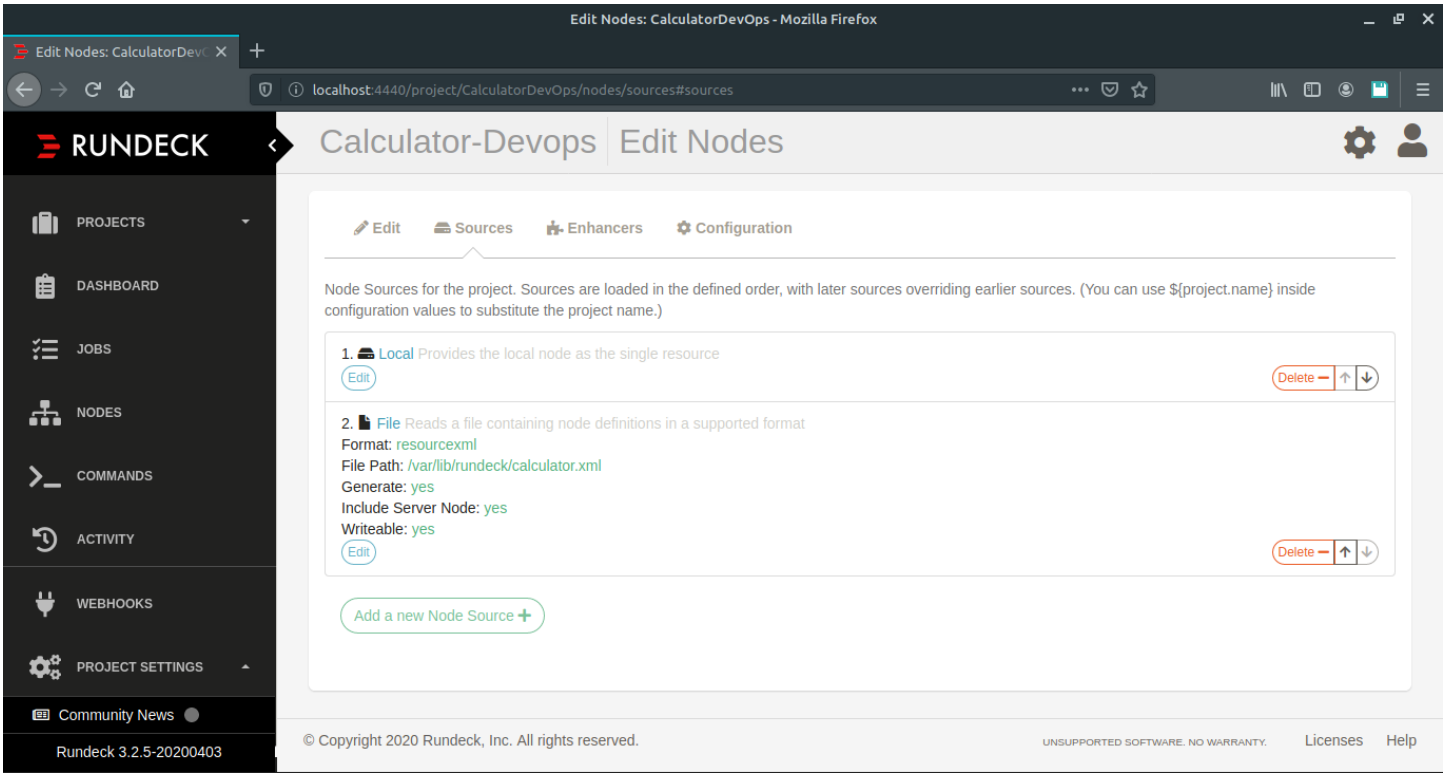
Rundeck is tool for continuous deployment where we can configure any number of nodes to a project and connect them via ssh. After successfully connecting you can create any job related to the project and run commands or scripts or ansible playbooks over the set of nodes. Here we connect rundeck with jenkins pipeline and rundeck in sequence runs the created job and pulls the docker image.

Since rundeck would be used to pull docker image so rundeck must have docker permission so here we add rundeck to docker group using command **sudo usermod –aG docker rundeck.**

Now run rundeck start with **sudo systemctl start rundeckd**

Rundeck runs at http://localhost:4440



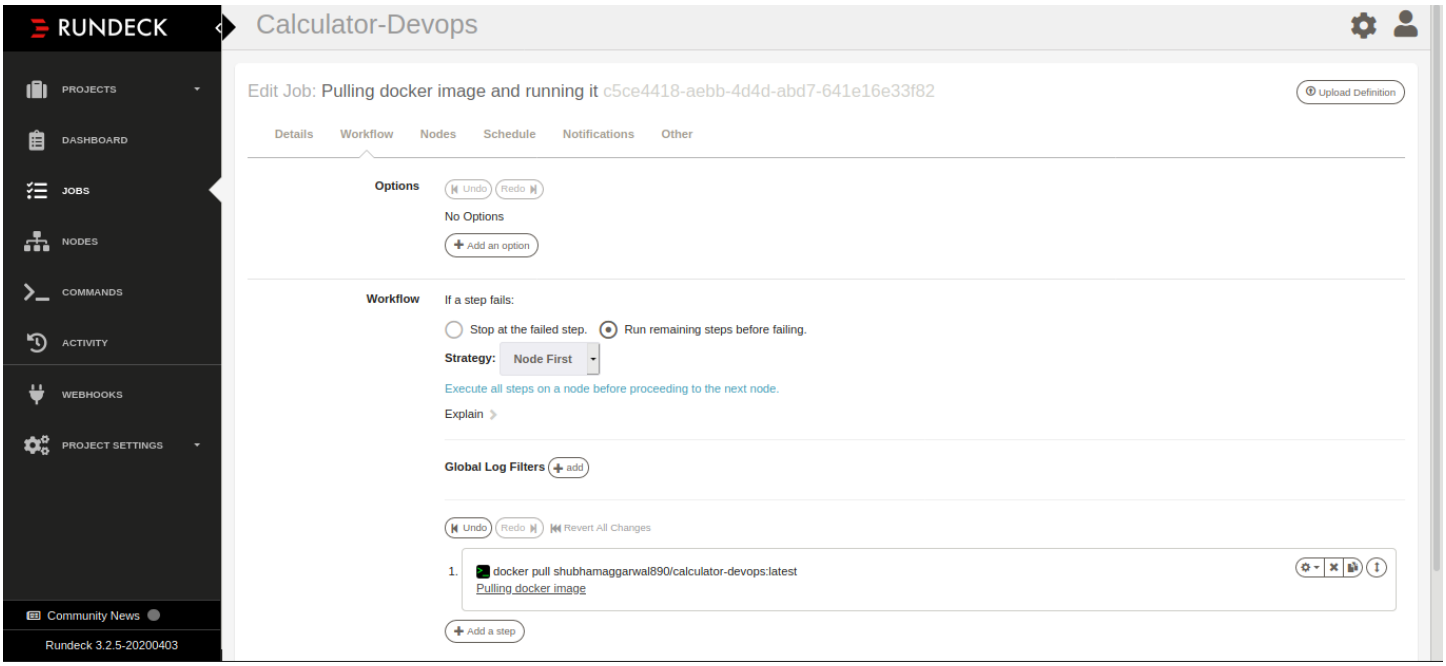


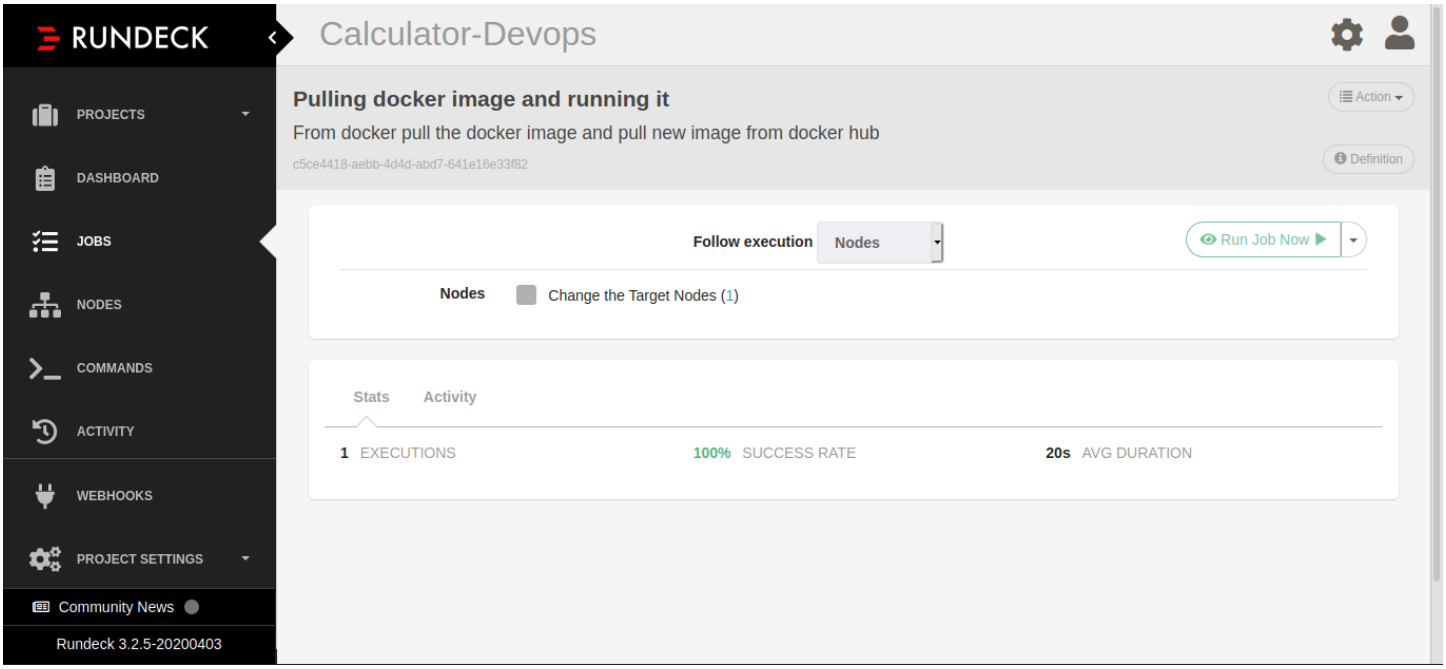
Rundeck Setup - 2

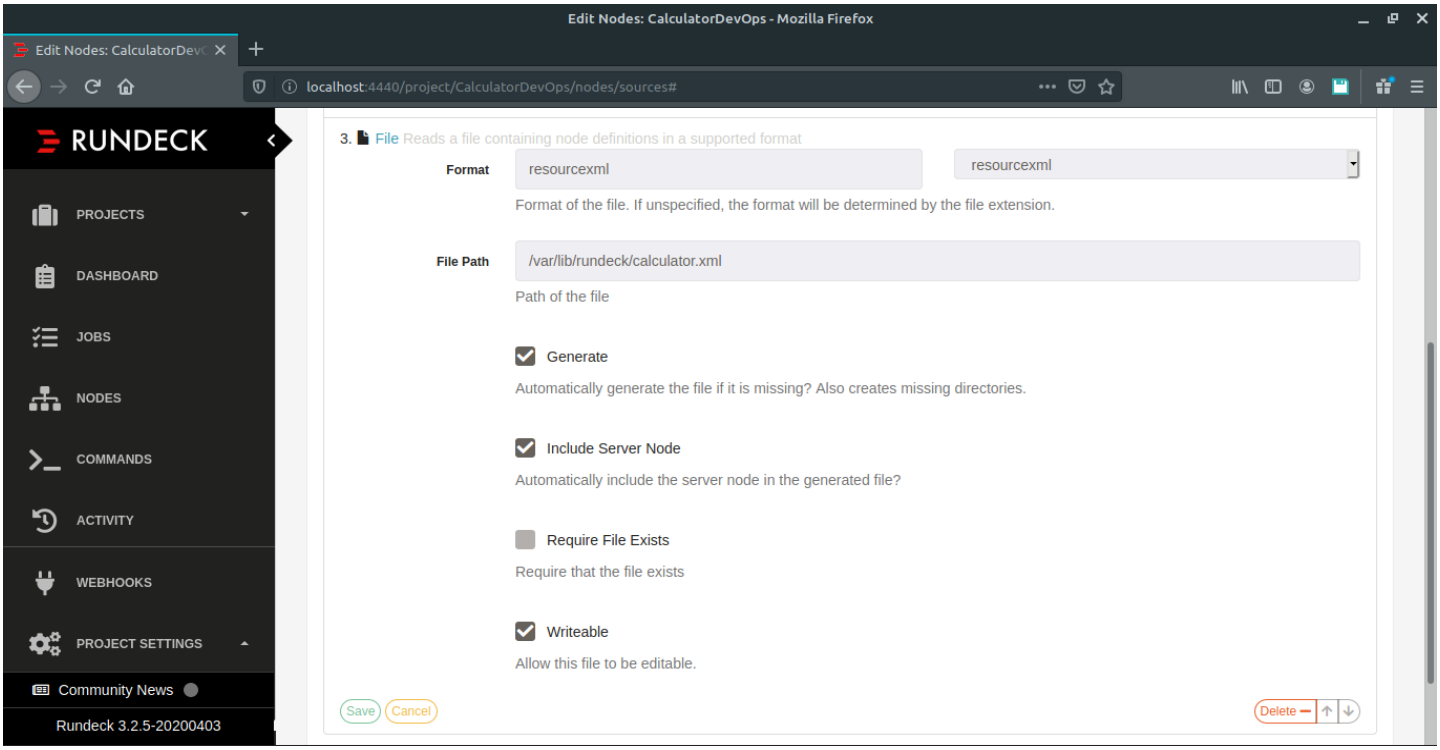
In rundeck we create a project and to that project you can add description and other project details. After creating project one has to add nodes to the project. Nodes can be added under project settings and edit nodes.

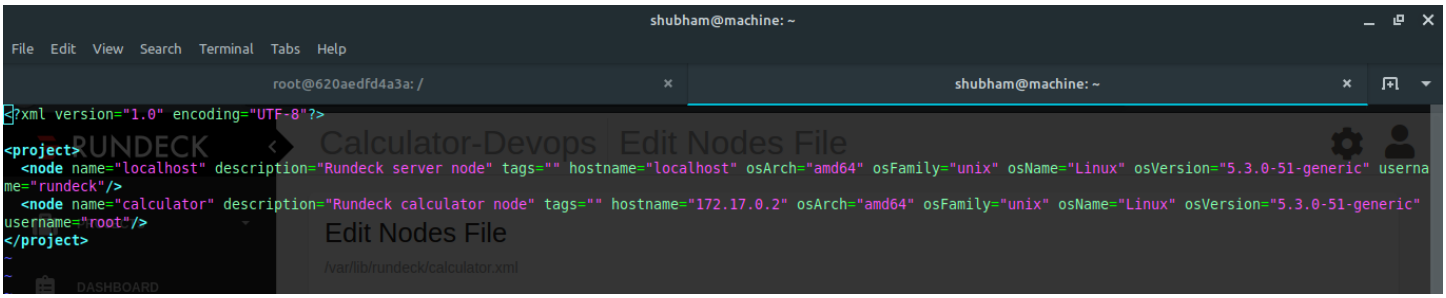
After configuring the node, I created a job and added the node configured to it and also added the script what this job would actually do. The motto of job was to pull the docker image. So accordingly the workflow was set to it and job description was set, the job id was then fed to the rundeck build created in jenkins so that jenkins can then trigger rundeck job after finishing of earlier stages.

To test if the node is set properly you can test it under commands in project.









Setting nodes on Rundeck – Running docker image on docker container or on cloud.

Setting nodes on rundeck was a little tricky for a while but after a fixed set of commands and lot of experimenting it was well cracked. So it starts with project settings > Edit nodes. Under Edit nodes in source tab we add resource xml file by adding a new node source. Set the path of the required details. Now either from rundeck itself or terminal modify the resource xml file by adding node details such as hostname and username.

On the attached docker container or running third party cloud machine. Either create a new user by command **useradd username or modify to login as root via ssh**. If doing on docker container make sure you have installed openssh-server by command **apt update && apt install openssh-server.**

Now make change in **/etc/ssh/sshd_config** and make **PermitRootLogin yes**

Then restart ssh by **service ssh restart,** you can also use systemctl provided it is installed in container.

Then generated keys for the ssh, for you to login from host machine without password you can do this by command **ssh-keygen**

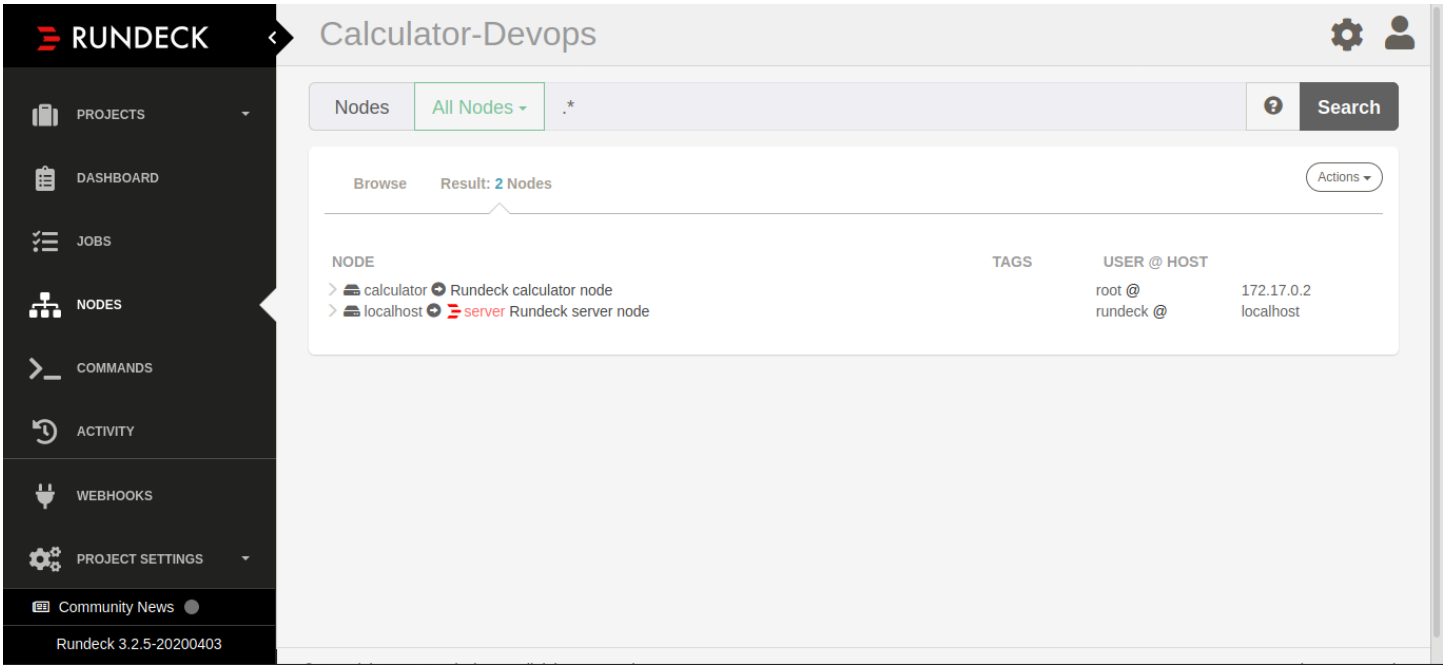
Now on from host machine do the same generate the keys if not generated by **ssh-keygen**,

Then copy the keygen to docker container by **ssh-copy-id root@172.17.0.x** or **ssh-copy-id username@ipaddress** for your third party or within network another machine.

After this copy **your host private key to /etc/lib/rundeck/.ssh**, via command **cp ~/.ssh/* /var/lib/rundeck/.ssh**.

Now the copied ssh files would have user and group owner as not rundeck we have to give permissions so that rundeck can access it too. This can be done using command **sudo chown rundeck:rundeck /var/lib/rundeck/.ssh**

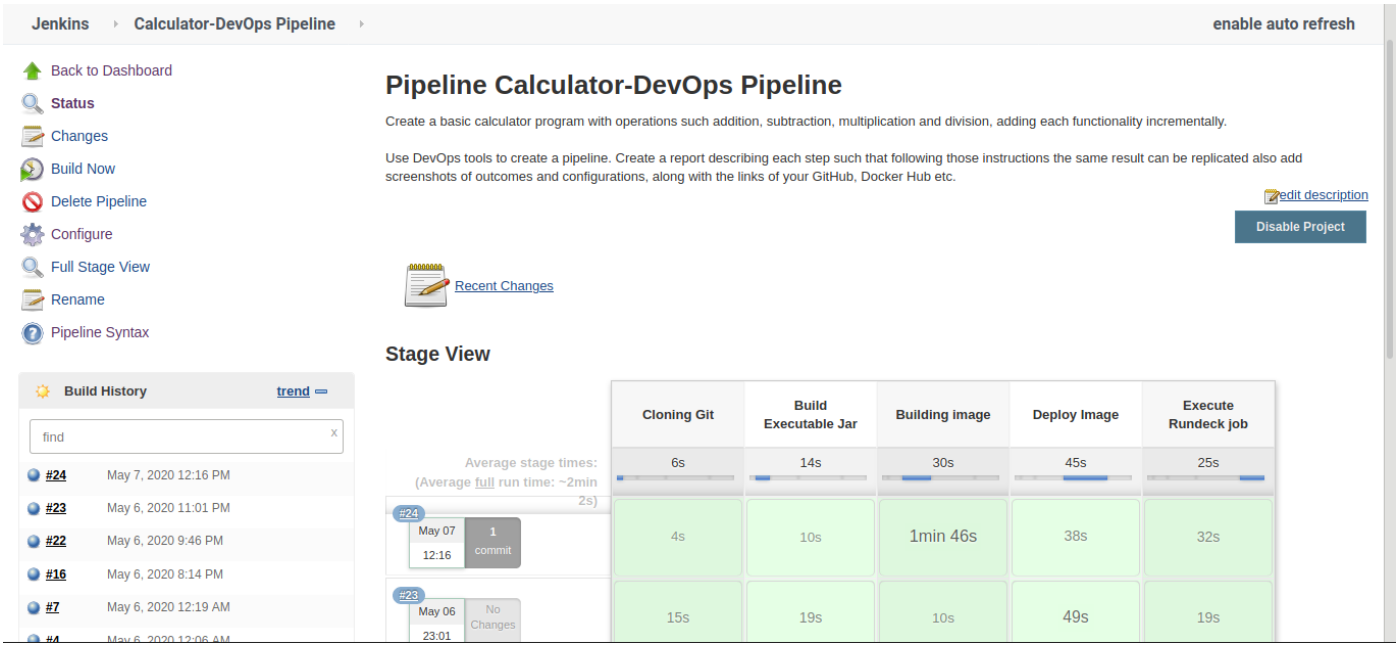
Your rundeck can now access nodes present within resource xml file.



Challenges and Solution – Rundeck

While working on rundeck many challenges were encountered. Some hurdles could be resolved and some couldn't because of architecture constraints, here's the list of it –

1. **Rundeck cannot take input from a running job** – So I tried couple of things here I wanted to run my docker image pulled from docker hub on to a rundeck job. But since Rundeck doesn't support input from job command desk it would throw an error **the input device is not a tty.** This can be resolved if we pass parameters via echo example **echo "1" && docker run –i –t <docker image name>** but again it's not a convenient method for multiple inputs. You can run a docker image provided it's doesn't ask for any input.
2. **Rundeck cannot access docker, doesn't have permission for docker.sock –** This usually occurs if the docker is not running which can be checked via **sudo systemctl status docker** and make sure rundeck is in group of docker, which can be checked via **sudo grep docker /etc/gshadow** if not this can be done using command **sudo usermod –aG docker rundeck** and then restart **sudo systemctl restart docker**
3. **SSH configuration and not able to connect to node –** This issue usually occurs because of miss in steps of ssh configuration while setting up nodes, check for **/etc/ssh/sshd_config file for permit root login**, add **ssh-keygen** of host machine to docker node via **ssh-copy-id root@<docker ip address>**, **copy ~/.ssh/* to /var/lib/rundeck/.ssh** and **set user and group owner of /var/lib/rundeck/.ssh as rundeck**
4. **apt-get-add doesn't work on rundeck job –** So what I tried was to setup docker and other relative environment on docker container via rundeck job surprisingly apt-get-add doesn't work over it and throws an error, to setup nodes you can either use chef cookbook or ansible playbook.



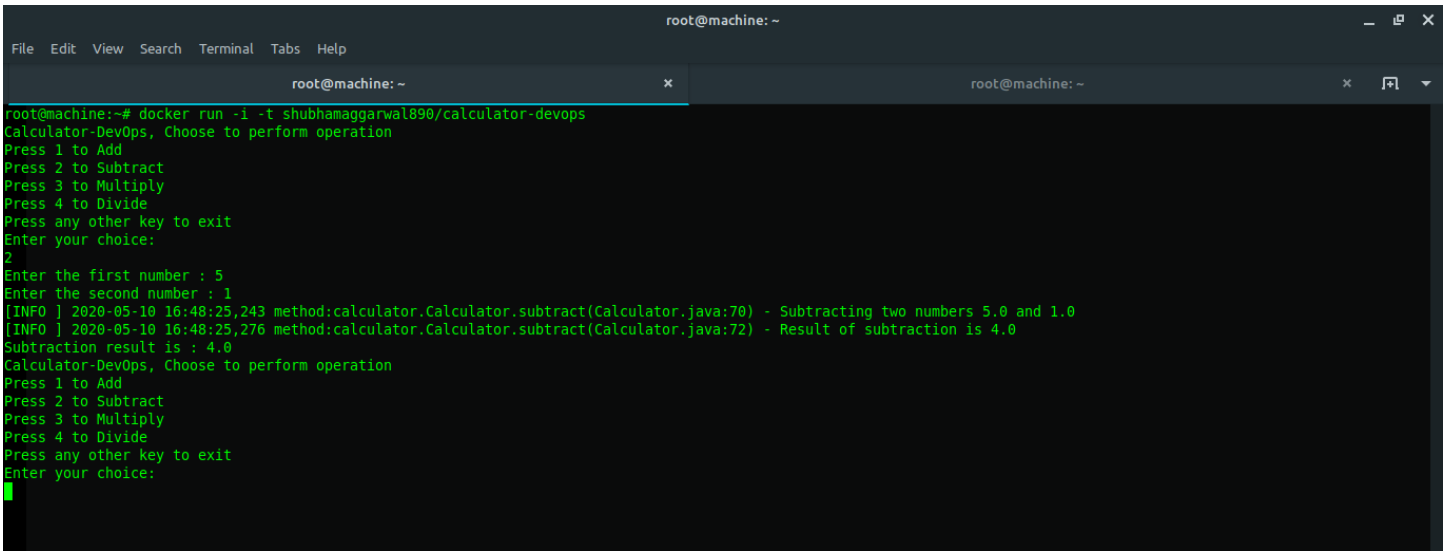
Jenkins pipeline in function

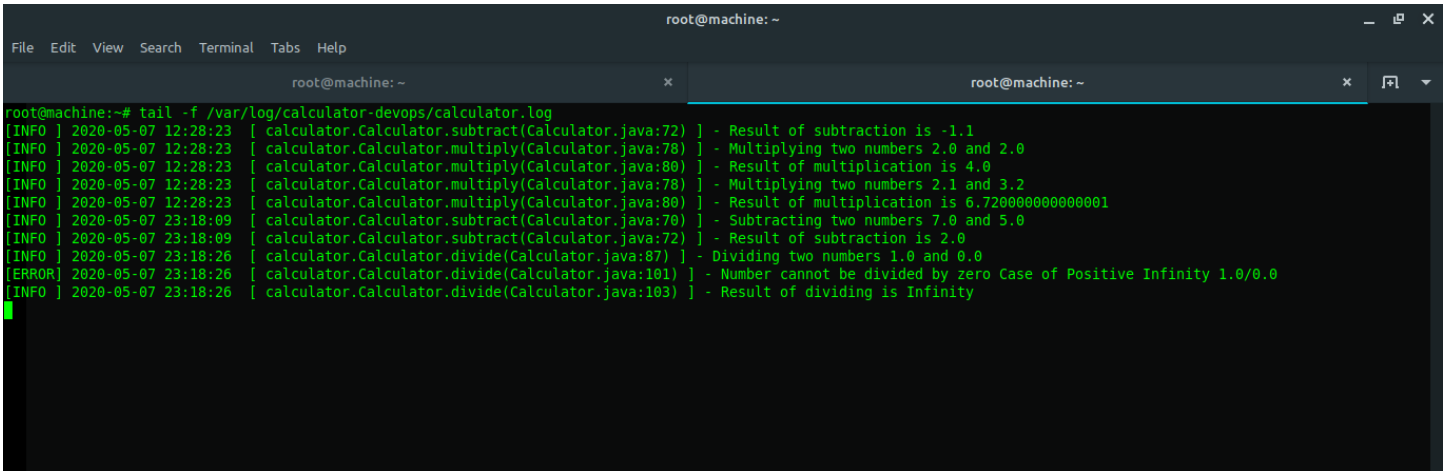
After we are done setting up every aspect of our DevOps tool chain, we may now build the jenkins job. This job for now can be manually triggered but for other SCM like gitlab it can be triggered based on events such as new push or new pull but for GitHub you might have set up a webhook. This can be done via port forwarding; you have make your jenkins port 8080 open on wide internet so it can be triggered based on event.

For now, we'll skip it and we'll build it manually, every stage of the pipeline script works in sequence which includes

- Cloning Git
- Build Executable Jar
- Building image (docker)
- Deploy Image
- Execute Rundeck job

After successful jenkins job build you'll find that maven test runs successfully while writing logs to /var/log/calculator-devops/calculator.log, building new docker image and pushing it on to docker hub and then rundeck pull the docker image on the local node.





Execution of Docker image

After we are done pulling docker image from rundeck on local node we can run it as **docker run –i –t shubhamaggarwal890/calculator-devops**, but the logs won't be created on to your local machine since the docker is running on a docker image container. But jenkins maven build logs can be seen through from described path of logs within log4j.properties file.

If you do only docker run shubhamaggarwal890/calculator-devops it would throw a scanner error because it won't find any input so make sure you make it interactive and attached to terminal.

```
input
{
        file {
                path => "var/logs/calculator-devops/calculator.log"
        }

}

output
{


        elasticsearch {

        }

        stdout {
                codec => dots
        }

}
~
~
```

```
shubham@machine:~/Documents/Tools$ ./elasticsearch-7.6.2/bin/elasticsearch
OpenJDK 64-Bit Server VM warning: Option UseConcMarkSweepGC was deprecated in version 9.0 and will likely be removed in a future release.
[2020-05-10T22:33:05,186][INFO ][o.e.e.NodeEnvironment    ] [machine] using [1] data paths, mounts [[/ (/dev/sda2)]], net usable_space [113.8gb], net total_space [915.3g
b], types [ext4]
[2020-05-10T22:33:05,219][INFO ][o.e.e.NodeEnvironment    ] [machine] heap size [990.7mb], compressed ordinary object pointers [true]
[2020-05-10T22:33:06,667][INFO ][o.e.n.Node               ] [machine] node name [machine], node ID [VgJXrTDbTSOfUhTKpbaS7g], cluster name [elasticsearch]
[2020-05-10T22:33:06,667][INFO ][o.e.n.Node               ] [machine] version[7.6.2], pid[22829], build[default/tar/ef48eb35cf30adf4db14086e8aabd07ef6fb113f/2020-03-26T0
6:34:37.794943Z], OS[Linux/5.3.0-51-generic/amd64], JVM[AdoptOpenJDK/OpenJDK 64-Bit Server VM/13.0.2/13.0.2+8]
[2020-05-10T22:33:06,668][INFO ][o.e.n.Node               ] [machine] JVM home [/home/shubham/Documents/Tools/elasticsearch-7.6.2/jdk]
[2020-05-10T22:33:06,669][INFO ][o.e.n.Node               ] [machine] JVM arguments [-Des.networkaddress.cache.ttl=60, -Des.networkaddress.cache.negative.ttl=10, -XX:+Al
waysPreTouch, -Xss1m, -Djava.awt.headless=true, -Dfile.encoding=UTF-8, -Djna.nosys=true, -XX:-OmitStackTraceInFastThrow, -Dio.netty.noUnsafe=true, -Dio.netty.noKeySetOpt
imization=true, -Dio.netty.recycler.maxCapacityPerThread=0, -Dio.netty.allocator.numDirectArenas=0, -Dlog4j.shutdownHookEnabled=false, -Dlog4j2.disable.jmx=true, -Djava.
locale.providers=COMPAT, -Xms1g, -Xmx1g, -XX:+UseConcMarkSweepGC, -XX:CMSInitiatingOccupancyFraction=75, -XX:+UseCMSInitiatingOccupancyOnly, -Djava.io.tmpdir=/tmp/elasti
csearch-7187029776826659886, -XX:+HeapDumpOnOutOfMemoryError, -XX:HeapDumpPath=data, -XX:ErrorFile=logs/hs_err_pid%p.log, -Xlog:gc*,gc+age=trace,safepoint:file=logs/gc.l
og:utctime,pid,tags:filecount=32,filesize=64m, -XX:MaxDirectMemorySize=536870912, -Des.path.home=/home/shubham/Documents/Tools/elasticsearch-7.6.2, -Des.path.conf=/home/
shubham/Documents/Tools/elasticsearch-7.6.2/config, -Des.distribution.flavor=default, -Des.distribution.type=tar, -Des.bundled_jdk=true]
[2020-05-10T22:33:13,527][INFO ][o.e.p.PluginsService     ] [machine] loaded module [aggs-matrix-stats]
[2020-05-10T22:33:13,528][INFO ][o.e.p.PluginsService     ] [machine] loaded module [analysis-common]
[2020-05-10T22:33:13,529][INFO ][o.e.p.PluginsService     ] [machine] loaded module [flattened]
[2020-05-10T22:33:13,529][INFO ][o.e.p.PluginsService     ] [machine] loaded module [frozen-indices]
[2020-05-10T22:33:13,530][INFO ][o.e.p.PluginsService     ] [machine] loaded module [ingest-common]
```

```
shubham@machine:~/Documents/Tools$ ./logstash-7.6.2/bin/logstash -f ./logstash.conf
Sending Logstash logs to /home/shubham/Documents/Tools/logstash-7.6.2/logs which is now configured via log4j2.properties
[2020-05-10T22:37:43,055][WARN ][logstash.config.source.multilocal] Ignoring the 'pipelines.yml' file because modules or command line options are specified
[2020-05-10T22:37:45,270][INFO ][logstash.runner          ] Starting Logstash {"logstash.version"=>"7.6.2"}
[2020-05-10T22:37:54,430][INFO ][org.reflections.Reflections] Reflections took 2404 ms to scan 1 urls, producing 20 keys and 40 values
[2020-05-10T22:38:09,960][INFO ][logstash.outputs.elasticsearch][main] Elasticsearch pool URLs updated {:changes=>{:removed=>[], :added=>[http://127.0.0.1:9200/]}}
[2020-05-10T22:38:16,842][WARN ][logstash.outputs.elasticsearch][main] Restored connection to ES instance {:url=>"http://127.0.0.1:9200/"}
[2020-05-10T22:38:17,873][INFO ][logstash.outputs.elasticsearch][main] ES Output version determined {:es_version=>7}
[2020-05-10T22:38:17,879][WARN ][logstash.outputs.elasticsearch][main] Detected a 6.x and above cluster: the `type` event field won't be used to determine the document _
type {:es_version=>7}
[2020-05-10T22:38:20,727][INFO ][logstash.outputs.elasticsearch][main] New Elasticsearch output {:class=>"LogStash::Outputs::ElasticSearch", :hosts=>["//127.0.0.1"]}
[2020-05-10T22:38:20,803][INFO ][logstash.outputs.elasticsearch][main] Using default mapping template
[2020-05-10T22:38:20,880][WARN ][org.logstash.instrument.metrics.gauge.LazyDelegatingGauge][main] A gauge metric of an unknown type (org.jruby.specialized.RubyArrayOneOb
ject) has been created for key: cluster_uuids. This may result in invalid serialization.  It is recommended to log an issue to the responsible developer/development team
.
[2020-05-10T22:38:20,901][INFO ][logstash.javapipeline    ][main] Starting pipeline {:pipeline_id=>"main", "pipeline.workers"=>4, "pipeline.batch.size"=>125, "pipeline.b
atch.delay"=>50, "pipeline.max_inflight"=>500, "pipeline.sources"=>["/home/shubham/Documents/Tools/logstash.conf"], :thread=>"#<Thread:0x12f69a94 run>"}
[2020-05-10T22:38:21,405][INFO ][logstash.outputs.elasticsearch][main] Attempting to install template {:manage_template=>{"index_patterns"=>"logstash-*", "version"=>6000
1, "settings"=>{"index.refresh_interval"=>"5s", "number_of_shards"=>1, "index.lifecycle.name"=>"logstash-policy", "index.lifecycle.rollover_alias"=>"logstash"}, "mapping
s"=>{"dynamic_templates"=>[{"message_field"=>{"path_match"=>"message", "match_mapping_type"=>"string", "mapping"=>{"type"=>"text", "norms"=>false}}}, {"string_fields"=>{
"match"=>"*", "match_mapping_type"=>"string", "mapping"=>{"type"=>"text", "norms"=>false, "fields"=>{"keyword"=>{"type"=>"keyword", "ignore_above"=>256}}}}}], "propertie
s"=>{"@timestamp"=>{"type"=>"date"}, "@version"=>{"type"=>"keyword"}, "geoip"=>{"dynamic"=>true, "properties"=>{"ip"=>{"type"=>"ip"}, "location"=>{"type"=>"geo_point"},
"latitude"=>{"type"=>"half_float"}, "longitude"=>{"type"=>"half_float"}}}}}}}
[2020-05-10T22:38:31,716][INFO ][logstash.inputs.file     ][main] No sincedb_path set, generating one based on the "path" setting {:sincedb_path=>"/home/shubham/Document
s/Tools/logstash-7.6.2/data/plugins/inputs/file/.sincedb_e25e6794032ace186f63e6c0cf287f55", :path=>["/var/log/calculator-devops/calculator.log"]}
[2020-05-10T22:38:31,769][INFO ][logstash.javapipeline    ][main] Pipeline started {"pipeline.id"=>"main"}
[2020-05-10T22:38:31,908][INFO ][filewatch.observingtail  ][main] START, creating Discoverer, Watch with file and sincedb collections
[2020-05-10T22:38:31,917][INFO ][logstash.agent           ] Pipelines running {:count=>1, :running_pipelines=>[:main], :non_running_pipelines=>[]}
```

Elastic Stack – Elastic Search, Logstash, Kibana

ELK stack makes the monitoring tool for any deployed software, it analyzes the logs and the same analysis can then be viewed on kibana dashboard.

To start with download elastic search, logstash and kibana from https://www.elastic.co

Run them side by side and feed the logstash your log set after configuring it config file.

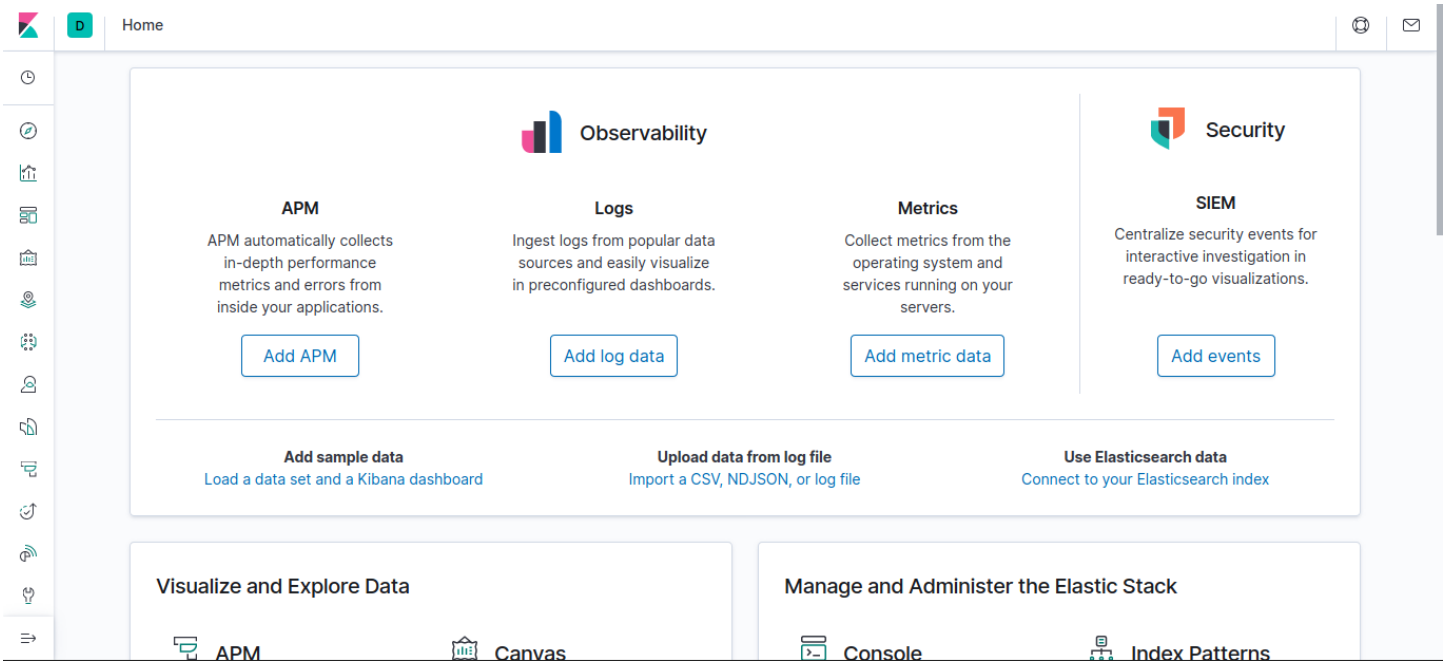
In the config file we provide the details for logs. Here the config file logstash.conf

Elastic search starts at localhost:9200, and kibana starts at localhost:5601

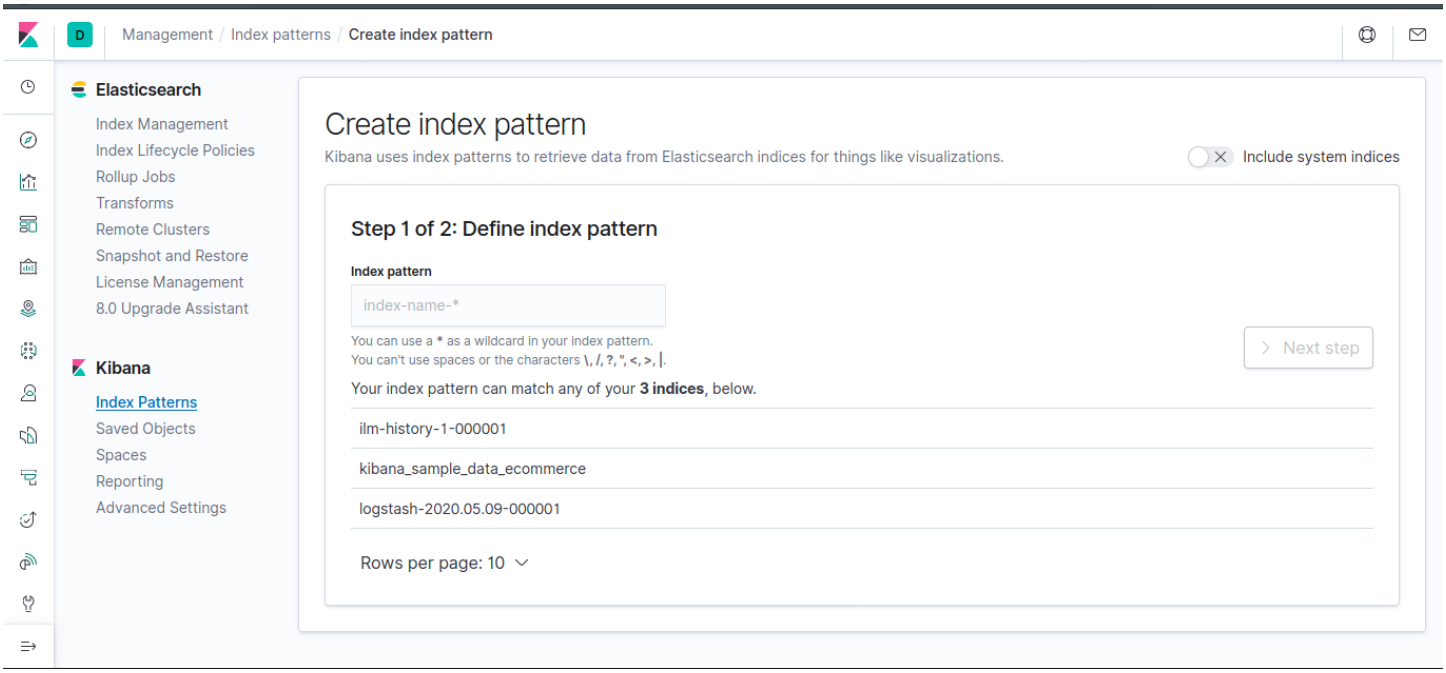
Commands to run

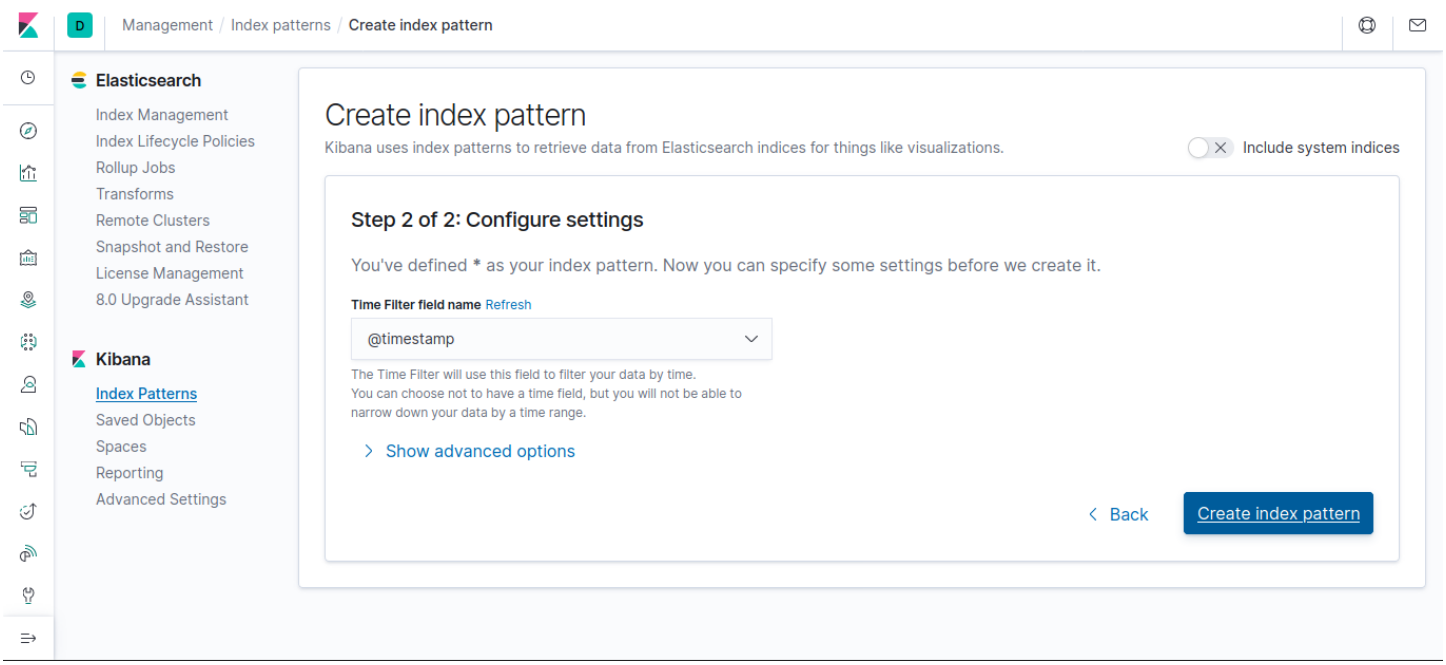
- Elastic search - **./path_to_elastic_search/bin/elastic**
- Logstash - **./path_to_logstash/bin/logstash –f ./path_to_logstash.conf**
- Kibana - **./path_to_kibana/bin/kibana**

```
shubham@machine:~/Documents/Tools$ ./kibana-7.6.2-linux-x86_64/bin/kibana
  log   [17:07:59.604] [info][plugins-service] Plugin "case" is disabled.
  log   [17:09:10.111] [info][plugins-system] Setting up [37] plugins: [usageCollection,metrics,canvas,encryptedSavedObjects,code,timelion,features,apm_oss,taskManager,siem,licensing,security,infra,uiActions,data,navigation,status_page,share,newsfeed,kibana_legacy,management,dev_tools,inspector,expressions,visualizations,embeddable,dashboard_embeddable_container,advancedUiActions,home,spaces,cloud,apm,graph,eui_utils,bfetch,translations,reporting]
  log   [17:09:10.113] [info][plugins][usageCollection] Setting up plugin
  log   [17:09:10.115] [info][metrics][plugins] Setting up plugin
  log   [17:09:10.115] [info][canvas][plugins] Setting up plugin
  log   [17:09:10.136] [info][encryptedSavedObjects][plugins] Setting up plugin
  log   [17:09:10.138] [warning][config][encryptedSavedObjects][plugins] Generating a random key for xpack.encryptedSavedObjects.encryptionKey. To be able to decrypt encrypted saved objects attributes after restart, please set xpack.encryptedSavedObjects.encryptionKey in kibana.yml
  log   [17:09:10.206] [info][code][plugins] Setting up plugin
  log   [17:09:10.207] [info][plugins][timelion] Setting up plugin
  log   [17:09:10.208] [info][features][plugins] Setting up plugin
  log   [17:09:10.209] [info][apm_oss][plugins] Setting up plugin
  log   [17:09:10.210] [info][plugins][taskManager] Setting up plugin
  log   [17:09:10.213] [info][plugins][siem] Setting up plugin
  log   [17:09:10.214] [info][licensing][plugins] Setting up plugin
  log   [17:09:10.216] [info][plugins][security] Setting up plugin
  log   [17:09:10.217] [warning][config][plugins][security] Generating a random key for xpack.security.encryptionKey. To prevent sessions from being invalidated on restart, please set xpack.security.encryptionKey in kibana.yml
  log   [17:09:10.218] [warning][config][plugins][security] Session cookies will be transmitted over insecure connections. This is not recommended.
  log   [17:09:10.234] [info][infra][plugins] Setting up plugin
  log   [17:09:10.235] [info][data][plugins] Setting up plugin
  log   [17:09:10.239] [info][plugins][share] Setting up plugin
  log   [17:09:10.241] [info][home][plugins] Setting up plugin
  log   [17:09:10.245] [info][plugins][spaces] Setting up plugin
  log   [17:09:10.249] [info][cloud][plugins] Setting up plugin
  log   [17:09:10.250] [info][apm][plugins] Setting up plugin
  log   [17:09:10.293] [info][graph][plugins] Setting up plugin
  log   [17:09:10.299] [info][bfetch][plugins] Setting up plugin
  log   [17:09:10.300] [info][plugins][translations] Setting up plugin
  log   [17:09:10.305] [info][savedobjects-service] Waiting until all Elasticsearch nodes are compatible with Kibana before starting saved objects migrations...
  log   [17:09:10.488] [info][savedobjects-service] Starting saved objects migrations
  log   [17:09:11.002] [info][plugins-system] Starting [22] plugins: [usageCollection,metrics,canvas,encryptedSavedObjects,code,timelion,features,apm_oss,taskManager,siem,licensing,security,infra,data,share,home,spaces,cloud,apm,graph,bfetch,translations]
```



Setting up kibana includes creating a new index pattern under management. Add a new index pattern and press next to choose @timestamp from next window and this will create a new index pattern to view your logs.





Now you can view your logs and virtualize them based on the chosen index pattern. Make sure to select the time range before it, it is usually configured to ~before 15 minutes, set it appropriately. And click on the discover or visualize to see through the logs and monitor them.