sdmay18-09: Tool Support for Continuous Model-Based Verification of the Linux Kernel

Week 6 Report

October 21 - October 25

Team Members

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

Summary of Progress this Report

First and foremost, we've decided to switch our reporting periods from Saturdays to Wednesdays. This aligns more closely with our weekly meetings, but it also means that this will be a short reporting period.

We've continued working on debugging our locking instance mapping algorithm and have discovered more edge cases that need to be considered. If the locking mechanism is called inside an if statement, our current implementation will copy the the "if (" and place it on the line before the locking mechanism with our comment. We've also run into issues with patch generation regarding the kernel's use of the "EXPORT_SYMBOL" macro. The macro is causing function redefinition and ambiguous/implicit function call related errors. We are currently investigating options for getting around this macro. We've also continued working on our website concept, and have created more concept images that demonstrate the view we're hoping to use when viewing a single locking mechanism, not all of them at once.

Pending Issues

Accounting for one edge case in our mapping algorithm reveals more edge cases and analyzing the code is revealing more edge cases as well. The EXPORT_SYMBOL macro used in the locking function implementation is causing several errors during compilation.

Plans for Upcoming Reporting Period

Before we can really make more progress on the project, we need to finish debugging what we currently have. Our efforts this week will be focused on cleaning and debugging our current approaches for mapping locking mechanisms and generating patches. We also continue to expand our library of concept sketches for the website.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Srinivas Dhanwada	Srinivas has continued to debug the locking instance mapping algorithm. He discovered a bug where inserting the comment for a locking mechanism inside an if statement would also include part of the if statement itself, and has been working on a method to account for this edge case while keeping the	14	47

	rest of the algorithm intact.		
Collin McIntyre	Collin has continued to work on patch generation for the most recent version of the Linux kernel. He encountered a scenario in which the EXPORT_SYMBOL macro that's used heavily in the kernel requires a fairly significant rewrite of previous patches, and has been working to create such a patch.	8	35.5
Benjamin Weno	Ben has worked to manually walk through our planned diff algorithm using three different locking instances as a basis. He has found that many instances don't have many noticeable differences from the point of view of our algorithm and has suggested that we look into alternative approaches.	4	22
Matthew Wall	Matt has continued to create website concept images, this week focusing on sketches for viewing individual locking mechanism instances. He's also incorporated feedback into his sketches for viewing all of the mechanisms at once.	6	18.5