Automatic Git Cache Maintenance On The Controller

Google Summer of Code Program 2022 Project Proposal

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Project Abstract :

Automate the actions that administrators want to perform regarding Git caches on their controllers, and allow administrators to control the commits and frequency of commits.

Project Description:

With a simple definition, Jenkins is a CI(Continous Integration) tool that automates the structural processes required dynamically in a software project, enabling the project to be quickly and easily reported and tested and fixed. The maintenance of cached Git repositories in the Jenkins controller is included in the Jenkins. Thus, teams will spend the time they spend on code management on developing code. Devops engineering is among my future plans. I am sure that this project will make an incredible contribution to the software industry.

Project Deliverables:

MAY 20 –JUNE 13

Being active in communication channels, meeting with mentors, meeting with key stakeholders and contributors in the project area, discussing and planning the project with the community and mentors, creating a strategic plan for the coding period, setting up the computer and development environment to work on the project, learning and discussing the process with mentors, documentation learn the rules.

JUNE 13-JUNE 27

- Identifying the java object(s) to be used to perform maintenance tasks.
- Determine the sequence and concurrency of maintenance tasks.
- Creating schedules for maintenance tasks.
- Determine the status of maintenance tasks in the UI.

JUNE 27-JULY 10

Defining environment variable in Jenkins as described in the stackoverflow.

- https://stackoverflow.com/questions/10625259/how-to-set-environment-variables-in-jenkins

JULY 10-JULY 17

Using the defined environment variable in the pipeline.

JULY 17 – JULY 24

Testing and documentation of the code obtained.

JULY 25-JULY 29

- Situation assessment with mentors.
- Documentation planning.
- Defining the next process.
- Adding innovations if the situation is good.

JULY 29 –AUGUST 21

- Reproduce issues that occur when using environment variables.
- Rerunning for different tasks and fixing to issues.

Issues can be caused by different reasons.

Example:

- ***"command1 --flag `command2`"***

First, command2 is run and command1's flag is passed as a parameter.

But this command gave an error.

Solution: Specify it as a string.

- ***"command1 --flag '`command2`'"***

AUGUST 21 – SEPTEMBER 4

Comprehensive testing and documentation of the code obtained.

SEPTEMBER 4 – SEPTEMBER 12

Working on presentation slides. Refinement of documents.

SEPTEMBER 12

Final coding phase assessment.

Future Improvements

As noted in the git maintenance documentation, several maintenance tasks cannot be run side-by-side with other maintenance tasks. In the case of command line git versions that do not provide the Git maintenance command, by holding an in-memory lock on the Git directory of the cached repository must be run sequentially.

The maintenance task must acquire the lock on the directory before performing an operation. This does not prevent others from working in the repository,however, it allows maintenance tasks to be performed one at a time on a cache store.

A convenient solution of in-memory lock to execute tasks sequentially. This will prevent cluttering the git repository.

It can be worked to schedule maintenance tasks in parallel. In this way, there is no need for an in-memory lock.

Continued Involvement

I'm interested in Devops engineering in the future. I'm excited to work for teams to develop more successful code. Jenkins is absolutely right for me to do that.

I think our relationship with Jenkins will not be just this project. Together with Jenkins, we can do good work.

Major Challenges Foreseen

- We'll have to do the gc less often because it's so expensive.

  For situations where we need to do it more often, we should work to make it less expensive.

- If the gc task is enabled, the tasks that should be avoided from running at the same time, such as loose objects, need to be handled. The lock system can be improved but we can work so that the tasks can run in parallel.
- We have to evaluate the commits and their results against different versions of command line Git. Multipack index requires Git version 2.20 or later.
- Which Java object(s) is correct to use to represent maintenance tasks should be tested and implemented.
- JGit should also be considered as part of wide-ranging git implementations because JGit 5.13 may be missing features found in newer versions of the git command line.

References

https://wiki.jenkins.io/display/JENKINS/Plugin+tutorial

https://www.jenkins.io/blog/2017/08/07/intro-to-plugin-development/

https://github.com/jenkinsci/jenkins/blob/master/CONTRIBUTING.md

https://issues.jenkins.io/issues/?jql=labels%20%3D%20newbie-friendly

https://git-scm.com/docs/git-maintenance

Relevant Background Experience

I can successfully complete this project because I have been dealing with devops for half term. I know the Java language in which we will carry out the project and I continue to develop it. I have knowledge and experience about Git and I am constantly researching the relevant git commands. I have been following Jenkins and its studies for a year, so I can make the targeted result suitable for jenkins. I am researching about Jenkins and Devops, and I will continue to do it while developing the project. Thus, I can suggest innovations to the project with other jenkins studies and innovations in Devops.

Personal

I am a first year computer engineering student at Bursa technical university. I am progressing towards my undergraduate degree by working in the fields of programming, software development and computer science.

I'm interested in Jenkins because I want to contribute devops to the software industry. Jenkins is good for DevOps.

I learned Jenkins from the link below.

- https://www.jenkins.io/doc/tutorials/

During the project development process, I intend to progress towards the goal by asking appropriate questions to my mentor and the community and doing the necessary research.

Availability and commitments

At my university, the fall semester ends on July 8. I have final exams between June 27 and July 8. I don't think they will hinder the project.

Experience

Language Skill Set

Java programming language : (3/5)

I can increase the coding start to level 4 until 13 June.

C programming language : (4/5)

There is no work in the c language in the project. If it is decided to add any innovations during or after the project and if the C programming language is required for this, I can contribute with the C language.

Reference Link

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