eResearch and Advanced Networking Meetings

Trip report from Neil James
24 July, 2007

eResearch Australasia Conference

26-28 June

General Comments

There were 315 registered delegates, including 11 from New Zealand, 4 from the UK, 3 from the US and 1 from France. Besides the university representation 8% of the attendees were from industry and 9% from government agencies.

I attended a good number of the eResearch applications presentations to get an idea about how people were taking up the eResearch paradigm. There was strong representation from those in the GRID world, particularly showing the influence of APAC over the years.

Some key messages

Web 2.0

There is a growing consensus that Web 2.0 and Mashups (a website or application that combines content from more than one source into an integrated experience) are seen as a direction forward and the view was put that in some ways Mashups are now providing the similar services to the Grid. David de Roure from the University of Southhampton gave the opening keynote talk and made the observation that, despite enormous efforts in creation of standards and prescribing how services should be provided, many of the real advances come through empowering users to create their own applications and services. He felt that some of what was being put in place was overly complicated, and there was an over-engineering of standards. He noted that the ‘e’ in eResearch should stand for enabling and empowering. We should bring functionality to the user, but don’t force them to come to you.

Workflow

Workflow was another common theme. As an example of very successful tools David de Roure pointed to Taverna (http://taverna.sourceforge.net/) noting it was well up in the download ranking in Sourceforge. The Taverna project aims to provide a language and software tools to facilitate easy use of workflow. David’s view was that workflow sequences can be seen as ‘science objects’. Several presentations emphasised workflow within the systems they had developed.

Data curation

Philip Bourne from the University of California posed a series of questions around the areas of publishing, data curation and databases. In his view publishers have not yet embraced the inevitable changes that are happening with publishing. There is a move towards requiring the data to be made available as a condition for publication of a paper. In developments like PLoS Corpus (peer-reviewed, open-access journals published by the Public Library of Science -- http://www.plos.org/), there is live linking, including potential interaction between the published paper and the data. Another speaker, Alex Szalay from John Hopkins, noted that we are moving to a situation where the data must be published before the analysis can begin.

Several speakers talked about the move to require open access to, and use of, the experimental data, as long as proper attribution is given.

Ease of access and use, avoiding anything complicated, is the best path to acceptance of middleware. This is supported by agile programming techniques allowing rapid development informed by user feedback.

Driven by the ever growing number of publications there is a need to explore and develop other ways of disseminating information, including more use of podcasting and video material. Philip Bourne shared his view that journal papers should come with short audio and/or video support material that can be experienced ‘on the bus’.

In some disciplines the amount of data is going to overwhelm current processes. Alex Szalay, who is a cosmologist and computer scientist, noted astronomy data volumes were set to grow at such a rate that it would just not be possible to transmit the data to another location (away from the instrument) and analysis would have to be done at the data source. His conclusion was that data of this sort would never be generally centralised. Another change he foresaw was moving toward discovering ‘fuzzy’ results from data sets that are just too large to fully analyse. In other areas he saw great discoveries being made through the opportunity for research workers to work across discipline boundaries and combine different data sets.

Some speakers talked about the opportunities to make data and tools available to the public via the Web, and encourage non-specialist involvement in research with social networking techniques. Alex Szalay gave Skyserver (skyserver.sdss.org) as an example of this, and Paul Arthur from Curtin University drew attention to a Hurricane Katrina history site.

David Abramson from Monash University gave good overview of the successful work that is now being done with the Grid, and the use of frameworks such as those developed by PRAGMA (The Pacific Rim Application and Grid Middleware Assembly -- http://www.pragma-grid.net/about/). The projects shown would not be possible without the computing power delivered through the Grid paradigm. He noted that while the tools they have developed are powerful, they necessarily hide the underlying complexity in making it all happen.

Most frameworks supporting eResearch are using Storage Resource Broker software (http://www.sdsc.edu/srb/index.php/Main_Page) to provide a unified view of data from disparate sources for the application.

Some attempts are being made to create generic tools. One example is the Common Instrument Middleware Architecture (CIMA -- http://www.instrumentmiddleware.org/) which provides a generalise interface for remote management of instruments. However the consensus is that a very large number of systems the are being developed will remain special purpose.

Access grid

Bernard Pailthorpe from Queensland Cyber Infrastructure Foundation talked about, among other things, new developments with Access Grids. He noted that HD (high

definition) is now native to the Access Grid, and a data sharing application has been implemented using a SRB backend. Work has been done on an interface with SIP (Session Initiation Protocol), and they have almost completed a good (evidently others are not good) whiteboard for the Access Grid.

NCRIS Platform for Collaboration

Several speakers filled in the current picture of the NCRIS Platform for Collaboration projects. There is already A$75 Million being committed to a programme across a range of initiatives. Rhys Francis has been appointed to the position of Executive Director in the newly formed the Australian eResearch Infrastructure Council (AeRIC), and has the job of driving the investments. (There is a wiki at pfc.org.au which records what is going on for anyone interested in more detail.) He explained where the money would be deployed -- he laid out a simple three layers diagram:

(3) Tools and Applications - for the end users
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(2) Resources & Services Infrastructure
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(1) Foundation Services (e.g. the network)

He noted that layer 1 was used by all sort of services, not just those supporting research. In consequence not much NCRIS funding would go in here. Layer 2 is where there is an opportunity for a lot a generic development and this is where the bulk of the money will go. Layer 3 is seen as narrow user-group specific and therefore it is considered that those special interest groups will need to fund such developments themselves. Specific funded initiatives include:

- Australian National Data Service - building an infrastructure for storing and curating data
- National Computation Infrastructure (NCI) -- renewed structure for carrying out the old APAC tasks
- A body called NEAT -- the National eRsesearch Architecture Taskforce -- is being established to provide governance over the developments.

Rhys noted that there was a serious shortage of people with the appropriate expertise to undertake all they wanted to do, and this was in reality the major limiting factor to development.

The very strong message is that the Australian Government are continuing to make very significant investments to support eResearch, and they have put a lot of effort into carefully planning how they will move forward.

It is not only the federal Government that is making investments in this area. The Victoria eResearch Strategic Initiative (VeRSI) is a 5 year Aus$10 million investment by the State Government to push research in the State.

Several speakers emphasised the raft of challenges that remote sensing was going to bring, ranging from the potentially massive amounts of data, to how to effectively

transmit the data from the sensors.

Summary
The forerunners to this inaugural eResearch in 2004 and 2006 attracted mainly technology people but this conference was targeted at researchers to get them to come and show what they are doing. This conference had about triple to number of attendees compared to the previous events, and there was strong evidence that many of the additional people were actual research workers. This is of course very important, in that the meeting should be helping get the message around the research community that the new paradigm is upon them, and if they fail to embrace it they will be likely to left behind in their discipline and research.

It seems very likely that this conference will become an annual event.

QuestNet
10-13 July 2007

The conference had a total of 330 delegates with most Australian universities represented. There were also delegates from New Zealand (Tim Chaffe from the University of Auckland, Mark Cordy from REANNZ, and myself), Hong Kong, South Africa, US, and the UK. At least 6 Australian Directors of IT attended. Forty vendors were represented in the trade show associated with the conference.

There was a broad range of presentations with 3 parallel streams, and six plenary sessions, spread over two and a half days. There were also 2 days before the conference with a variety of workshops, including a workshop for Directors of IT on trends in higher education (which I did not attend, but I was told that the presenter's later plenary session at the conference had much of the same material).

Key messages and common themes I identified at the conference included:

- Unified messaging services and 'presence' (systems having a knowledge of the user's state of contactability, and actively managing communication channels) featured in several presentations. It is clear that some companies are seeing these developments as a (future) lucrative revenue stream.

- High definition (HD) video, including telepresence type developments, are becoming ubiquitous. While there are still a lot of differing standards some semblance of interoperability is appearing with leading developments. Codian have put a lot of thought into providing conference services that don't just revert to the lowest common denominator of capability of the conference attendees. Their MCUs reprocess streams to get the best possible resulting experience for all attendees. Another development, inSORS (a soft MCU), can be used as the glue between Access Grid, and many video conference formats including SIP and H.323.

- Several speakers emphasised the growing importance of virtual worlds. It was noted that over 100 universities have a presence in 2nd Life, and a growing number are providing courses in that domain.

- The use of social networking and social tagging techniques are being explored in support of both research, and teaching and learning. Speakers felt that the phenominal success of FaceBook, MySpace etc. was showing the way forward.

- There were two Research Channel/content provision related presentations. Australia, through work done by AARNet, have had a long association with Research Channel. There is strong demand for high quality video content and an interest in exploring/developing a YouTube for research in collaboration with Google Video and NSF. The US Research Channel has over 3,000 hours of broadcast quality material, including a lot of medical videos.

- AARNet are providing a video conferencing service. They provide MCU services and focus on interoperability. They provide user support and training (including assistance for CAVEs [coordinators of audio visual equipment]), and develop policy and provide documentation, and adopt best practice models. They are also providing a point of contact for the industry, and provide advice on products to the R&E community. See www.nvcs.edu.au.

- Notwithstanding the recent eResearch Australasia conference there were a number of presentations on eResearch topics. There was a lot of interest shown in the work that QUT have undertaken with their ESOE, standards based, open source single sign on and federation development. The software has been developed by QUT using Java and XACML working to the SAML 2.0 standard, and it sits on Tomcat. It is simple to deploy with computer science students with no experience able to have a fully operational system up in 1 1/2 hours. The project has caught the eye of Google and they are now working with them. See www.esoeproject.org.

- There were several talks on wireless networking technologies. There was an interesting research based presentation by Bjorn Landfeldt from the University of Sydney. He made the statement that 802.11 was not designed for mass deployment in public spaces, and based the statement on design considerations around the standards. He saw the fundamental problem being that in the urban deployment situation there are inevitably many more access points that channels available, and contention and interference caused by overlapping domains leads to poor performance. New R&E is required - a rethink of how we build WLAN in public settings.

Notwithstanding such matters another speaker from Netgear talked about how to make to best of the 802.11 standards, an gave an excellent run-down of the soon to be ratified (well expected October of next year) 802.11n standard. Up to 5 radios can be used and the actual performance should be as high as 65-100 Mbps. However he noted that for deployment we should have PoE (power over Ethernet) GigE to access points.

A speaker from LAN1 said that they can get 300 Mbps with a greater than 100 mile reach on point to point wireless. He also noted the use of the Wifi 5MHz band for backhaul on meshed services. He talked about their development of BPL (broadband over power lines). They have 8 Mpbs from the power point now and will

have 200 Mbps soon.

- Urban (and wider) fibre networking was addressed in a number of presentations, with several Australian cities and states having initiatives in this area. VERNet in Victoria is developing a 1,700km fibre networking using a combination of builds and 20 year IRUs. They have over 100 committed sites for either dark fibre services of GigE, and the roll-out will be completed this year. Another presentation covered the SABERNet development that was launched earlier this year in South Australia.

- Geoff Houston, currently with APNIC but in the past a funding member of AARNet, gave an excellent exposition of the IPv4 address space issue. He noted 3 potential solutions:

    - IPv4 plus NAT
    - IPv4 with trading of address in a market
    - IPv6

While now everything that needs to will work over NAT unfortunately all implementations of NATare different - this lack of uniformity leads to increasing complexity and will ultimately limit NAT's effectiveness. In Geoff's view this is not a long term solution.

Trading addresses may work in the short term (what will the price be?) but it cannot be a long term solution - there just isn't enough address space.

IPv6 needs a critical mass to be viable. At the moment there just isn't the commercial drivers to push people to implement it - there is essentially no extra service you get when you invest in moving to IPv6.

Geoff presented and interesting mathematical analysis based on data he ahs been logging since 2000 which predicted the address space will run out on 24th April 2010.

Summary
QuestNet continues to provide a wide range of presentations of interest, and despite the eResearch Australasia conference being held just 2 weeks earlier, still attracted a good number of delegates. As we start to push the boundaries of networking services it is important for New Zealand to develop a greater level of experience and expertise in advanced networking. QuestNet is a good event to provide New Zealand network staff (and their managers etc) with an opportunity for people networking, as well as giving exposure to new research and techniques in advanced networking.