



Quarterly Research Report #3 [01.10.2008 - 31.12.2008]

<i>Project Name</i>	PlanetLab NZ
<i>Project Manager</i>	Prof. K. Pawlikowski
<i>Milestone Achieved</i>	Milestone 2
<i>Project On Track?</i>	Yes

The goals of the Capability Build Fund are to raise awareness and enable effective use of KAREN. REANNZ wants to promote the enabling potential of KAREN and its use through creating a community ethos of sharing knowledge.

Current Status

As it has been already reported, the first milestone of this project was reached on July 26, 2008, when first two PlanetLab NZ nodes at the University of Canterbury were connected to global PlanetLab via KAREN. The second milestone was reached on December 19, 2008, when another pair of PlanetLab nodes became operational at the University of Otago in Dunedin. All nodes have been equipped with DELL PowerEdge 860 servers. We did not experience any problem when connecting our new machines to KAREN at University of Otago, despite that PlanetLab technical requirements specify that such machines cannot be located behind firewalls of participated universities. However, the nodes became fully operational later than we originally planned, because of unexpected delays connected with formal registration of these nodes by the PlanetLab's administrative centre at Princeton University in the USA. Nevertheless, they are now fully operational, with Dr Zhiyi Huang from the Department of Computer Science at the University of Otago as Principal Investigator.

Our PlanetLab NZ research group kept fortnightly meetings in October 2008, and then weekly meetings from November 2008, to make sure that the second milestone would be achieved on time. In addition to installing PlanetLab NZ nodes at the University of Otago, we can report a substantial progress on a number of other issues.

Firstly, we have already organized an international workshop on PlanetLab NZ, which was originally planned at the conclusion of our research project, in June-July 2009. The "PlanetLab Panel on NGN/NGI Research and Experimentation" was held on December 2, 2008, during the 9th International Conference on Parallel and Distributed Computing, Applications and Technologies (PDCAT'08), in Dunedin; see the program of PDCAT'08 at www.cs.otago.ac.nz/pdcat08/index.html with two sessions of PlanetLab Panel: 1.30pm-3.00 and 3.30pm-5.30, on Tuesday, December 2). The program of this workshop consisted of presentations given by the following invited speakers:

- Prof. Adnan Al-Anbuky (Centre for Computer and Embedded Engineering at AUT, Auckland);
- Dr Brian Carpenter¹ (Department of Computer Science, University of Auckland);
- Prof. Richard Harris (Institute of Information Sciences and Technology at Massey University);
- Dr Peter Komisarczuk (Department of Computer Science, University of Victoria in Wellington)

¹ Due to unexpected personal problems of this speaker, the talk was presented by Prof. K. Pawlikowski

- Associate Prof. Tony McGregor (Department of Computer Science, University of Waikato in Hamilton)
- Dr Max Ott (NICTA, Sydney, Australia)
- Prof. Krys Pawlikowski (Department of Computer Science & Software Engineering, University of Canterbury)
- Prof. Harsha Sirisena (Department of Electrical and Computer Engineering, University of Canterbury)
- Thomas Zinner (Department of Distributed Systems, Institute of Computer Science, University of Wuerzburg, Germany).

These presentations will be available from the website of our PlanetLab NZ project, at www.planetlabnz.canterbury.ac.nz. Earlier on the same day, as an introduction to the workshop, Dr Max Ott gave a lecture/keynote address on “Global Experimental Testbeds for Studying Future Internet Technologies”. The workshop, in the opinion of panellists and other participants, was very interesting, both from national and international perspective. The main conclusion was that these days any advanced and serious research on broadband multimedia networks should be accompanied by full scale implementations, and scalability tests, of new networking concepts and solutions. This is why research communities around the world are actively involved in designing of, and experimenting with, such global research infrastructures as PlanetLab, OneLab, GLab, Fire, Geni, etc. Also in New Zealand, network research groups should have a free access to such facilities if they want to remain at the leading edge of research on next generation networks, including research on Future Internet, a global initiative led by European Union. Research teams from the University of Auckland, University of Canterbury and University of Otago have been lucky to become a part of PlanetLab via KAREN, due to their participation in this PlanetLab NZ project funded by REANNZ from the Capability Build Fund. It would be desirable to install PlanetLab nodes also at the remaining New Zealand universities as well. It has been pointed out too that such experimental networking infrastructures as PlanetLab are also very useful teaching tools, for students at undergraduate and postgraduate level.

Secondly, our team at Canterbury has begun preparations to installation of PlanetLab NZ nodes at the University of Auckland. It will be done probably in February or March 2009.

Thirdly, we have advanced research activities in which PlanetLab deployed over KAREN is expected to play its vital role as a powerful research tool. This includes a successful experiment with Akaora2, our unique controller of distributed simulation, which has been recently successfully distributed over PlanetLab nodes. A technical report summarizing this experiment will be written soon. Additionally, a short paper on this subject will be presented by our international collaborator at the IEICE Conference in Japan, in March 2009.

Successes

The technical expertise gained while working towards goals of Milestone 1 and Milestone 2 (installation of PlanetLab nodes at the University of Canterbury and the University of Otago) will be very useful when working on the installation of computer servers at the University of Auckland (a part of Milestone 3). We have also promised to help our colleagues from Massey University, University of Waikato and Victoria University with installation of PlanetLab nodes over KAREN, if appropriate grants become available.

KAREN is used now, both nationally and internationally, as the communication platform for PlanetLab, for conducting research on new telecommunication technologies. Our first successful experiments with distributing Akaroa2 (our unique controller of distributed

simulation, see <http://www.akaroa.canterbury.ac.nz>) over PlanetLab nodes allow us to plan further research activities in this direction.

Communications

Information about our project on PlanetLab NZ, its goals and our current activities have been available on the Internet since in October 2008, since launching a website of this project at <http://www.planetlabnz.canterbury.ac.nz>. Additionally, during last three months members of our team attended a number of international conferences and visited research institutes and universities overseas. During all these events, we had numerous opportunities for presenting our research activities within PlanetLab NZ and distributed our poster informing about KAREN and PlanetLab NZ. The attended conferences include:

- the 3rd International Conference on Access Networks (AccessNets'08) in Las Vegas, October 2008 (attended by Prof. Pawlikowski);
- the 9th International Conference on Parallel and Distributed Computing, Applications and Technologies (PDCAT'08), in Dunedin, December 2008 (attended by Prof. K. Pawlikowski and Prof. H. Sirisena from Canterbury, Dr B. Carpenter from Auckland and Dr Z. Huang from Otago); and
- Australasian Telecommunications Networking and Application Conference (ATNAC'08) in Adelaide, Australia, December 2008 (attended by Prof. H. Sirisena and W. Liu, a PhD student from Canterbury)

In mid November 2008, Prof. Pawlikowski travelled to Europe, as a member of six person delegation of MoRST, to Germany, Poland and France. The main purpose of this delegation was to inform European scientists about New Zealand research initiatives and activities in the area of ICT, and to seek new links for international cooperation. The presentation prepared by Prof. Pawlikowski gave an overview of our project on PlanetLab NZ and was given at:

- University of Wuerzburg, Germany;
- Gdansk University of Technology, Poland; and during
- ICT Congress 2008 of European Union, in Lyon, France.

All these visits were associated with meetings with scientists who also use such global telecommunication testbeds as PlanetLab in their research projects. A few European research groups expressed their interest in a closer collaboration with our team. However, it appears that, for cooperation with say GLab, PlanetLab NZ would need to be spanned over more than three universities in New Zealand. Thus, further developments depend on future funding.

In the meantime, to help with future users of PlanetLab nodes at other universities, we have written a user manual which will be available soon on the website of our project. Additionally, a short paper on our initial experiments aimed at distribution of Akaroa 2 over PlanetLab will be presented by our international collaborator (a PhD exchange student from Japan) at the IEICE Conference in Japan, in March 2009.

Top Issues

In our previous report (June-October 2008) we signalled a possibility of installation of PlanetLab nodes on Dell m1000 multiprocessor server, a multiprocessor donated us by Dell. However, a number of technical problems related with this equipment forced us to abandon this plan.

Installation of additional PlanetLab nodes in New Zealand (at Massey University, University of Victoria and University of Waikato) would make our PlanetLab NZ much more powerful and wider accessible research tool, both for network research communities and

students at these universities. It would also allow us to establish links of formal cooperation with very powerful experimental network infrastructures in Europe. However, any future realisation of this plan depends on availability of appropriate fundings.

Top Risks

None

What's Coming Up

Now we are preparing ourselves for installation of two additional nodes of PlanetLab NZ at the University of Auckland. The date and logistics of this operation will be discussed soon with Associate Prof. Nevil Brownlee and his research group from the Department of Computer Science there. Most likely, this operation will be conducted in February or March. The necessary computer equipment has been already ordered.

At the University of Canterbury, having successfully demonstrated that Akaora2, our simulation controller, can be distributed over PlanetLab, we plan to further enhance Akaora2 functionalities, making it even more powerful tool for studying performance of new telecommunication technologies. We are also intensifying our research programs in which PlanetLab, via KAREN, can be used as a research tool. These include evaluation of search algorithms of structured and unstructured P2P networks and network resilience techniques for Next Generation Networks. Additionally, we are planning to investigate a possibility of using PlanetLab NZ for accessing experimental wireless networks, to support our research on next generations of multimedia mobile wireless networks.