

## RESEARCHSPACE@AUCKLAND : DISASTER RECOVERY (DR)

Yin Yin Latt – Research Systems Analyst – University of Auckland Library New Zealand

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### Abstract

The University of Auckland Library and Information Technology Services have partnered to provide a DSpace installation utilising a mature IT infrastructure. The application is hosted on the University of Auckland's virtual server cluster in the recently completed "City Data Centre" along with other enterprise systems. ResearchSpace is operational 24x7 and has a Disaster Recovery mirror located at a second location. Handle identifiers are maintained between the two systems to ensure users can submit items at all times.

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Disaster recovery is a means to back up important system information and prevent data loss from unforeseen events. New Zealand is an island nation situated on the boundary of the Pacific and Indo-Pacific tectonic plates. Auckland city is built on top of an active volcanic field, and surrounded by 45 dormant volcanoes. The largest erupted 600 years ago and the view from the University of Auckland Library towards the harbour, is dominated by the imposing volcanic cone of Rangitoto Island. The University of Auckland is located in the heart of Auckland city and has the largest university library system in the nation. It holds an enormous amount of digital information e.g., academic research publications and graduate theses. The University of Auckland has moved to making most of the enterprise applications systems reliable, robust and highly available. ResearchSpace, the University of Auckland's Institutional Repository, uses DSpace and is located on the Sun E25k server along with other enterprise applications. It has a Disaster Recovery (DR) mechanism which runs in parallel with the main production server to provide a robust and consistent system performance.

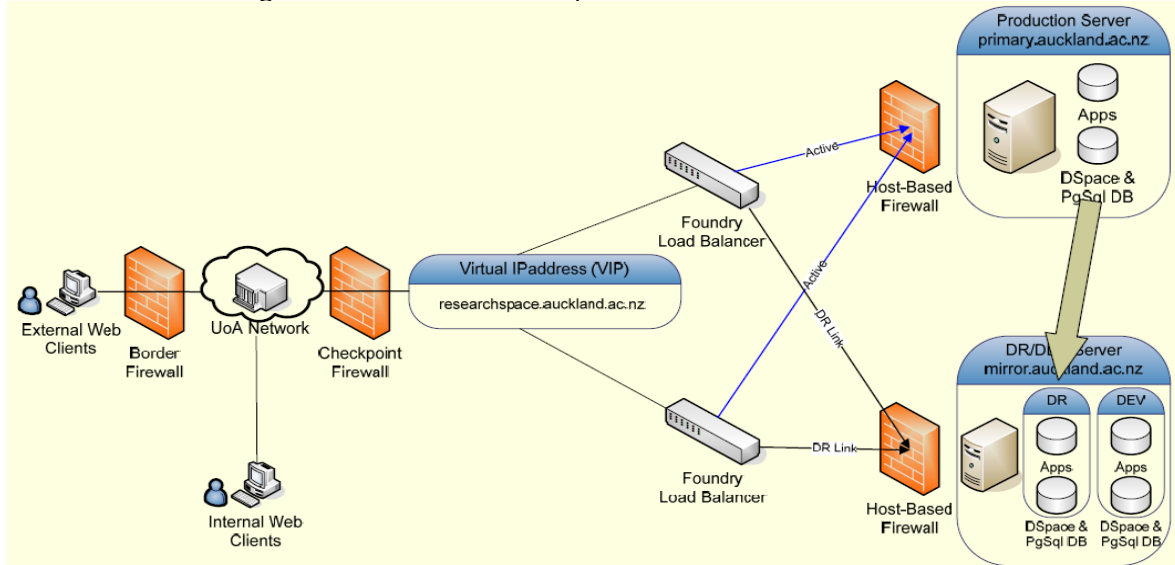


Our initial design of DR was based on restoring the application, data store and database from a simple backup solution in the event of a disaster. The time and system outage of this option seemed unacceptable to us, given that our users are expected to self-submit their research outputs. Furthermore, our solution should be able to answer the following 2 questions effectively from a DR perspective:

1. Recovery Time Objective - How can we provide the fastest recovery time from a disaster occurrence?
2. Recovery Point Objective - How can we provide the most up-to-date data in the system?

A synergy of our data centre moving locations, prompting from our IT enterprise group and operating system zoning developments led us to evaluate other options. In the following diagram, by using the Foundry hardware with host based firewalls, the management of complex routing and addressing meant that the application could

have two internal IP addresses but appear to the world with a single virtual location. This architecture proved challenging to implement at first due to the Solaris cluster zoning that caused serious performance issues. In our architecture this was solved by reallocating subnets that belonged to the same group. The Production system and DR mirror are running simultaneously and their DSpace instances are synchronized. If a disaster situation arises, the Foundry hardware will automatically switch to the DR mirror, resulting in a seamless user experience.



Our next challenge was to replicate the handle between the Production system and the DR mirror. In the beginning, we were misled by attempting to replicate the handle. However, the easiest solution is to leave the handle server as it is, but replicate the database using Slony-I as shown in the figure on the right. Often the simplest solutions are the least obvious.

### Summary

Evaluations show that our production system failover switches seamlessly to its DR mirror should there be any issues. We also have a development system on the DR server that we can use for development and testing. The DR mirror is located 5 km from the main university site, and there are plans underway to relocate this to a more secure location. We still need to perform normal file backups, but having a highly available system architecture that utilizes virtual servers results in disaster and post-disaster recovery that is automatic and more effective. It further attracts more and more users to trust our Dspace information repository and voluntarily deposit data into the system.

