GNU Radio

GSoC – 2024 (175 hr)

By – Satya Prakash Sasini

Project under Proposal-

* CI for maintenance branches and selected OOT modules(CI improvements)

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**CI for maintenance branches and selected OOT modules(CI improvements)**

Problem Description

The current CI setup is taking longer to build due to building for every environment separately. This approach results in redundant builds for different platforms, significantly increasing the overall build time. Also implementing an efficient nightly builds for GNU Radio's maintenance branches and some select OOTs.

**Implementation Description**

**What the patch has accomplished & Work to be done**

**Cross-Platform Build Workflow:**

* Configured build jobs for Linux, Windows, and macOS using Docker containers.
* Automated consistent build environments across different operating systems.

**Automated CI Re-Renders:**

* Enabled automatic re-rendering of Conda CI scripts upon /rerender comments.
* Streamlined Conda CI configuration updates via GitHub Actions.

**Comprehensive Testing Suite:**

* Implemented C++ and Python formatting checks, Doxygen documentation generation, and Linux Docker tests.
* Enhanced code reliability and maintainability with integrated testing.

**Packaging Workflows for Debian and Fedora:**

* Established packaging workflows for Debian and Fedora distributions.
* Integrated GPG key import, dependency installation, package generation, and repository submission.

**Artifact Management and Distribution:**

* Managed Conda build artifacts and source RPMs with GitHub Actions' artifact uploading.
* Facilitated easy access to build outputs for testing and deployment.

**What the patch has accomplished?**

**Dependency Management Challenges:**

* Potential difficulties in managing dependencies across different platforms and package managers.
* Risk of inconsistent environment setups leading to build failures or runtime errors.

**Complexity of Packaging Workflows:**

* Packaging workflows for Debian and Fedora may be complex to understand and modify.
* Potential challenges in maintaining compatibility with evolving packaging standards and tools.

**Segregation of Builds:**

* Currently, builds are not segregated based on different environments or conditions.
* Implementing conditional workflows can enhance efficiency by targeting specific environments or scenarios for builds.

**Multi-Stage Docker Build:**

* Introduce a multi-stage build process to optimize Docker image building.
* This approach can reduce build times and improve efficiency, especially for overnight builds.
* Segregate build stages to prioritize essential tasks and reduce overhead in non-critical stages.

**Automated PPAs, Snaps, Flatpak apps:**

* Implementation of automated processes for generating PPAs, Snaps, and Flatpak apps.
* Streamlining the packaging and distribution process for end-users.
* Enhancing accessibility and ease of installation for users across different Linux distributions.

**Possible Mentor**

* Håkon Vågsether

**Project Timeline**

Since I have a previous commitment as a full-time DevOps Intern in one Organisation, I m planning to give at least 20 hours a week. I will push myself to complete the project before September i.e. nearly towards end of August.

* Before Official Coding Period Starts
* Explore all the existing CI pipeline
* Understand the existing pipeline mechanism
* Explore flatpak apps
* Identifying the common dependencies
* Getting familiar with the GNU radio installation process in every environment
* May 27 – June 27
* Will identify common dependencies across all environments
* Dockerise them into one common image
* Segregate all the build process of different environments
* June 27 – July 8
* Segregate the build process for all the environment
* Get the metrics for the build time and optimise them
* Connect the workflows with conditional logics so that if any one build fails then the build for the next environment is not trigerred
* July 13 – September 2
* Implement night build mechanism i.e to build flatpack apps
* POC on updated CI pipeline
* Implement and test Flatpak apps for nightly builds with proper tags so that it will be easy to segregate the perfect he environment on the basis of a particular state of the repository
* Test the implementation and improve them

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**About Me**

Hello! I am Satya Prakash Sasini a final year of the ongoing course Bachelor Of Technology in the field of Computer Science and Engineering from Trident Academy Of Technology, Bhubaneswar, Odisha, India. Currently I am working as an intern in Devtron Inc. as DevOps Intern.

**Personal Details:**

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I would be residing in Gurugram, Haryana, India during Google Summer of Codes Program

**Time Zone** : (GMT + 5:30)

**Personal Skills and Experiences**

The whole GNU Radio project on the most basic levels needs C++, DSP(Digital Signal Processing ) and Python to be a contributor.

I happen to have had courses and experiences that pertains to theses requirements in my engineering course and on-going internship so far. Namely

**College Course Works:**

* Data Structures and Algorithms using C++
* Operating System
* OOPs Using Java
* DLD(Digital Logic Design)
* DSP(Digital Signal Processing)
* DBMS(Database Management System)
* Theory Of Computation
* Programming in Python
* Software Engineering
* Computer Networks

**Internship Experiences So far:**

* Docker
* Kubernetes
* Helm
* GitHub Actions
* Scripting
* Automation (python)
* Kube-Prometheus-Stack

**Other Commitments during Summer**

* As currently I’m working as a DevOps intern I will be spending first half of my day there and will continue to accomplish my GSoC related tasks once I get back from office.
* I will give 20 hours a week at least and push beyond to complete my project and it will be quite easy for me as my internship work field and chosen project are quite relevant.

**How many hours per week do I plan to spend on solving the issues?**

* I m willing to give my full dedication to accomplish my commitments as it resides with my interest and quite fascinating
* I will also keep track of all my works and post weekly blogs regarding my work
* Once, I get back from Office I can easily give 20+ hours a week to accomplish the above commitments.

**GitHub PR**

* PR : <https://github.com/gnuradio/gnuradio/pull/7188#event-12140189641>

For an subtask mention in the issue : <https://github.com/gnuradio/gnuradio/issues/4765>

SECRET WORDS : Cyberspectrum is the best spectrum