

Systems Software Developer II

Manager: Karen [REDACTED]

Evaluated By: Karen [REDACTED]

Organization: QNX Test Team (Karen [REDACTED])

Location: Cary, CG2

03/01/2021 - 02/28/2022

Overall

Manager Overall Evaluation

Rating: Fully Meets Expectations

Goals

Performance Evaluation Questions

Highlight Key Accomplishments/Achievements:

Manager Evaluation

Response: Jerren continues to solve test lab issues and enable his teammates to be effective and highly productive. Jerren performed research into hardware configurations, custom PCB control via REST API and use of RPi for automation and efficiency. His skill at identifying and solving issues is very advanced. He analyzes and diagnoses complex interactions and produces viable solutions as noted in his self-evaluation.

The Cary automated test lab ([REDACTED]) has been critical for continued productivity during the last 2 years of COVID work from home. The Blackfish database has enabled automation of the Master [REDACTED] Table required for all ISO26262 and future APSICE projects. The Blackfish test result database is also key for [REDACTED] benchmark result monitoring and reporting. Jerren has been the key developer to create these solutions and drive them to "production" as they are used daily by numerous test colleagues.

Jerren also serves as the local IT coordinator, performing work in the server room, helping colleagues with laptop solutions and IT issues to enable productivity for numerous colleagues. Jerren volunteered to be the local IT contact, which is outside expectations for his role. Jerren's willingness to fill the gap and ensure smooth

Employee Evaluation

Response: 2021 has come and gone, but the benefits of the work done this year will be reaped for many years to come.

This year, we continued to add more test racks to [REDACTED] for WiFi and P [REDACTED] testing. An additional three test racks were assembled and up-fitted to support many more test devices for these test areas. On some of the existing test racks, we ran into a problem where new test devices were not being enumerated when connected to the USB ports on the Terminal server. I was able to assist D [REDACTED] with troubleshooting the problem and discovered that a configuration change was needed in the terminal server's BIOS to allow more USB devices to be allocated, and that some of the USB hubs that were being used were designed in a way that consumed additional USB devices internally. By making the change in BIOS and replacing the USB hubs, we were able to avoid adding another terminal server to the test racks which would have resulted in a more complex setup and were able to populate the racks with several more test devices.

While planning out the test rack for P [REDACTED], I [REDACTED] discovered that the [REDACTED] boards he would be using for P [REDACTED] testing needed power to be applied to a specific pin to safely power down the board.

operations for his colleagues is very beneficial to the Cary site.

If powered down by pulling power directly (the method used for most dev boards), there was a risk that the dev boards could be destroyed. M█████ created a board (Diesel) that could be used to easily connect to the █████ boards via a connector instead of requiring a challenging soldering procedure to add a jumper wire, which itself could destroy the board. I contributed to the development of the Diesel control board by reviewing the PCB layout and fastening mechanism, as well as designed the command interface for the serial connection. I also developed a REST API and service that allows remote control of the Diesel board over ethernet. I also created the wiki landing pages to hold documentation and design information and the go/diesel link reference.

While working with A█████ this year, I learned that for many of the test he was running, he was manually connecting to the web interface of the Power Distribution Unit and toggling the power each time a dev board needed to be rebooted. This process was not only time consuming for him, but also error prone. I provided him instructions for how to use a feature that I had added to BlackFish which allowed for a simple web request to be called from his test scripts that would toggle the outlet for a specific dev board and also query the current state of an outlet. Using this information, A█████ has been able to enhance his test scripts to automatically restart the dev board before executing a test so that the dev board is in a known state. Also, since the request is initiated from a script, the chance of toggling the wrong outlet has been eliminated and the overall process is much faster allowing him to execute more tests.

Taking the knowledge gained from the above efforts, I have configured a Raspberry Pi device so that it can be used as a Terminal Server for the test racks, as well as hosting the REST service to control the Switched Power Distribution Units and the REST service to interface with the Diesel boards. Using a Raspberry Pi no longer consumes a smaller foot print on the test rack which leaves room for more dev boards, but it is also a cheaper alternative to the L█████ and PCs that have been used to fulfill these

roles.

I have continued to be a vital contributor of the design, implementation and maintenance of the BlackFish infrastructure used to manage the many results of test executed in different test areas of the company.

M███████████ and I typically split the work of developing BlackFish into: him coding the frontend (web dashboard), while I develop the backend (node) server.

However, even though we split the coding, we collaborate closely in the design of most functionalities. I have proposed many features and provided proof of concept code snippets to demonstrate how the features could be integrated into the current design to help M█████ rapidly implement new functionalities. Some specific areas of contributions were the log viewer syntax highlighting, advanced features in the Tabulator component to embed additional test result details, and the formatting of perma-links to support complex options while remaining easy to format, parse and still remain future-proof for later enhancements. I was also able to research and demonstrate the use of several 3rd party modules that allowed him to rapidly implement features into the dashboard that helped users sort through the vast amounts of data available quickly.

We have worked with the █████ Regression team throughout the year to add functionality to help them automate more of their test results and analysis. With their weekend test runs frequently covering 250+ dev boards and surpassing 130,000 tests, the features developed in BlackFish help them quickly identify new problems and saves enormous amounts of time. The █████ Regression team came up with the concept of a 'signature' that allows their scripts to identify new and reoccurrence of errors. I have worked closely with the team to allow the storing and linking of these signatures with test results within BlackFish. With these features added, the team will be able to quickly identify problems and reduce the time needed to investigate and analyze the results. The team has also developed a tool which uses BlackFish to help them triage

and manage these detected errors. M█ and I are also using this signature information to enhance and develop new tools on the BlackFish Web Dashboard. With the collaborative effort, the Kernel Regression team is quickly moving towards being able to not only run weekend regressions, but are now experimenting with nightly smoke-test to help identify problems earlier.

Throughout this year, I have been working with several other test groups to teach them the process for adding their results into BlackFish. We have also been working on normalizing the process for all test areas so that once results are uploaded to BlackFish, and the test requirements have been entered into █, these test areas can automatically be populated in the MTT report.

I have also worked with A█ and M█ to plan the design for a PyTest plugin that should allow existing tests written for this platform to automatically have their results pushed into BlackFish as soon as the test case has finished executing. I also worked with T█ to guide him through the process of modifying the LogParsing script that I wrote for █ Benchmark test results so that it could be appended to a Jenkins job and automatically executed to upload the results to BlackFish when the test suite was complete.

This year, with respect to my responsibilities in the development of the BlackFish backend service, I have been able to add several new features and optimize several areas of existing functionality. Many of the features implemented this year have been discussed and planned for a while, but the completion of other features had taken a priority. Some of the features were new concepts that will help with the development of new tools which will operate as clients to BlackFish. A few of these features include:

- The ability to tag and add user comments to documents
- An interface to provide clients with a central location to store settings and other persistent data for global, site, and user configurations
- A scheduling mechanism to help manage and automate various tasks (for managing the database and contents)

- Enhanced logging to provide incident reports to clients with an incident number to help tracking down errors
- Logic to track and record metrics on request to the backend server
- Automatic API documentation generation from source code

A lot of work was also done this year to continue optimizing existing features and functionality in BlackFish. Some optimizations were implemented between the node server and the database connection which allows for faster transfer of data between the two services. Several areas of code used in legacy functionality were revisited and optimized, along with configuration changes in the database, which reduced some query times that were taking around 45 seconds to run, down to less than 2 seconds. These changes not only allow for simpler code, but removed the dependency we had on caching data so that clients are now more interactive when multiple users are working on the same data on different machines and users no longer have to be concerned with potentially stale data.

Since the backend interface is the centerpiece between clients that are reporting test results and clients which are retrieving data to present those results to users, it is vital that the interface is hardened and be well tested. This year, as I added or enhanced existing features in the backend, test cases were also developed to validate those features and changes. Currently there are over 1100 tests written and executed against the backend REST interface. This test framework has also allowed me to use a test driven development process when adding new functionality which significantly speeds up the time to implement.

To help new-comers get a better understanding what BlackFish is and the benefits it provides for the company, I created a presentation that starts with a high-level overview of the different components in the infrastructure, and progressively drills down to explain the more minute details of the inner workings and structure of the project and how tools can interface to contribute and consume test results and other data stored in BlackFish.

In addition to the development of the BlackFish backend, I have taken the responsibility of managing the servers used by BlackFish. These responsibilities include frequently applying security and update patches to the operating system, as well as setting up the NGINX and node services, managing the SSL signed certificates and configuring proxy services to provide a secure connection between browsers, clients and the server.

This year, I setup, configured and now maintain a 'Stage' server to provide a testing area for both the backend and frontend services before they are deployment to the production server. This setup allows for better testing and soaking of new features without risking interrupting clients who are dependent on the BlackFish service. This stage server also allows us to provide updates more frequently to those developers we are actively working with to develop new clients and tools. With this new arrangement, updates can be applied within seconds and if necessary, rolled back to previous versions just as quickly. The changes to the infrastructure also included configuring the services to automatically start-up when the server boots so that in the event of a power outage, BlackFish services will be available again shortly after power is restored.

I took the initiative this year to get the BlackFish project fully using JIRA for tracking new features, bug fixes and other issues. It took some getting used to, but it has been beneficial to keep track of progress of work as this project continues to grow. The integration between JIRA tickets and GitLab has been very beneficial with our process of developing on feature branches, submitting GitLab Merge Request, reviewing the MRs and merging those changed back to a master branch.

Outside of my normal work with [REDACTED] and BlackFish, I also continue to be the local contact person for IT when work needs to be done in our server room. This year, I have been driving the effort to have a lab/test subnet reinstated for our site. Together with IT, we have started to get hardware in place that will support this isolated subnet, but the

work is being done in small steps to minimize downtime for the test devices.

Highlight areas where company values have been demonstrated. Share specific examples about how the goals were achieved in a way that supported the BlackBerry values of Customer Focus, Innovation, Integrity, Team Work, Mutual Respect and Accountability:

Manager Evaluation

Response: Jerren's role serves the entire test team. He demonstrates technical skill, a large amount of collaboration, implicit leadership and flexibility to enable ~75 testers and point them in a common direction. Jerren brings logic, accountability and credibility to tool design discussions, incorporates input from others, and has been successful and respectful when working with challenging colleagues. He provides the right amount of internal customer focus, leadership and teamwork to move the ball forward.

Employee Evaluation

Response: My customers are my co-workers. I have continued filling the role of being the local hands for IT, assisting coworkers with troubleshooting their PCs and other equipment, as well as replacing, installing, verifying and configuring equipment in the server room.

I worked with several members of the test team this year to improve test automation. The Diesel board was created and a serial and REST API developed to allow test scripts to safely power down the [REDACTED] boards. I worked with A [REDACTED] to provide him with an interface that allowed him to automate the power-cycling of dev boards from within his test. I also guided T [REDACTED] in adapting the LogParser to automatically run in Jenkins so that the benchmark test results were uploaded to BlackFish.

The BlackFish Project has been working with several different test groups this year to enable them to upload their test results into BlackFish and to provide tools which help them when analyzing the results so they can quickly identify and focus on problems that need to be addressed.

This year, I was also responsible for working with 1/3rd of the Cary team to provide guidance in preparation for the ISO audit. This work included reviewing devices in designated areas to ensure that all devices were accounted for in [REDACTED] and their entries were up to date, coordinating with the team the completion of their ISO survey, and reviewing lab spaces at team member's desk in the office.

Highlight areas of improvement required in the current role:

Manager Evaluation

Employee Evaluation

Response: I encourage Jerren to continue developing the skills noted. If there are external courses that would be beneficial, let's discuss so I can sponsor as needed.

Response: My knowledge of web development and MongoDB continues to grow while working on BlackFish, but the frameworks we use also continue to be developed and new releases published every 6 months. These short update cycles by the frameworks are beneficial that new features are quickly implemented and problems addressed, but it also requires constantly learning new techniques and researching new features that are available so that they can be leveraged in new development and retrofitting legacy code.

As [REDACTED] continues to grow and while working with IT to implement a lab subnet for our test devices, I need to get more familiar with the network gear being used so that I can provide guidance on the best way to implement and use what we have available for us.

As more teams begin to tie into BlackFish and the client traffic increases, I will need to get very familiar with managing and monitoring the hardware (server) so that potential bottle-necks can be identified and address before they become a problem. Maintaining our own server is also going to require additional monitoring and backup implementations so that downtime and data loss is avoided.

Highlight areas that can support you in your career development (12 - 18 months):

Manager Evaluation

Response: Automation and efficiency improvements are key to enable the test team. The company's ambition is growing and one of the prime ways to meet the demand is via automation improvements. I agree that continued pursuit of test process improvements will enable future career development for Jerren.

Employee Evaluation

Response: I still see a lot of potential for making improvements in our testing process. The work in both [REDACTED] and BlackFish has allowed for some of these improvements to be implemented and hopefully will pave the way for more automation and improvements in our testing efforts.

Section Summary

Manager Evaluation

Comment: Jerren is a valuable member of the team with notable strengths in the areas of collaboration, drive for performance, flexibility, influence, and innovation. He is technically savvy engineer who is highly productive and collaborative. He

Employee Evaluation

Comment:

works on internal tools that enable productivity for the larger Cary team and test team in general. Jerren's skills range from big picture to detailed implementation. For both the Cary test automation lab (██████) and the Blackfish test results toolset, Jerren has successfully envisioned a whole solution, and then constructed and deployed the solution.

His work involves researching technologies (like MongoDB) and off the shelf hardware (like switches, power supplies etc), training himself on the technology pieces, working with IT team, security team and test colleagues to bring up the final solutions.

Thanks Jerren and keep up the good work!