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Physical Machines - Prerequisite

Five Machines, 1 puppet-master and 4 puppet-agent is required.

Node	Name	Requirements	Purpose
1	Master	OS: Debian Jessie RAM: 2GB+	puppet-master
2	Agent1	OS: Debian Jessie RAM: 8GB+	Jira
3	Agent2	OS: Debian Jessie RAM: 2GB+	Jenkins
4	Agent3	OS: Debian Jessie RAM: 2GB+	Gerrit
5	Agent4	OS: Debian Jessie RAM: 2GB+	Zuul

Installation

Provisioning using Vagrant

Tested with Linux (Debian Jessie)

Note: We can use vagrant setup procedure for Testing Purpose, it is not required if installation is for Physical machines.

Prerequisite:

Vagrant >= 1.8.5

Download URL's:

- For Mac

- For windows

Virual Box >= 5.1.2

Download URL's:

- For Mac
- For windows

Provision Machines

Here we are provisioning five virtual machines into virtual box using vagrant, follow the below instructions to provisioning.

- Chnage directory where *Vagrantfile* is placed.
- Ensure that both *puppet-master.sh* and *puppet-agent.sh* is present in same location where vagrant file is placed.

Make the below necessary changes in Vagranfile (if required e.g if you want to change ip addresses for nodes)

For Master VM:

```
config.vm.define "master" do |master|
master.vm.network "private_network", ip: "192.168.35.11"
master.vm.provision "shell", path: "puppet-master.sh", args: "-m 'master' -H
'192.168.35.11' -a 'agent' -h '192.168.35.12 192.168.35.13 192.168.35.14 192.168.35.15'"
```

Description:

- -m : master host name.
- -H : master host IP.
- -a : agent nodes (Required for autosign certificate)
- -h : agent nodes IP.

For Agent VM:

```
config.vm.define "agent1" do |agent1|
agent1.vm.network "private_network", ip: "192.168.35.12"
agent1.vm.provision "shell", path: "puppet-agent.sh", args: "-m 'master' -H '192.168.35.11'
```

```
-a 'agent' -h '192.168.35.12 192.168.35.13 192.168.35.14 192.168.35.15' -i 'agent1'"
end
```

Repeat the same steps in other agents by replacing the agent name.

Scripts

- puppet-master.sh : for puppet master installation and configuration while provisioning VM.
- puppet-agent.sh : for puppet agent installation and configuration while provisioning.

How to run:

Use below command for provision VMs in single shot with vagrant (first time it will take time because it will need to download the linux box).

```
vagrant up
```

Once it is finished successfully, check the status using below command

```
vagrant global-status
```

Now we can login the VM, using below command

```
vagrant ssh master
```

we can provide VM id otherwise VM name while login to instance

Provision Physical machine

Network Configuration

Setting up static ip for stable puppet master-agent configuration.

- The majority of network setup can be done via the *interfaces* configuration file at `/etc/network/interfaces`.

- Configuring the interface manually by adding something like this to `/etc/network/interfaces` will set the default ip (network, broadcast and gateway are optional):

- auto eth0
  iface eth0 inet static
  address 192.168.35.11
  netmask 255.255.255.0
  gateway 192.168.35.1

Note: Your IP configuration may vary according to your Internet settings

- Configure sequentially IP's for Master(192.168.35.11) and Agent(192.168.35.12, 192.168.35.13, 192.168.35.14 & 192.168.35.15) machines respectively.

For Master VM:

Login to Master Machine and configure puppet-master as follows,

- create executable file named *puppet-master.sh* and add the content form here

- Now run the following command to configure puppet-master.

```
./puppet-master.sh -m 'master' -H '192.168.35.11' -a 'agent' -h '192.168.35.12 192.168.35.13 192.168.35.14 192.168.35.15'
```

- Puppet-Master is configured successfully.

For Agent VM:

Login to each of the Agent Machine and configure puppet-agent as follows,

- create executable file named *puppet-agent.sh* and add the content form here

- Now run the following command to configure puppet-agent.

```
./puppet-agent.sh -m 'master' -H '192.168.35.11' -a 'agent' -h '192.168.35.12 192.168.35.13 192.168.35.14 192.168.35.15' -i 'agent1'
```

Note: Replace -i option at the end of command with respect to the agent's

- Puppet-Agent is configured successfully in all agent's.

Infrastructure Overview

Let us have an overview of our instances/Machines,

Instance	Name	Purpose	Private IP's
1	Master	Puppet Master will be Installed	192.168.35.11
2	Agent1	Jira	192.168.35.12
3	Agent2	Jenkins	192.168.35.13
4	Agent3	Gerrit	192.168.35.14
5	Agent4	Zuul	192.168.35.15

Puppet Configuration

After running script on master and all agents puppet will be installed and get configured automatically.

In puppet we need to edit main `site.pp` into "/etc/puppet/manifests/site.pp", which will consider module distribution to agent, look into below code for configure.

Custom Configuration for different modules

Let us dig deep in each resource of site.pp, these instructions are only applicable for additional custom configuration for the various CI modules. Use these instructions to suit your organizational needs"

Agent1 - JIRA

In this resource part the *Jira class* for installing JIRA and *postgresql class* for db server is configured along with username and password.

```
node 'agent1.example.com'{                                  Resources for "agent1"
                class { 'postgresql::server': } ->

                postgresql::server::db { 'jira':
                        user     => 'jiraadm',
                        password => postgresql_password('jiraadm', 'mypassword'),
                } ->
                file { '/usr/java/':
                        ensure => 'directory',
                } ->
                java::oracle { 'jdk8' :
                        ensure  => 'present',
                                version => '8',
                        java_se => 'jdk',
                } ->
                class { 'jira':
                                javahome    => '/usr/java/jdk1.8.0_51',
                }
}
```

specifying username and password for postgresql server

Agent2 - Jenkins

In agent2 resource part Jenkins modules are included along with credentials of JIRA for integration as follows,

```
node 'agent2.example.com'{                  Resources for "agent2"
                include jenkins
                include jenkins::master
                jenkins::plugin { 'gerrit-trigger': }
                jenkins::plugin { 'gearman-plugin': }
                jenkins::plugin { 'workflow-aggregator': }

                class { 'acli':
                        version     => '5.0.0',
                        user        => '',
                        password    => '',
                        jira_server => 'http://agent1.example.com:8080',
                }
}
```

Specify the same username and password that specified in Jira Dashboard creation

Agent3 - Gerrit

Gerrit class is included in agent3 resource part with jenkins slave configuration for integration as shown below,

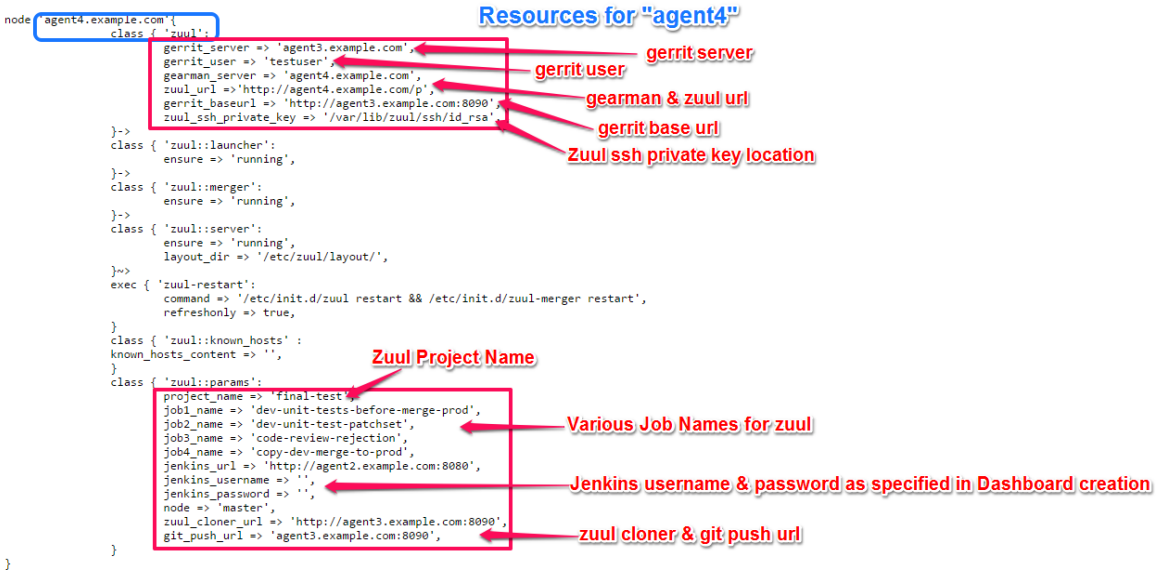
```
                                                    Resources for "agent3"
node 'agent3.example.com'{
                class { 'jenkins::slave':
                        masterurl => 'http://agent2.example.com:8080',
                        ui_user => '',
                        ui_pass => '',
                } ->

                class { 'gerrit':
                        canonicalweburl => 'http://agent3.example.com:8090/',
                        httpd_hostname  => 'agent3.example.com',
                        httpd_port      => '8090',
                }
}
```

Specify same Jenkins username & password that was specified during Jenkins administration dashboard creation

specify Gerrit url and hostname of gerrit_httpd

Agent4 - Zuul

Resource part for agent4 includes Zuul with the following specifications for proper integration,




```
node 'agent4.example.com'{
        class { 'zuul':
                gerrit_server => 'agent3.example.com',
                gerrit_user => 'testuser',
                gearman_server => 'agent4.example.com',
                zuul_url =>'http://agent4.example.com/p',
                gerrit_baseurl => 'http://agent3.example.com:8090',
                zuul_ssh_private_key => '/var/lib/zuul/ssh/id_rsa',
        }->
        class { 'zuul::launcher':
                ensure => 'running',
        }->
        class { 'zuul::merger':
                ensure => 'running',
        }->
        class { 'zuul::server':
                ensure => 'running',
                layout_dir => '/etc/zuul/layout/',
        }~>
        exec { 'zuul-restart':
                command => '/etc/init.d/zuul restart && /etc/init.d/zuul-merger restart',
                refreshonly => true,
        }
        class { 'zuul::known_hosts' :
        known_hosts_content => '',
        }
        class { 'zuul::params':
                project_name => 'final-test',
                job1_name => 'dev-unit-tests-before-merge-prod',
                job2_name => 'dev-unit-test-patchset',
                job3_name => 'code-review-rejection',
                job4_name => 'copy-dev-merge-to-prod',
                jenkins_url => 'http://agent2.example.com:8080',
                jenkins_username => '',
                jenkins_password => '',
                node => 'master',
                zuul_cloner_url => 'http://agent3.example.com:8090',
                git_push_url => 'agent3.example.com:8090',
        }
}
```

Now puppet setup and configuring modules with required parameters has been completed then we need to start one by one puppet agent and run it in server level sequentially.

E.g: “puppet agent start && puppet agent -t”

Once jira setup has been completed and installed successfully we need to configure and login using dashboard(See section Module for reference). Then same credentials and keys we need to put into site.pp and required templates for jenkins and further.

Then finally we need to run puppet agent into zuul. Puppet automation installation is complete and puppet master and agents can be stopped

Tool Dashboard Configuration

Let us explore each modules for detailed understanding,

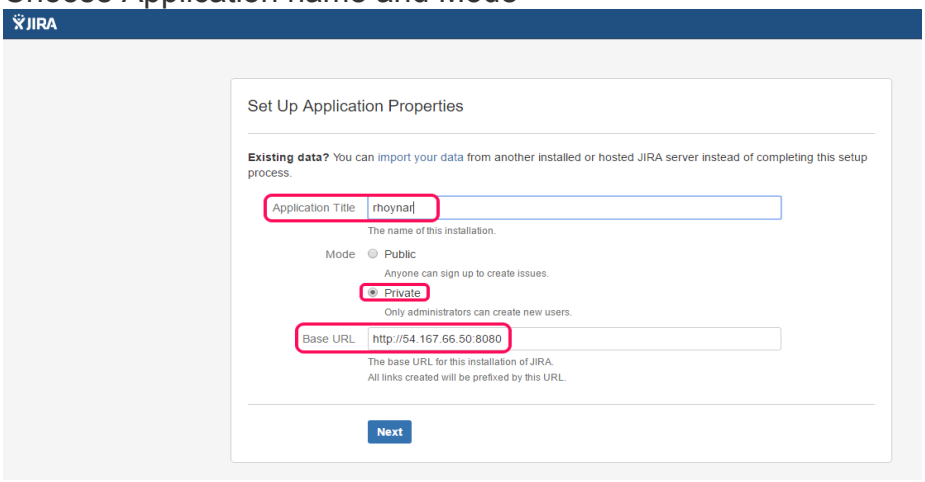
JIRA

As per our puppet module JIRA will be installed on *Agent1*

- Once puppet agent installs JIRA vist the url on port 8080 *192.168.35.12:8080*

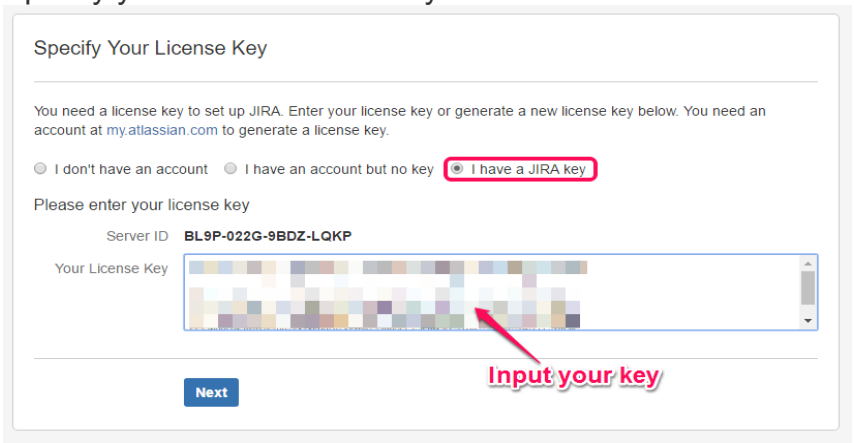
Setup JIRA by using the simple GUI as follows

- Choose Application name and Mode

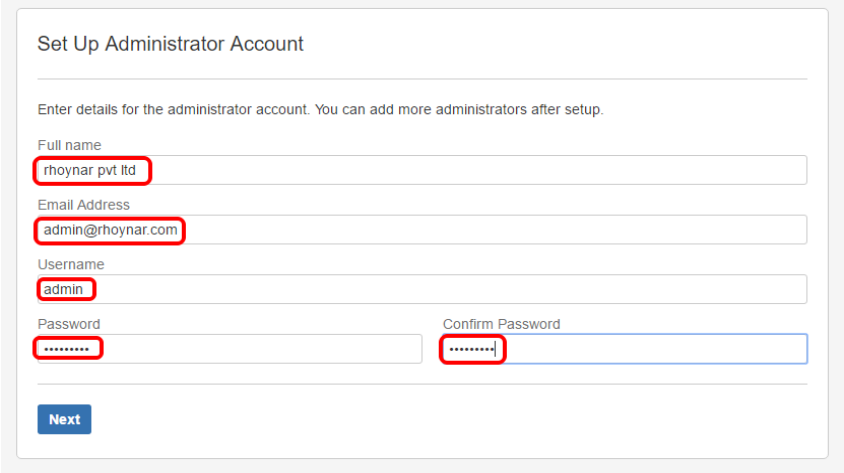


- Choose how do you want to use JIRA

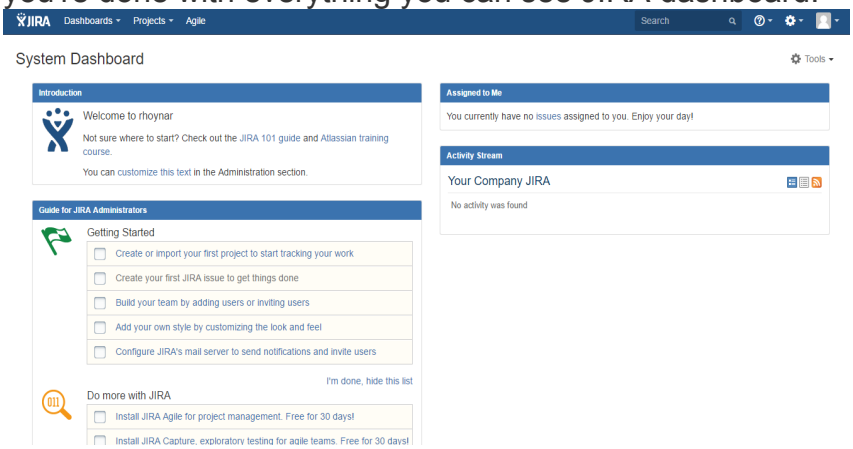
- Specify your JIRA License Key



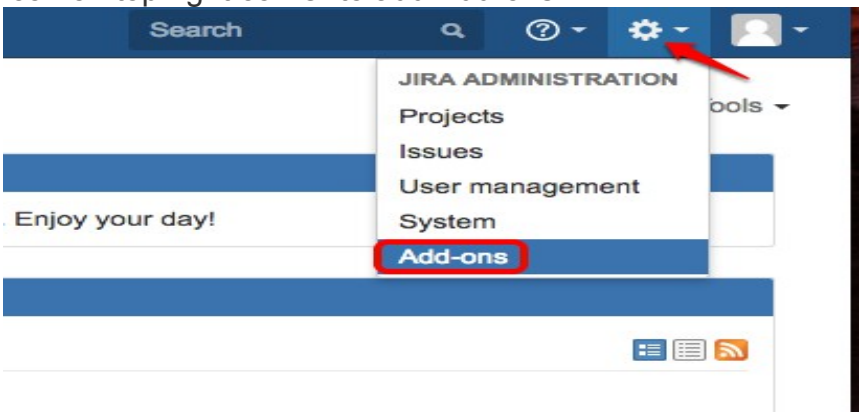
- Setup Administrator account



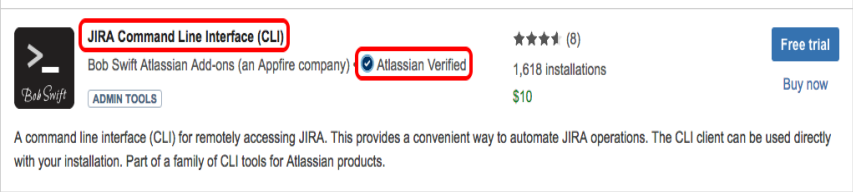
- Configure Email id, Avatar and finish installation with basic intro to JIRA. Once you're done with everything you can see JIRA dashboard.



- Now let us add JIRA CLI Add-ons for interacting with JIRA using CLI, click gear icon on top right corner to add Add-ons.



- From the list of available Add-ons choose JIRA Command Line Interface (CLI) which is Atlassian Verified, to install it.



JIRA Functionality

- we have automated JIRA issues modification as per code-review actions.

- Currently we have added standard workflow transition for jira "To Do – In Progress - Done"

- In case if we need to modify the jobs for transition state. We need to modify puppet jjb template in puppet-master. For modifying jjb follow instructions given in the Jenkins Job.

Jenkins

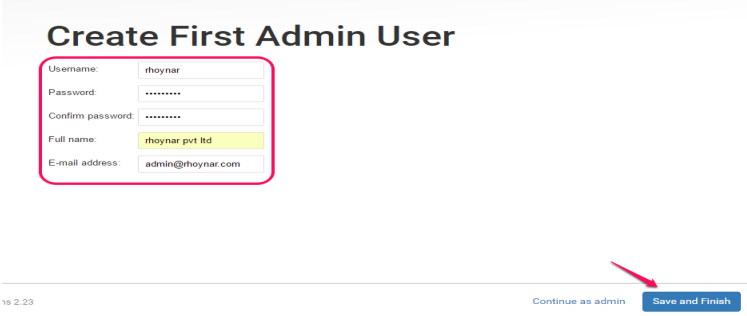
Puppet Module will install Jenkins on Agent2, visit the instance IP with port 8080 to configure Jenkins *192.168.35.12:8080*

- Initiall password will be automatically generated in the following location*/var/lib/jenkins/secrets/initialAdminPassword*

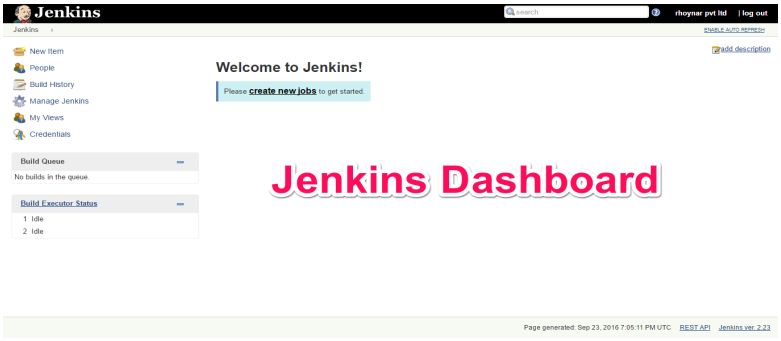
- Login to the instance and copy paste the password.

- Proceed with installing the basic required plugins for Jenkins.

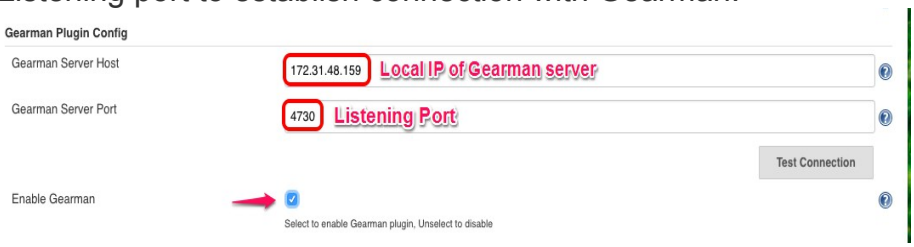
- Setup new administrator *username* and *password* for administrator account.



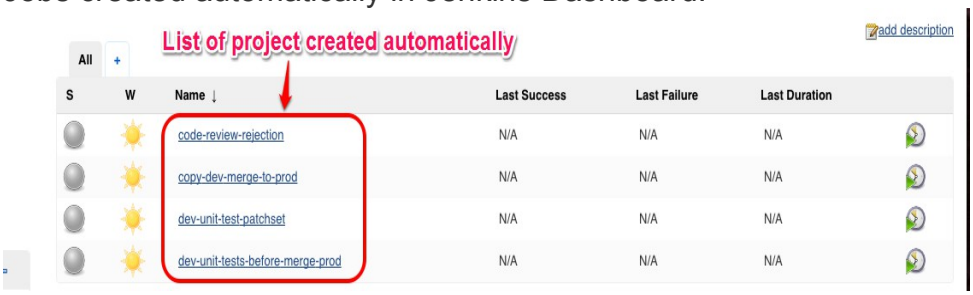
- Now Jenkins is ready.



- Let us make connection with Gearman for interaction. Configure Gearman server IP and Listening port to establish connection with Gearman.



- After successful connection to Gearman with Jenkins we could see the list of Jobs created automatically in Jenkins Dashboard.



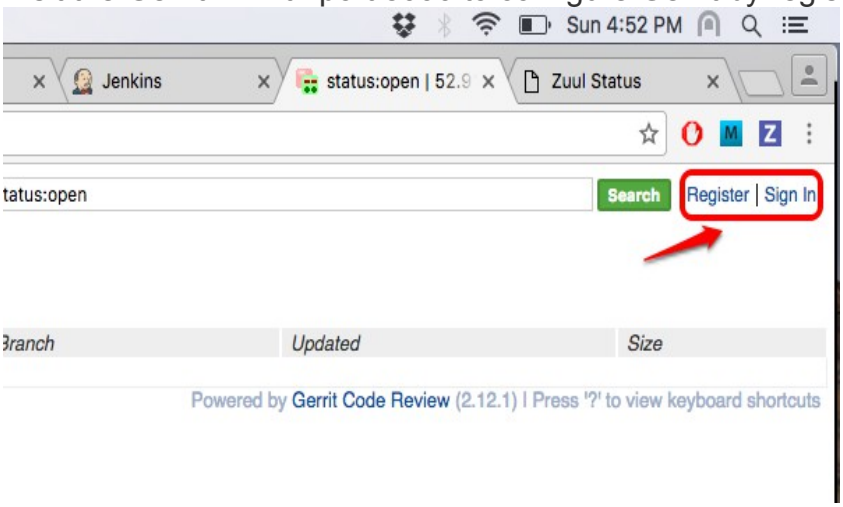
Jenkins Job Functionality

We have automated Jenkins jobs using puppet through zuul server. Currently we have created 4 jobs, in case if we need to modify or add new jobs to it follow the below instructions

Gerrit

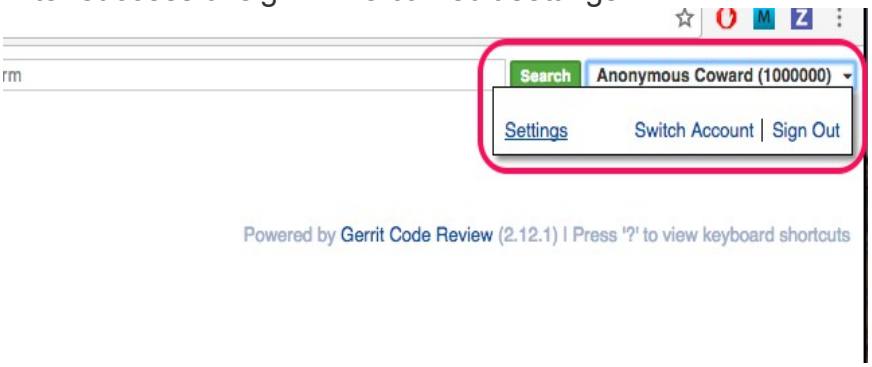
Gerrit is a code review tool which will be installed in Agent3 by puppet module.

- Visit the Gerrit IP with port 8090 to configure Gerrit by registering or signing in.

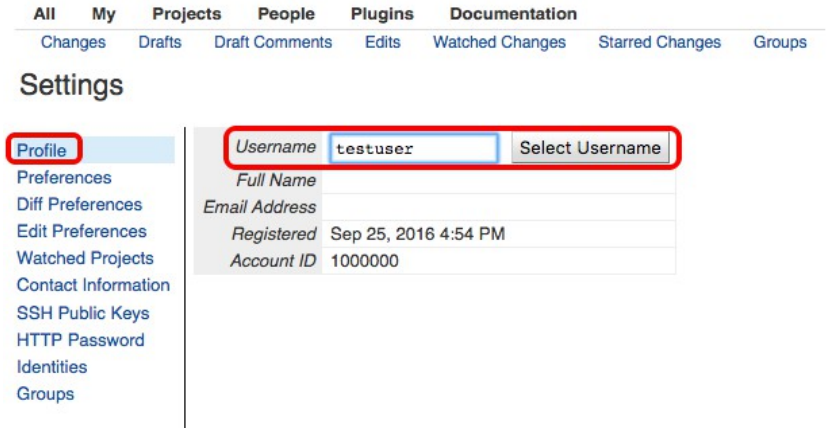


- Sign in to Gerrit with the existing account.

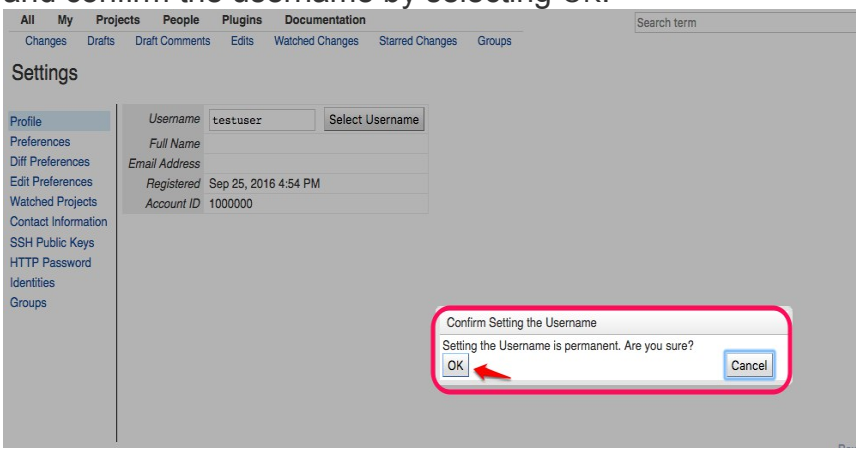
- After successful sign in we can edit settings.



- Under profile select username to setup.

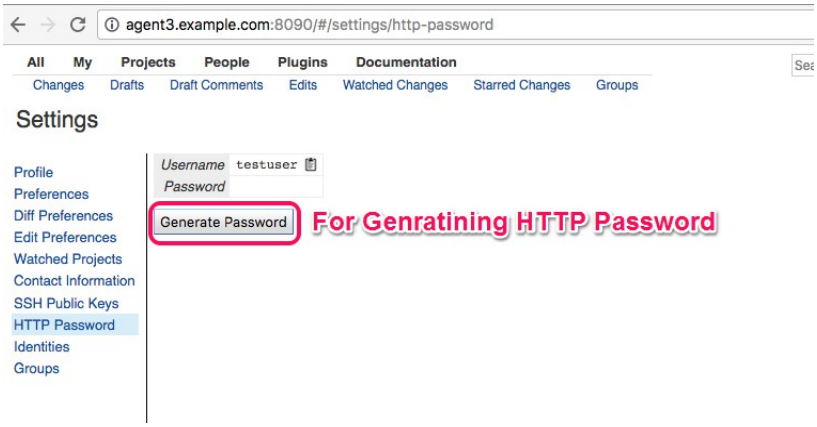


- and confirm the username by selecting OK.



- Add a SSH public key to Gerrit under SSH Public Keys

- Generate HTTP Password.



Zuul

Puppet module will install Zuul in Agent4. Zuul is a pipeline oriented project gating and automation system.

After installation visit the IP for Zuul Dashboard.

Add/Modify Jenkins Job

Zuul creates Jenkins job according to the puppet configuration.

Edit the following file in Puppet-Master for making changes with respect to job or project.

- /etc/puppet/modules/zuul/templates/jjb.yaml.erb

- /etc/puppet/modules/zuul/manifests/params.pp

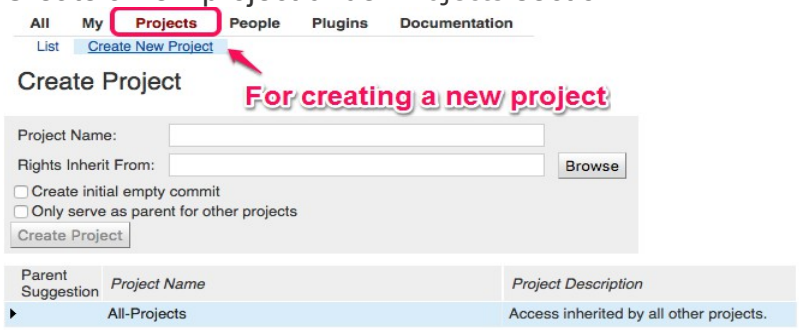
Finally add the modified entries in main site.pp

- /etc/puppet/manifests/site.pp

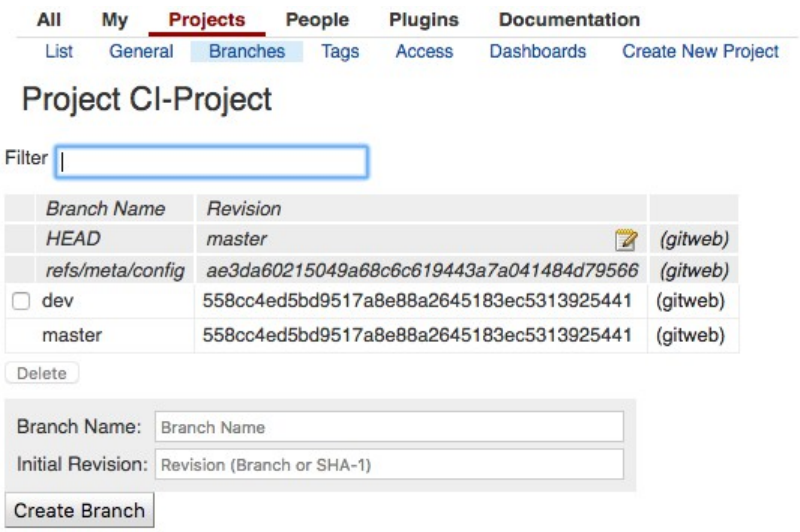
Once all is done, then pull changes from puppet server to zuul server(agent 4) using “puppet agent -t” command.

Create Project

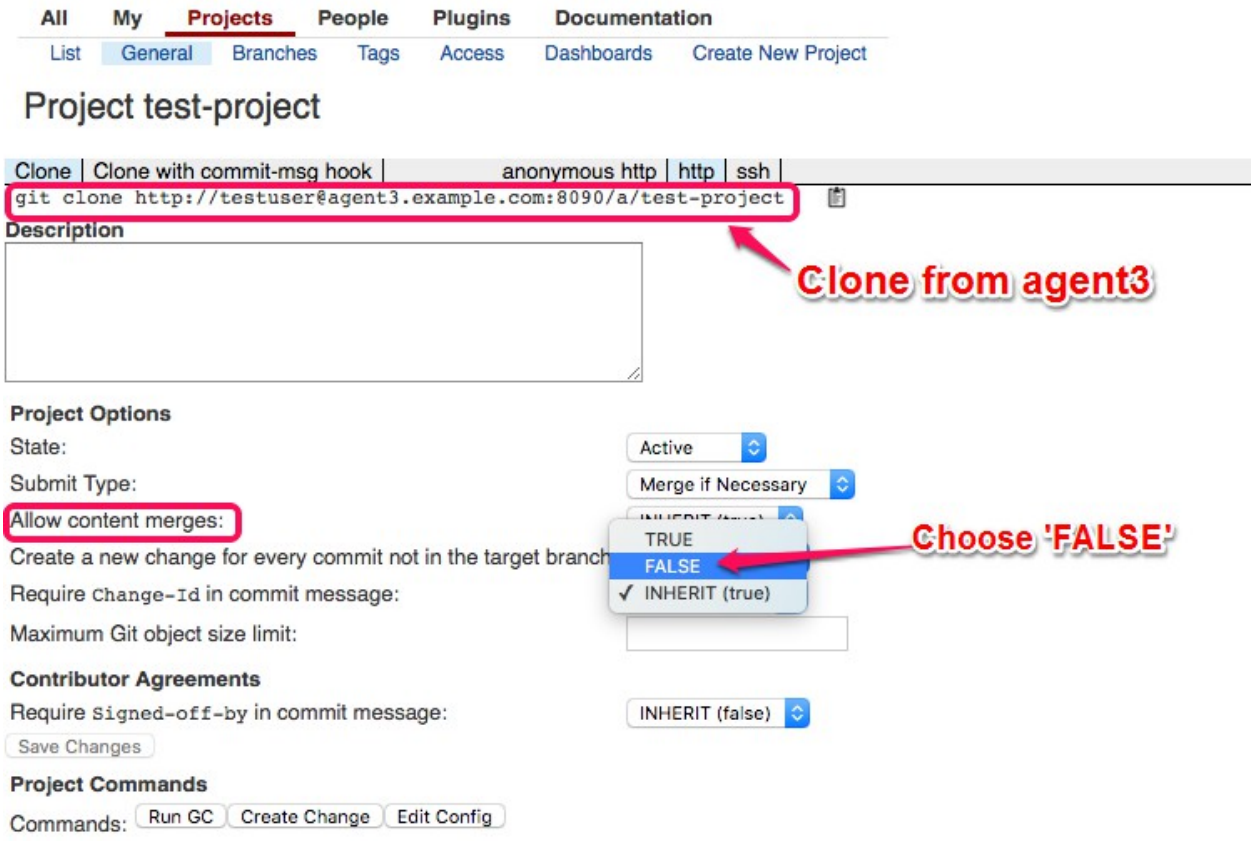
- Create a new project under Projects section.



- Create dev branch



- Clone test-project from agent3 for testuser and choose FALSE for Allow content merges



Git-Review

We use git-review tool for submitting git branches to gerrit for review.

Installation

We use pip to install git-review

```
pip install git-review
```

Setup

By default, git-review will look for a remote named ‘gerrit’ for working with Gerrit. If the remote exists, git-review will submit the current branch to HEAD:refs/for/master at that remote.

If the Gerrit remote does not exist, git-review looks for a file called .gitreview at the root of the repository with information about the gerrit remote. Assuming that file is present,

git-review should be able to automatically configure your repository the first time it is run.

The name of the Gerrit remote is configurable; see the configuration section below.

.gitreview configuration file

Example .gitreview file (used to upload for git-review itself):

```
[gerrit]
host=review.openstack.org
port=29418
project=openstack-infra/git-review.git
defaultbranch=master
```

Note:

Required values: host, project

Optional values: port (default: 29418), defaultbranch (default: master), defaultremote (default: gerrit).

What happens when you submit a change

When you submit a change, git review does the following things:

It looks up which branch to push to (production or whatever) in the .gitreview file. If it can't find this information, it pushes to master

it figures out what "topic" to put on the revision (you can set the topic manually with -t)

if you're resubmitting a downloaded change, it will reuse the tag of the original change

if your commit summary contains a bug number like bug 12345, the tag will be bug/12345

otherwise, the tag will be the name of your local branch

it rebases your change against the HEAD of the branch you're pushing to (use -R to skip this)

if you are submitting more than one change at once, or submitting a change that's based on another unmerged change, it will ask you whether you really meant to do that (use -y to skip this)

it pushes the change for review

For more detailed informaton visit openstack-docs

Git Workflow

Cloning Project:

First we need to clone project to local directory to modify it.

e.g: git clone http://agent3.example.com:8090/Project-Name

Change Branch to Dev:

After cloning project to local directory we need to change the branch to dev.

e.g: git checkout dev or git checkout -b dev

Pull changes from dev:

Once you changed to dev branch you need to pull recent changes for dev branch.

e.g: git pull origin dev

Modify your code:

Then you can start with your work of modifying the code.

Add changes to git:

Once you done with all your changes you need to add changes to git.

e.g: git add file-name or git add

Commit your changes:

Then commit your code, this time we need to take care, while committing code we need to follow the below given standard format

git commit -m “JIRA_ISSUE_ISSUE-ID”

e.g: git commit -m “JIRA_ISSUE_TEST-1”

Push your changes:

Once you committed your changes push code for code-review, we can push code with 2 ways either git push or git-review

e.g: git push origin HEAD:refs/for/dev

git-review

Post Installation Steps

- Once the setup is configured successfully we can stop the puppet master-slave process.
- It is *not mandatory* to stop the process.
- To stop puppet-master login to master machine and run the following command.

```
service puppetmaster stop
```

- Simillarly to stop puppet-agent login to each agent machine and run the following command.

```
service puppet stop
```