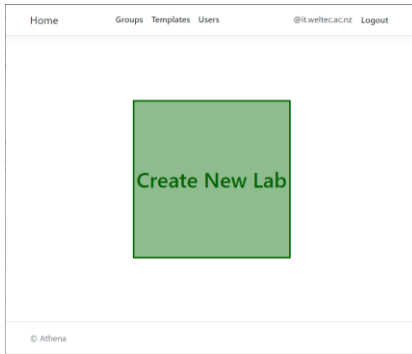


Kubernetes for WelTec

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Supervisor: Chaliner Baliuag

Client: Paul Bryant



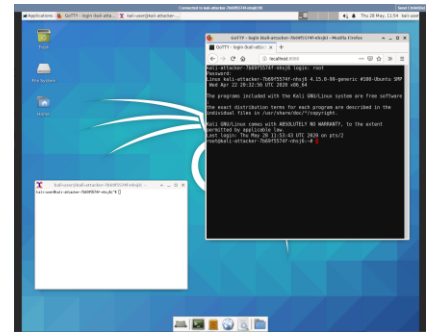
The Main Screen

Template List

Create New

Path	Template Name	Lab Label	
template1	Juice Shop	juice-shop	Edit Delete
Templates\\Template2\\	SQL Injection	example	Edit Delete

Viewing available Labs



Example of a Lab Interface

INTRODUCTION

The client, Paul Bryant, a senior Lecturer at the Wellington Institute of Technology wants to reduce operating costs for the School of IT by replacing Netlab, which provides a virtual lab environment to students over the School's network. Netlab enables students to access pre-configured virtual machines for the purpose of completing assigned lab work.

The project team developed Kubernetes-based lab environments, using Docker containers instead of virtual machines, and a web interface to access the lab environments. As well as addressing the primary goal of the client — developing a replacement for Netlab— the team was also able to integrate their web application into the School of IT's existing Google account system, allowing them to sign in and have their role within the School recognised automatically.

DEVELOPMENT

During the Development phase of the project, the team implemented an iterative development model, with development split into three iterations. At the end of each iteration, the team had a status meeting with the client, where the team would demonstrate the deliverables for the iteration, and seek feedback.

The Kanban workflow management method was also implemented to help manage development at the task level. Each task was assigned its own Kanban card, and was treated as its own 'mini-iteration', with the team going through design, development and testing for each Kanban card.

The web application was developed with ASP.NET Core framework, since it provides the basic UI for a web application, and allows the end product to be deployed on Linux server or Docker containers. Its functionality was then extended through the use of the Entity Framework (EF) Core framework and ASP.NET Core Identity API.

Lab environments were developed with Docker containers instead of the virtual machines used in the current Netlab solution. This choice brought with it performance benefits, as a container host does not need to emulate the hardware normally associated with a computer system, but also challenges, as Docker containers do not include a 'friendly' user interface for new users by default. However, the team was able to work past this.

Individual components of the system were tested as they were developed, with test results delivered with other iteration completion outputs.

The project team was able to adjust to the COVID-19 lockdown, making great use of the School of IT's G Suite tools and applications. The team used Google Chat, Meet and Calendar for communication, along with Google Drive for file sharing.

CONCLUSION

The project team learned to work together despite the differences in each team member's academic goal, situation, and technical background. The team had to learn about unfamiliar technologies, while still ensuring that development targets were met. However, thanks to the comprehensive design documents produced early in the development, the team was able to deliver on their commitment to their client.