



# KAREN Members Technical Report

For the 6 months ending 31 December  
2008

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## Audience

The intended audience for this document are:

- KAREN members networking staff
- REANNZ Board members
- REANNZ staff

## Reference Documents

No documents are referenced.

## Version control

VERSION	DATE	REASON FOR UPDATE	AUTHOR
1.0	4 December 2008	Initial Draft	David Brownlie

## Review and Approval

This document has been approved for release by the following:

NAME	ROLE	ORGANISATION	DATE
Mark Cordy	Operations Manager	REANNZ	

## **Introduction**

This report is intended to provide a high level overview of REANNZ operational activities and the performance of KAREN for the 6 month period ending 31 December 2008. This is a companion report to the KAREN Compendium.

## **Projects Delivered**

A variety of project work has been undertaken in the six months ending 31 December 2008.

### **APAN 26**

The Asia Pacific Advanced Network Consortium meeting (APAN 26) was successfully held in Queenstown from 4 – 8 August 2008 involving over 350 guests and speakers from across the Asia – Pacific region. This conference was a great success and is the largest APAN meeting that has been held to date.

### **National Education Network (NEN) Trial**

REANNZ has been working with the Ministry of Education, the Tertiary Education Commission and the National Library to conduct a National Education Network (NEN) trial. The trial has focussed on validating the network as a delivery mechanism for education and has included a number of content and service providers delivering applications and services to the schools involved in the trial. Further information is available at [http://www.wiki.karen.net.nz/index.php/National\\_Education\\_Network](http://www.wiki.karen.net.nz/index.php/National_Education_Network).





**Figure 1 - School music concert across the NEN**

The trial has been a great success, with positive feedback being received from an enthusiastic education community. A good overview can be found at <http://www.core-ed.net/karen/>.

### **M320 Relocation**

The third Juniper M320 router, which had previously been held as a spare, was physically installed in the Dunedin POP in November 2008. REANNZ expects that the logical commissioning of this router should be completed early in 2009. This will provide KAREN members in the South Island with a local peering option, and all KAREN members an assurance that there should always be 2 core routers available for service.

### **KAREN Services**

While our principal concern is with the core network, REANNZ has, this year, also introduced a number of additional network based services. These new services are aimed at supporting members with their use of KAREN, and to illustrate some of the potential from the use of high definition video conferencing. Each of these new services is described in further detail below:

#### *KAREN Video Conferencing Service*

The KAREN Video Conferencing Service trial has now been in operation for 8 months. Usage of this service in November saw a huge spike culminating in over 1,200 hours of video conferencing through the bridge by KAREN

members. With the trial due to finish in April 2008, REANNZ will be consulting with members on the nature of the ongoing service after that time. Further information can be found at <http://www.karen.net.nz/vc-service/>.

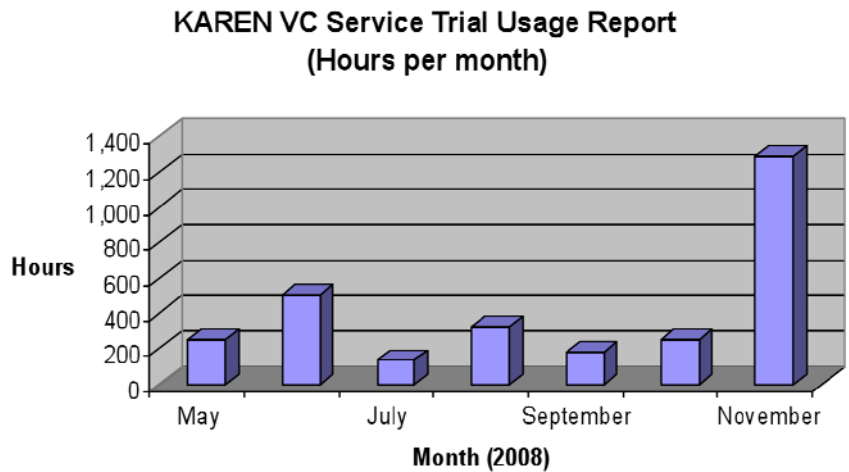


Figure 2 - KAREN VC Service Usage

#### KAREN Router Proxy

The KAREN Router Proxy is currently in proof of concept mode for KAREN members only at <http://krp.karen.ac.nz/routerproxy/>. This service was developed after requests from members for a service similar to the Internet2 router proxy. It allows a limited set of commands to be executed on the core KAREN domestic routers, as well as on the international routers in Auckland, Sydney and Seattle.

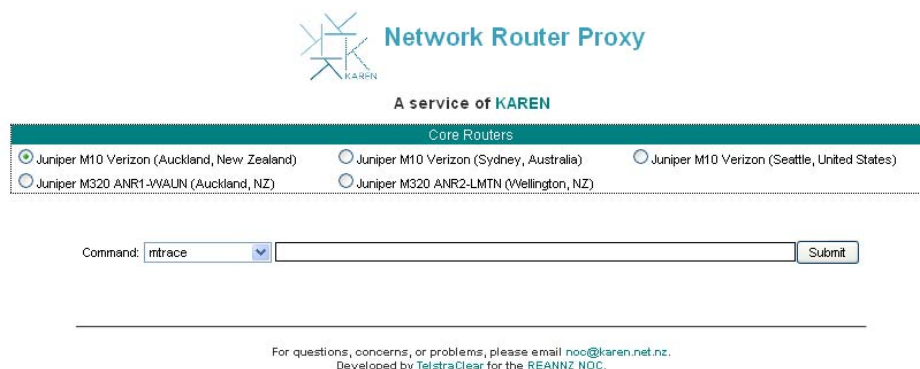


Figure 3 - KAREN Router Proxy

#### KAREN Wiki

The KAREN wiki has been a very popular tool for sharing information amongst the community. The content is varied, covering technical topics such as IPv6 and multicast services in addition to guides to on-net content. This wiki is

available for use by KAREN members and we encourage you to become involved and add information to the wiki. It is available at [http://www.wiki.karen.net.nz/index.php/Main\\_Page](http://www.wiki.karen.net.nz/index.php/Main_Page).

### *KAREN Network Diagnostic Tool*

The network diagnostic tool is available at <http://netperf.karen.ac.nz:7123> and has been migrated to a production platform to ensure consistent results are achieved.

#### **KAREN Web100 based Network Diagnostic Tool (NDT)**

**Located at Wellington; 1000 Mbps (Gigabit Ethernet) network connection**

This java applet was developed to test the reliability and operational status of your desktop computer and network connection. It does this by sending data between your computer and this remote

- The slowest link in the end-to-end path (Dial-up modem to 10 Gbps Ethernet/OC-192)
- The Ethernet duplex setting (full or half)
- If congestion is limiting end-to-end throughput.

It can also identify 2 serious error conditions:

- Duplex Mismatch
- Excessive packet loss due to faulty cables.

A test takes about 20 seconds. Click on "start" to begin.



**Figure 4 - KAREN NDT Tool**

Auckland University has also been investigating Path Diagnostic Server which may be added to this suite of tools in 2009.

### *KAREN DNS Servers*

In response to member requests, REANNZ has been working on the implementation of a DNS service for both IPv4 and IPv6 name resolution. Testing has been completed and a plan has been formed to make this service available to members in early 2009.

### *KAREN Monitoring and Measurement*

REANNZ continues to use open source software to monitor and measure aspects of the network's performance. MRTG and Smokeping graphs depicting usage and performance of the international circuits were made available as part of the KAREN Network Services proof of concept at <http://noc.karen.ac.nz>.

REANNZ has also been working with Victoria University of Wellington and the University of Otago on multicast beacons to measure the performance of multicast services over KAREN. The multicast beacon has also been used as a troubleshooting tool in trying to understand some instability in making New Zealand multicast content available internationally. This has allowed us to successfully identify the area causing the instability which is currently being addressed.

## **Network Operations**

This includes a variety of normal business activities resulting from the operation of the network.

## **Member Connections**

There are currently 56 organisations connected to KAREN at 92 sites around New Zealand. The last 6 months has seen an increased number of aggregated connections being made to the network as schools and other organisations request connection.

## **Peering**

KAREN is peered with 18 networks internationally providing IPv6, IPv4 and multicast routes for KAREN members. There were 12,009 IPv4 prefixes, 2689 multicast destinations and 990 IPv6 prefixes available as at 16 December 2008.

## **Outages**

We continue to experience fibre optic breakages in the core network, transparently dealt with by the networks redundant design. The overall number of fibre breaks has been higher in the last 6 months than in any previous period. The majority of these breaks have occurred in the same area between the Napier and Rotorua POPs as a result of other fibre optic work in the area.

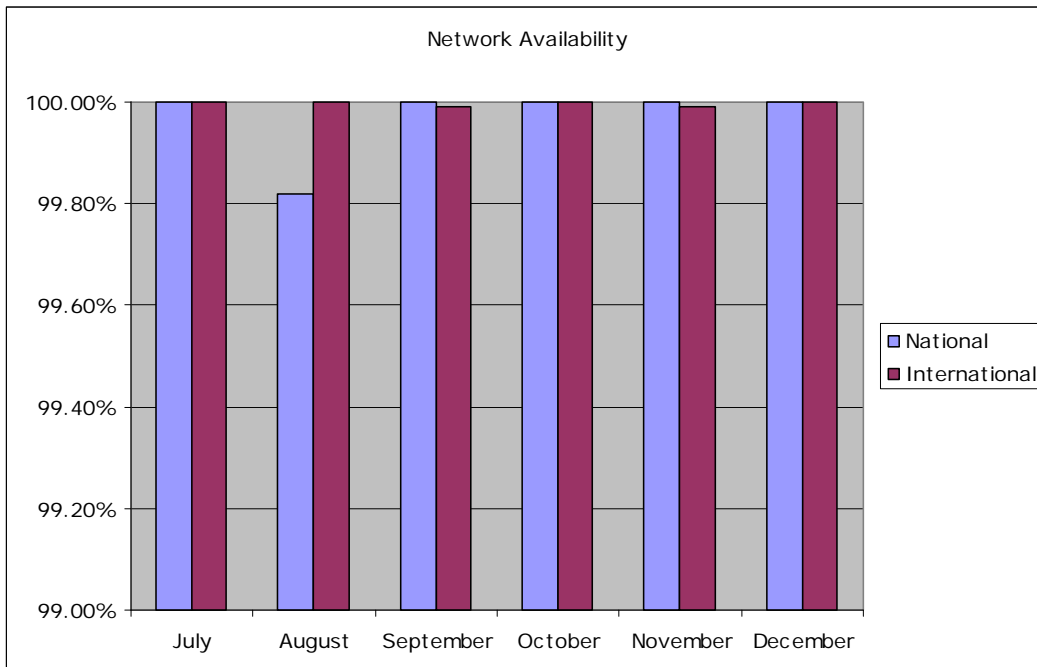
The only service affecting outage in the domestic network was a fibre break caused by severe weather in the Seddon area of the upper South Island. This occurred in the only area of the network that does not have physical diversity, although logical diversity is in place. As a direct response to this outage a backup tunnel has been planned between Dunedin and Wellington that can





make use of a different physical path. This interim solution will have a smaller throughput than the normal KAREN backbone and may not support all the features that are supported on the KAREN core. The long term solution is full physical redundancy in the upper South Island, which should be available in late Q2 2009.

REANNZ has been working with Verizon Business following the detection of several unscheduled router restarts in Seattle. These restarts have been short in duration, being between 7 and 10 minutes in total. Fortunately they have occurred in the early hours of the morning. This work has unearthed a bug in the operation of the particular version of router software in use. It is expected that the routers will be moved to a new software version in late 2008 or early 2009.



**Figure 5 - Network Availability**

### **Network Maintenance**

The planned software upgrades on the Juniper routers that were referred to in the last members report were carried out successfully in July 2008.

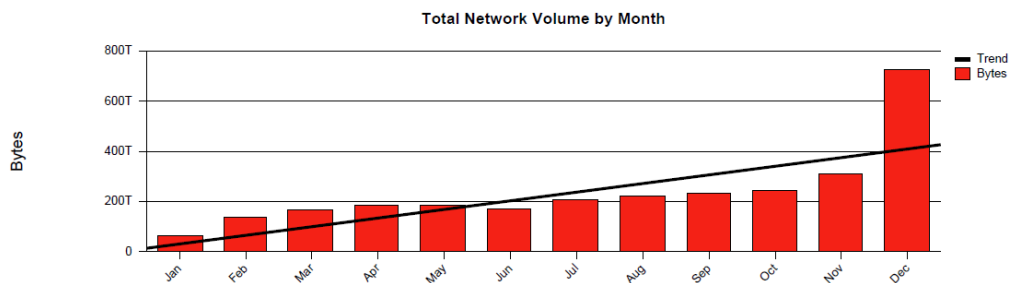
The majority of the Extreme switches were rebooted in early September to address a bug in the software that caused a system reset after 497 days uptime. It had been anticipated that a major software release would be available before this was necessary, but the release was delayed.

The Extreme software upgrade that was anticipated for Q4 2008 has not been scheduled at this point. After reviewing the known software bugs and

considering the implications of those bugs, the decision was made to await a more stable code release.

## Network Capacity

The average utilisation across the network is still modest, when compared to the available capacity. However, average utilisation and total daily traffic measured across all ports in the network continues to grow steadily. The last members report for the period ending 30 June 2008, highlighted that total traffic volume would soon exceed 200TB per month. December 2008 saw the total traffic volume measured at well over 700TB as demand for new multicast services increased dramatically. REANNZ is delighted that this upward trend has remained constant during the first two years of KAREN's operation.



**Figure 6 - Total Volume (All Ports)**

Individual member traffic has also continued to grow with a number of sites generating sustained periods of more than 150Mb/s use of the network.

The international capacity continues to have a higher average utilisation due to the comparatively lower bandwidth available. A change in the reporting platform for these circuits has meant that the graphs previously used are no longer relevant. However, information on peak utilisation is still available in a tabular format. Peak utilisation on the STM-1 to Australia remains very high, particularly from Australia to New Zealand where the peak is usually over 80% of capacity. The peak for the last 6 months was 87.31% of capacity, or 135.33Mb/s on the 155Mb/s circuit.

Element	BW Util In	BW Util Out
	Max %	Max %
	All	All
REANNZ_nz-w0p50530-link-so-0/2/0	87.02	50.73
REANNZ_nz-w0p50530-link-so-0/2/0.0	87.02	50.73
REANNZ_au-w0p50530-link-so-0/2/0	50.72	87.31
REANNZ_au-w0p50530-link-so-0/2/0.0	50.72	87.31
REANNZ_us-w0p51858-link-so-0/2/0	48.44	38.62
REANNZ_nz-w0p50530-link-so-0/2/1	35.32	10.56
REANNZ_nz-w0p50530-link-so-1/3/0	23.63	9.86
REANNZ_nz-w0p50530-link-so-1/3/0.0	23.63	9.86
REANNZ_au-w0p50530-link-ge-0/0/0.0	13.53	7.86
REANNZ_au-w0p50530-link-se-1/1/0	10.93	99.65

**Figure 7 - STM-1 to Australia**

The STM-4 to Seattle has seen a significant increase in utilisation over the last 6 months. Peak utilisation on the circuit to Seattle was 48.44%, or just over 301Mb/s. The busiest period on this circuit during the last 6 months was not during APAN, as could have been expected, but during October.

Element	BW Util In	BW Util Out
	Max %	Max %
	All	All
REANNZ_nz-w0p50530-link-so-0/2/0	87.02	50.73
REANNZ_nz-w0p50530-link-so-0/2/0.0	87.02	50.73
REANNZ_au-w0p50530-link-so-0/2/0	50.72	87.31
REANNZ_au-w0p50530-link-so-0/2/0.0	50.72	87.31
REANNZ_us-w0p51858-link-so-0/2/0	48.44	38.62
REANNZ_nz-w0p50530-link-so-0/2/1	35.32	10.56
REANNZ_nz-w0p50530-link-so-1/3/0	23.63	9.86
REANNZ_nz-w0p50530-link-so-1/3/0.0	23.63	9.86
REANNZ_au-w0p50530-link-ge-0/0/0.0	13.53	7.86
REANNZ_au-w0p50530-link-se-1/1/0	10.93	99.65

**Figure 8 - STM-4 to US**

### Service Management

REANNZ has noted that the latest member survey rates the service desk as the least satisfactory aspect of the performance of KAREN. The Service Desk has been the subject of a service improvement programme and a considerable amount of work this year and it is disappointing to see it rated as less satisfactory than in 2007. REANNZ will continue to work with the Service Desk to make improvements where possible. As always we welcome any feedback you have about the performance of the Service Desk or any other aspect of service management.