sdmay18-09: Tool Support for Continuous Model-Based Verification of the Linux Kernel
Week 4 Report
October 8 - October 15

Team Members
Srinivas Dhanwada — *Team Lead*
Collin McIntyre — *Scribe, Tool Integration Lead*
Benjamin Weno — *Automation Lead*
Matthew Wall — *Web Lead*

Summary of Progress this Report
This week, we demonstrated our proof of concept program for mapping instances of locking mechanisms from one version of the Linux kernel to another to our adviser. He agreed that the results looked promising and asked us to extend the mapping algorithm from three instances to all instances within the Linux kernel. We achieved this by storing all of the information about each instance in a JSON file that we then parse through to map each instance of a locking mechanism to its newer equivalent. When the verifying program runs, it generates the structure of the results website that can be viewed in a file browser. A folder is generated for each instance of a locking mechanism, and the folder name is a delimited string containing all of the information on the instance that we parse into the JSON file. We leverage the Git merge algorithm to insert comments into the code that we use to differentiate this instance between two different versions of the Linux kernel. We've also developed a patch for version 4.13 of the kernel and have sent it to our client to run the verifying program on that version (due to system requirements, the verification program must be run on one of the Knowledge Centric Software Lab's machines). We've also continued discussion about features of the website and how to go about implementation after receiving feedback from our adviser on our initial proposal.

Pending Issues
The verification program has incredibly high system requirements and none of our members have a machine that is capable of running the program. For the time being, we need to go to the KCSL to test automation of the verification process, but this will likely prove to be a hindrance as testing becomes the main focus. We need to find a way to mock up the verification program so we can test each of our programs on our own machines and without needing to rely on a machine from the KCSL being available.

Plans for Upcoming Reporting Period
By our meeting on Wednesday, we plan to have a full JSON file containing all of the instances for one version of the Linux kernel generated that we can show our adviser. We also want to develop a plan for linking each part of the automated verification process together and possibly begin implementation of that plan. We also want to begin the mock-up process for the website and begin to get a feel for the practicality of the layout and features we want to implement.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Srinivas Dhanwada	Srinivas finished the prototype of the mapping algorithm that allows us to compare	10	25

	instances of the locking mechanisms between different versions of the Linux kernel. He then extended the mapping algorithm and developed the system that allows us to parse the website structure to create the JSON file.		
Collin McIntyre	Collin took the patch we were given for version 4.08 of the kernel and modified it to apply to version 4.13 of the kernel. He also sent the patched kernel to our client so they could begin the verification process on kernel version 4.13.	4	19.5
Benjamin Weno	Ben gave feedback on our diff algorithm after seeing it demonstrated at our meeting. While he hasn't worked much on our project itself during this period, Ben spent most of his time writing the Design Document for our project.	3	14
Matthew Wall	Matt spent his time this week developing an algorithm for filtering searches for individual instances of a locking mechanism on the website.	2	8.5