

Shane Mulligan, Software Developer

Birthday: 15 Feb 1988

<https://github.com/mullikine/>

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Employment

- **Software Developer for TracMap NZ LTD,**

- **Developing firmware for the TM5XX prototype headunit,**

- * Key programming languages:
C++, C, shellscript and Perl.

- * Development cycle:
Waterfall.

- * Duties:
Porting C++ firmware code to a virtual machine and subsequently to new hardware. Create perl and bash scripts for automating the compilation and deployment of firmware code. Creating a higher DPI GUI for the new hardware.

- * Other responsibilities:
Set up and maintain the company's DNS/DHCP server, troubleshoot and restore customer's bricked headunits and to help with staff computer problems such as setting up new office computers or migrating emails.

- * **Nov 2011 to Jan 2013**

- **Repairing TM465 headunits, testing TM5XX prototype headunit and other miscellaneous tasks.**

- * **Feb 2013 to May 2013**

- **Developing the TracLink online platform,**

- * Key programming languages:
Javascript and Python.

- * Development cycle:
Scrum / Continuous delivery

- * Duties:
Adding new features, fixing customer reported bugs and creating jasmine scripts for automated testing of the TracLink online platform. Jasmine is a javascript library for browser automation and testing.

- * **June 2013 to Dec 2013**

- **Web Developer,**

- Bluewater Island Resort - January 2006

- UnitLink - November 2009 to June 2010

- NZChannels - September 2010

- Qualao Consulting - December 2010

- K.E.Y. Software Solution - December 2010

- Business On Film - October 2011

- **Sudoku Puzzle Maker,**

- The Independent Foundation Inc. (Vanuatu) 2005-2006

Education

- Bachelor of Science in Computer Science from the University of Otago.
 - 2010: 7th in heat, ACM-ICPC.
 - 2011: Won the COSC343 Robot Design competition.
 - COSC 345 Software Engineering: Project Leader, Scarfie World video game. Received an 89% grade for the project.
 - COSC326 (Effective Programming): A+ grade. All assignments completed in **Ruby**.
 - 2013: Provided private tutoring for COMP160.
 - Summer Project (Genetic Algorithm in Delphi 7).
 - 2014: Degree completed.
- Year 12 (Queensland) Certificate

Work Style

I am most at home working within a linux terminal. This made me a unique member of the TracMap team, and I believe enabled me to adapt quickly to different projects and manage my time effectively.

Experience

Experience with embedded devices

From November 2011 to December 2013 I was a contractor developing software full-time for TracMap NZ in Mosgiel. My initial project was to port their agricultural software for their existing TM465 headunits to a new prototype model. Not yet having this hardware, I had to first get the software running on an x86 Debian 6 linux VirtualBox VM. This meant compiling a new linux kernel with framebuffer support. Utilizing multiple virtual machines and after creating some bash scripts to assist, I was able to design a new interface, comparing different versions of the software, without the prototype hardware. I made a version that could run on x86 linux computers running Xorg so that VirtualBox wasn't required.

In concluding this task, I had to get it to run on the prototype machines. This involved creating a new toolchain with an updated ARM cross compiler. I had to convert the application from using Sysfs to Procfs, which meant fixing GPIO support in the application's libraries and reprogramming the application's brightness control, for example. Multiple LCD displays were tested from different manufacturers and I had to assist in finding solutions to rotating the display, increasing the frame rate via directfb, inverting the brightness when linked with particular LCD screens and identifying flaws in the schematics of some headunits. My discoveries led to updates in the u-boot code which prevented some units from not being able to be shutdown and some units having an inverted screen brightness.

When doing this work, I found novel ways to test my work. Firstly, I used some old laptops to speed up compilation time. I was also using xpra, Xephyr and Xdmx to utilize a monitor connected to a separate machine as if it were a local monitor.

Aside from programming, I was given assignments requiring a competency of linux command line knowledge:

- Using u-boot to reconfigure the usb subsystem when multiple USB support stopped working.
- Flashing multiple SD cards in parallel, whilst compiling on multiple machines, so I could rapidly test the new iterations of the firmware on several different headunits.
- I was asked to manage the company's DNS and DHCP servers, creating subnets and assigning IP addresses.

I also had to debug many problems. One such problem was figuring out why a headunit might stop displaying the path of the GPS coordinates. What I found was that the unit was running out of RAM. But how? Files were no longer being written to disk and instead were being cached in the RAM buffer. The solution was to reduce the number of bytes per inode on the ex3 filesystem.

I had to recover bricked headunits via their JTAG interfaces using openocd. On occasion I would need to flash their u-boot partitions. Otherwise, I also had to upgrade headunits with new u-boot versions.

Working at TracMap, I have learned to use many useful unix programs such as rsync, socat, rdesktop, unison, bind, ssh, tmux, git, rdiff-backup, rsnapshot, rbackup, bind9, dnsmasq, squid and more.

Since 2013, some things I have made that are related to the work I did are:

- A patch X11 to fix a fault where the -scale option would constrain the mouse.
- A patch to tmux to add Function keys for prompt (an iPhone app).

Experience with web development

From June 2013 to December 2013 (5 months) I was still a full-time contractor at TracMap NZ in Mosgiel but this time working on their web platform.

There was a shortage of web developers so I was asked to work on the web platform.

Initially, my task was to write unit tests. I had to write jQuery code to automate the web browser and create jasmine suites and specs which would interact with jenkins to provide feedback on each build. This freed up the other 2 developers to focus on building new features. The automated tests were carried out in phantomjs instead of a regular browser.

I also contributed to developing new features. I created new models and views in the pyramid framework (sometimes using SQLAlchemy, an ORM), backbone models and views, PostgreSQL functions, views and attributes and migration scripts when modifying the database schema.

I was also required to push changes to the server using git after merging and rebasing my code into succinct commits.

I used jenkins to create new builds and run jasmine tests before merging my changes into the shared development branch.

Something I have made in Python since working at TracMap is a command line program (a precursor to Trigger Studio 1.2) that takes a TrigText XML file and sorts it by one of its attributes.
heavengames.com

Startups

Kaicar (startup for p2p car sharing)

http://54.206.10.212/#p=find_a_car

Projects

Trigger Studio
open-source Age of Empires editor
github.com/mullikine/aokts

Proficiencies

Development

Linux
Autotools
Git
vim (editor)

Languages and Libraries

bash, zsh
Python
 Pyramid
 SQLAlchemy (ORM)
 jinja
 WTForms
C / C++
 Win32
 MFC
 GTK
 SDL
 cairo
 directfb

Haskell

PHP

 codeigniter

X/HTML, CSS, PHP, XML

 JasperReports

Java

Javascript

 jasmine

 jQuery

 underscore

 backbone

Visual Basic 6

Perl

Ruby

expect (for CLI automation)

Databases

PostgreSQL

MySQL

Document preparation

LaTeX

Graphviz

GIMP

Fireworks

Photoshop

Networking and SysOps

Apache httpd

VirtualBox

Jenkins

Amazon AWS

 Online backups

 running ftp, irc and teamspeak servers

 deploying websites

Puppet and JuJu

IDEs and Issue Trackers

Eclipse

Visual Studio (2005, 2010)

JIRA (Scrum issue and project tracker)

IDA Pro (decompiler for reverse engineering x86 and ARM)

Experience with Windows development

Recently, I have been using IDA Pro 6.6 (a decompiler) to reverse engineer the age2_x1.exe (main application) file for Age of Empires 2. Some of this knowledge I've used to design new features for Trigger Studio.

Reference

Shane Mulligan has been a puzzle creator for The Vanuatu Independent newspaper for well over a year. He sets our Sudoku puzzles and has a considerable following in Port Vila as a result. Shane's Sudoku Rocku regularly brought him into our office when he resided here, and since his move to New Zealand has continued to meet our deadlines with exemplary punctuality. Shane Mulligan is a young man of good character and clearly destined for success in his studies. He will be an asset to anyone who chooses him for a position.

Bob MAKIN

Managing Editor

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Vanuatu

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To whom it may concern

Reference – Shane Mulligan

We employed Shane to a temporary position in early 2013 and he worked full time for us until November 2013. (As I am away from the office while writing this I cannot be precise about dates.)

Shane's original project task was to work through methodically transforming the embedded code for our existing device to be able operate on a replacement device operating a different screen resolution, processor, and in/out pathways.

He undertook this task diligently and with a high quality output.

At the finish of this project we transferred Shane to our web development team where he had expressed an interest in working. However, the capability we required exceeded Shane's level of competence, and due to the timeframes and urgency we are operating under we could not afford the time for Shane to acquire the knowledge and skill level required. As a result, and following discussions, Shane resigned to pursue other career opportunities.

In the whole time Shane worked for TracMap he was an excellent employee. He was always prompt in arriving for work, interacted well with other staff members, and demonstrated a willingness to listen and respond to constructive criticism and suggestions for changes in how he approached his work projects.

We wish him well in his future endeavours, and commend him to any potential employer looking for a loyal and hardworking staff member.

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