REAANZ

November 2015

REANNZ: NZ Update

T. Charles Yun
IVTW4
AUT, Auckland, NZ

Overview

- A bit about me
- About the Network
- Successes, Projects and Possibilities
- eRNZ2016 (Captive Audience)

About: Charles

My Background

- T. Charles Yun, tcyun@reannz.co.nz
- Current
  - REANNZ: Research Education Advanced Network New Zealand
- Path
  - US -> NL -> NZ
  - Industry (CAE/CAM) -> Research & Education
  - Infrastructure -> User -> Infrastructure
    - Internet2 -> JIVE (radio astronomy) -> REANNZ

The Network

the images are of no particular significance (pūkeko, Porphyrio melanotus)

About the network...

REANNZ

- **R**esearch **E**ducation **A**dvanced **N**etwork **N**ew **Z**ealand
- One of the international organisations that provides networking services to the research, education and innovation sectors around the world
  - Sister Organisations: Internet2 (US), SURFnet (NL), GEANT (EU), KOREN/KREONET (KR), SINET (JP), CERNET/CSTNET (CN), RedIRIS (ES), AARNet (AU), ...
- Almost 30 staff, all located in our Wellington, NZ office

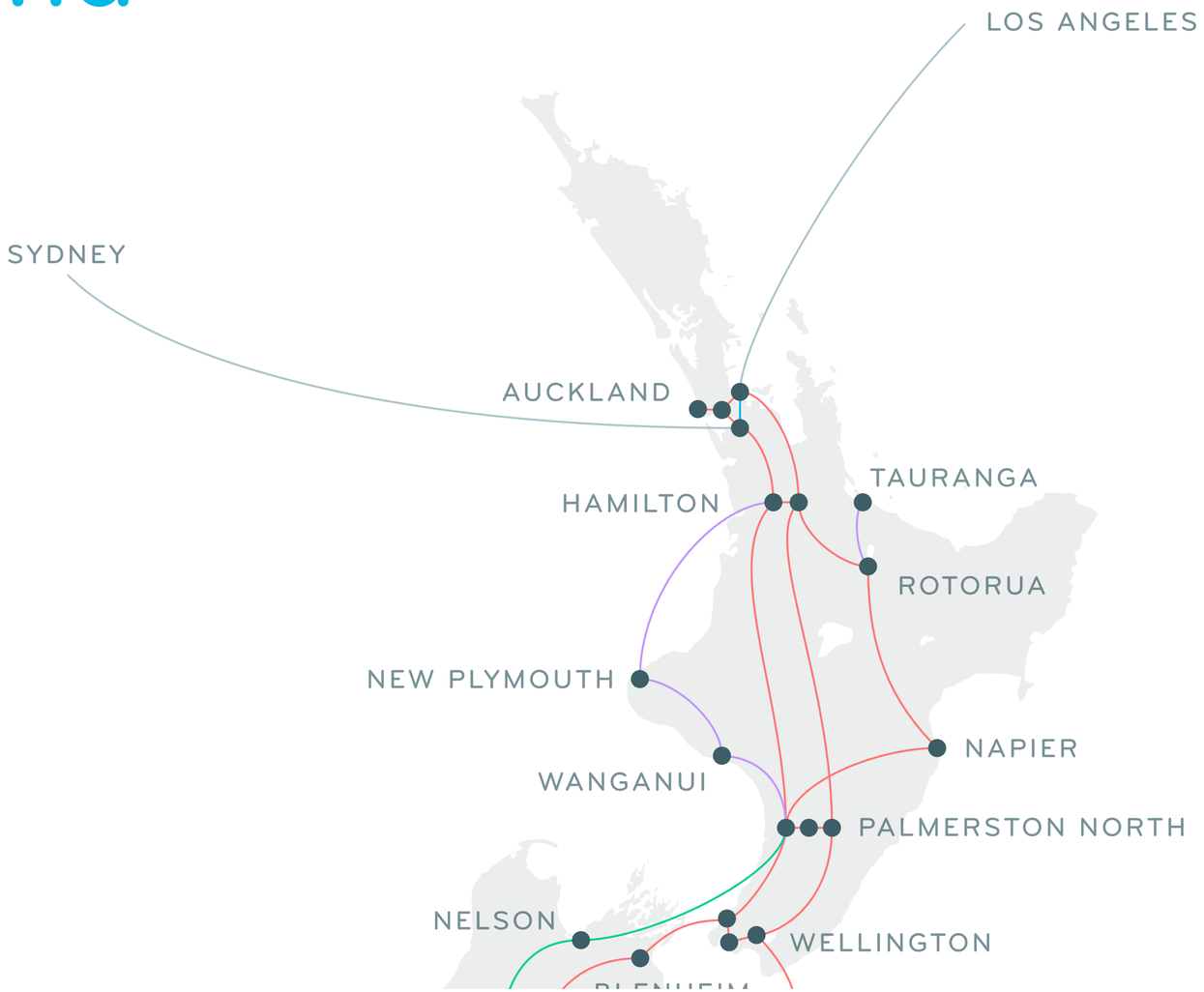
About the network...

National Connectivity

- Control and own a national footprint
  - Fiber and equipment
- 10 Gb/s ladder design
  - Planning for upgrade to 100 Gb/s
- International connections to AU and US
  - 40 Gb/s R&E to SYD and LAX
  - approaching 10 Gb/s commodity usage

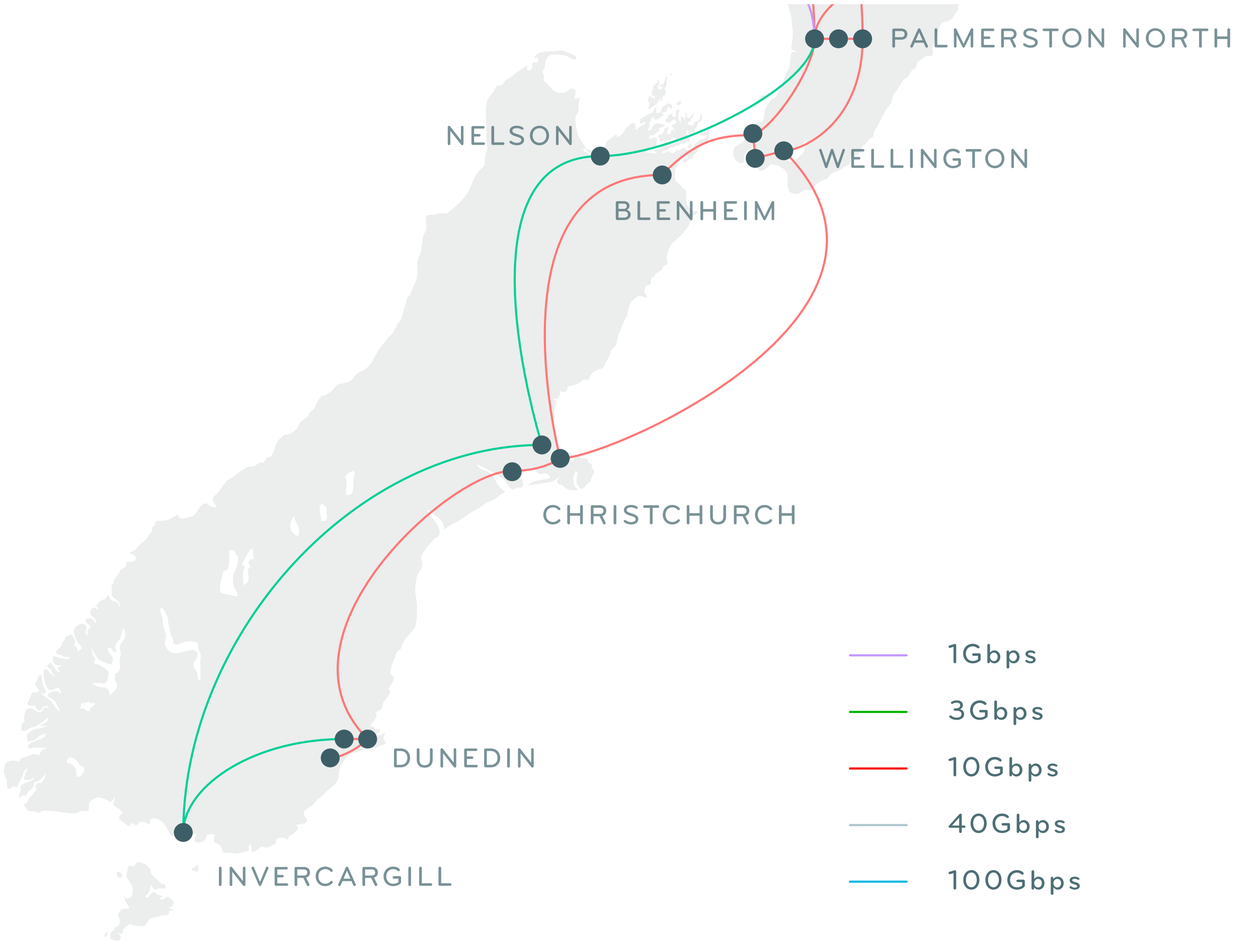
About the network...

North Island



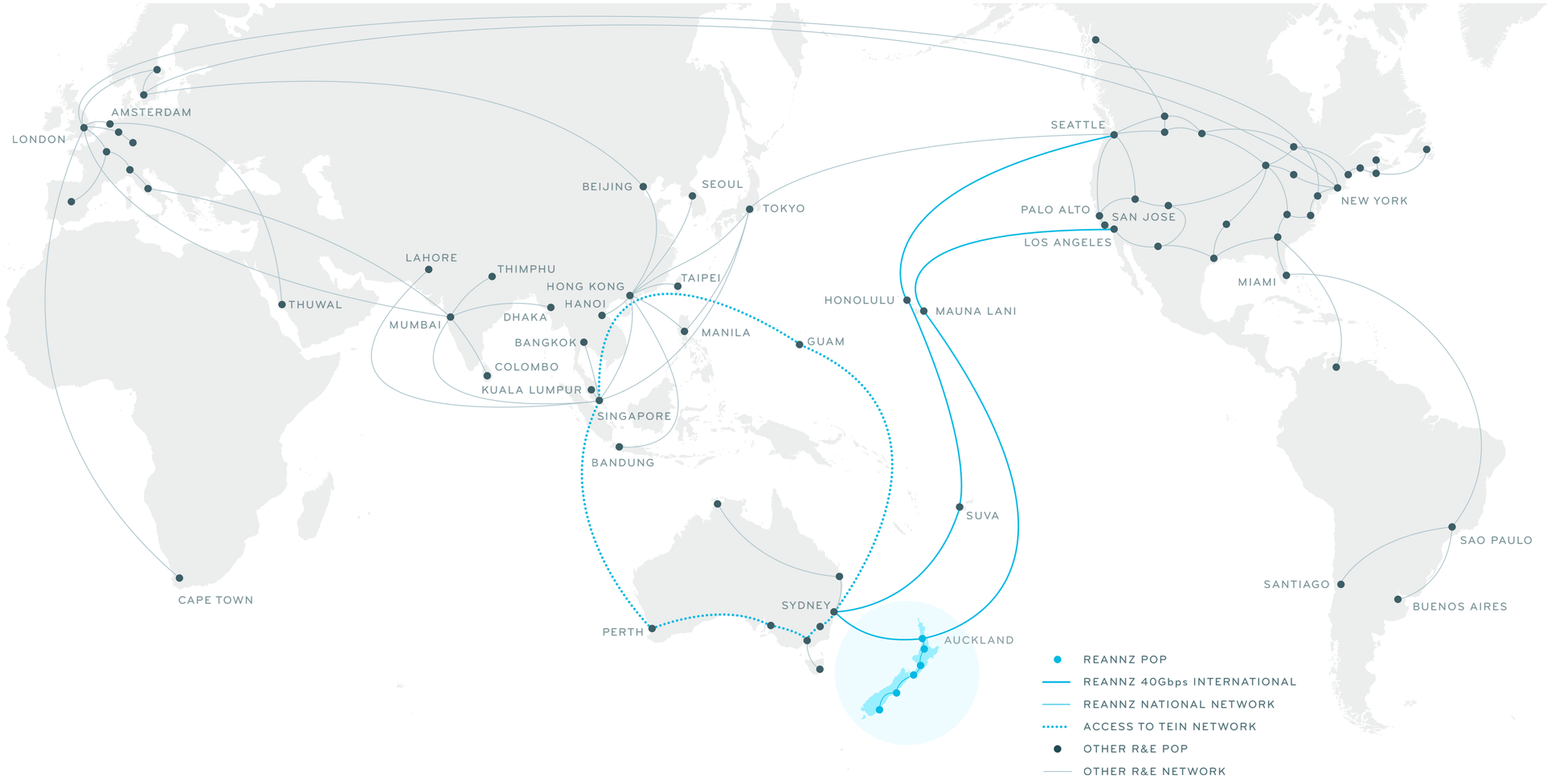
About the network...

South Island



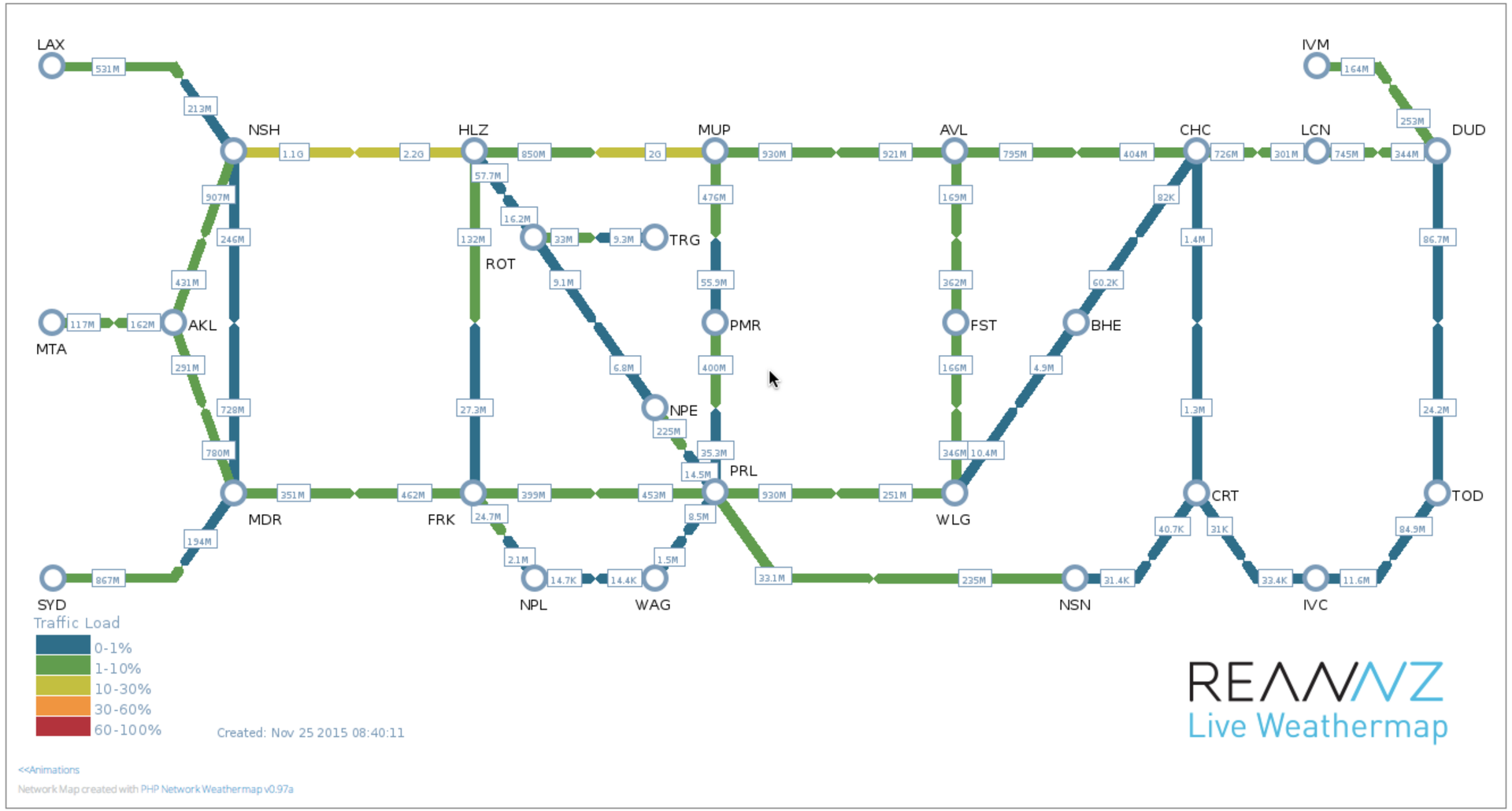
About the network...

International Connectivity



About the network...

Weathermap



About the network...

Perspective and Comparison

- We have a small population (4.4M), about the size of:
  - Ireland (4.5M), Costa Rica (4.5M), Czech Republic (10.5M)
  - X'ian (4.5M), Johannesburg/Melbourne (4.4M), Los Angeles (4.3M)
- Multiple 10 Gb/s links nationally, planning to move to 100 Gb/s soon, ownership of the physical infrastructure
  - NZ's geography/shape means that data aggregates to the north
  - It also means that the southernmost links seem underutilised

- We are also far away from everyone...


Amsterdam, NL (21
Detroit, MI (15h35m)
New York, NY (16h15m)
Los Angeles, CA (12h10m)
Seoul, Korea (11h15m)
Honolulu, HI (8h25m)
Bombay, IN (14h00m)
Kuala Lampur, MY (10h00m)
Suva, FJ (2h55m)
Sydney, AU (2h30m)
Perth, AU (5h55m)
Auckland, NZ (0h35m)
Wellington, NZ
North Atlantic Ocean
North Pacific Ocean
South Atlantic Ocean
South Pacific Ocean
Indian Ocean
Southern Ocean
ANTARCTICA

Successes, Projects and Possibilities

Successes

REANNZ is fundamental to NZ

99.998%

Network Availability

46%

Traffic Grown 2014 vs 2015

99.998%

Members consider the REANNZ network valuable and essential to their work in 2014

The REANNZ network is a Research Instrument

Successes

SCiNet

- Supercomputing, the annual conference for researchers and vendors
- For SC2015, REANNZ was invited to participate in the construction of the SC local network
  - All the major networking vendors provide their top-of-the-line hardware
  - Multiple 100 Gb/s connections to the conference centre
- REANNZ is seen as a global player in both networking

Upcoming Collaborations

- EYR
  - AUT's Institute for Radio Astronomy and Space Research (IRASR)
  - ASTRON (Netherlands Astronomy Research Entity)
- Large File Transfer
  - Potentially with CSIRO and IBM/Aspera

Successes

EiR: Engineer in Residence

- Engineer in Residence program
  - An organised process to get engineers from different organisations to work out of our office
  - SANREN sent an engineer to REANNZ; REANNZ has an engineer at SCiNet 2015 “right now”
- Challenges
  - remember that map?
  - We are a long away away… from everyone
  - Involves sending slightly more junior engineers than normally are allowed to travel internationally…

Possibilities: Collaboration

Persistent Connections

- REANNZ will build long-duration connections to support testing and demonstrations
- Persistent (but not permanent) connections
  - primarily to support ongoing SDN work
- NZ-based end-point availability for future demonstrations (to support the desire for high-latency, real-life dynamics)

- There is still a gulf between applications (people) and the network (physical, logical and people)

Successes

Tuakiri

- Tuakiri is New Zealand's formal Identity Management Federation for the research and education community
  - The Tuakiri community unanimously requested to be a REANNZ managed service in 2014
  - In the past six month, we have been working to leverage Tuakiri to better support the needs of the the community
- Sat Mandri and Vlad Mencl from REANNZ are available at the conference to discuss in greater detail

Successes

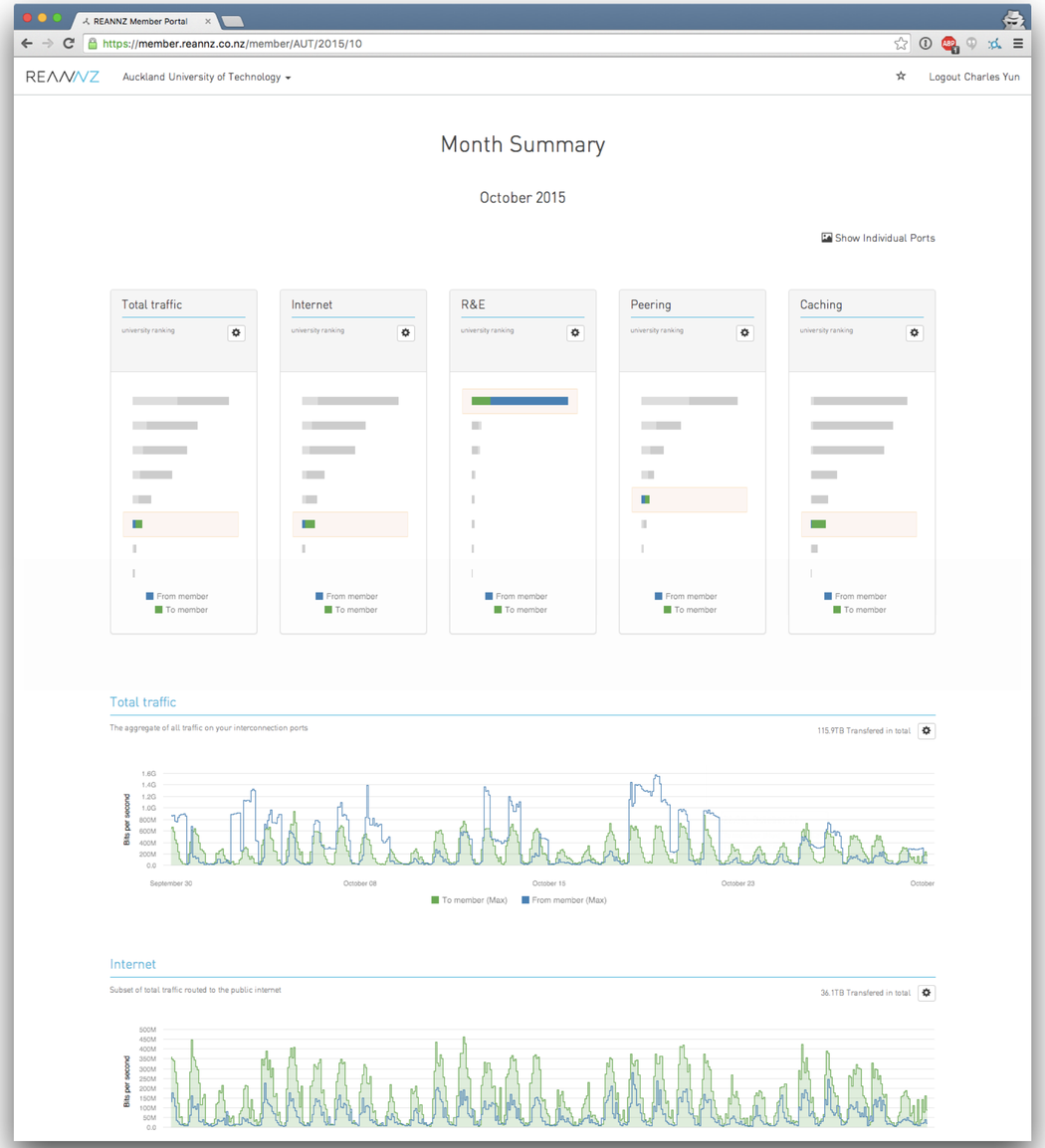
SAGE 8K Visualisation Wall

- 2x2 Matrix of 4k Displays
  - Single 8K display surface
  - First 8K display of its kind
- Debuted at GLIF 2014 and successfully demonstrated at eRNZ 2015 and the REANNZ Parliamentary Briefing
  - Multi-continent, telemedicine demonstration
  - NZ topological data visualisation

Successes

Member Portal

- Providing members with better visibility of their network usage
- Highlights usage and displays types of usage compared to other members from the same category
- Login is Tuakiri enabled
  - Almost 100 registered users (mostly CIOs and IT staff)



Possibilities: Oceanic Connections

Hawaiki

- Trans-pacific cable
  - Multiple attempts
  - REANNZ negotiated on behalf of NZ
- Hawaiki has lined up investors
  - We are waiting for the building to start

- This is an opportunity for “Zeastralasiapac” to begin thinking about a physical R&E network for a pan-hemispheric network

Wet strings

- (This summary conveniently ignores the very complicated history and realities. You are welcome to present your {truth|version|fiction})

- “Next generation science projects” are not going to get smaller, less ambitious or send less data
- As the networking community, we need to state that there was an opportunity to establish significant, low-cost capacity with Hawaiki
- These opportunities are not frequent and we must prepare in advance to take advantage of them
- Is the radio astronomy community ready to commit to investment?

Possibilities: SDN

Faucet

- Faucet is REANNZ's SDN implementation
  - Build minimal viable product: OpenFlow L2 switch
  - Replace office switch
  - Develop Operational familiarity with OpenFlow
- Being integrated into the Ryu SDN source tree

- It works!
- It is available!
  - https://github.com/REANNZ/faucet

— Chris Lorier's Talk from Monday —

Successes

Parliamentary Briefing

- Sept 2015
- Dr Jian Yang invited REANNZ to present at the Beehive to update Ministers, MPs and the community
- Minister Joyce opened the meeting (and stayed through the Q&A period!)
- Three video case studies: AUT's Ensor; Cawthron's Cornelisen; and W2's Wolfe and Fallon
- ~140 people participated

Successes

Video Case Studies

- W2
  - https://www.youtube.com/watch?v=IBoGZhMCrPo
- AUT
  - https://www.youtube.com/watch?v=kq1GhF3vbDQ
- Cawthron
  - https://www.youtube.com/watch?v=pu3rx57WkJU

Successes

GLIF 2014

- The world's longest submarine 100 Gb/s connection
- The world's first SDN Router capable of handling the entire internet route table
- The world's first SAGE 8K Visualisation Wall
  - Demonstrating global-scale telemedicine

Captive Audience

You can not look away….

eRNZ 2016

- eResearch New Zealand (eRNZ) 2016
- Location/Coordinates
  - Queenstown
  - Tue 9 - Thu 11 Feb 2016
- Multiple tracks, demonstrations, workshops

- Call for presentations out next week

- Considering proposing eResearch Zeastralasiapac 2017…

Questions?

T. Charles Yun
tcyun@reannz.co.nz

http://www.reannz.co.nz/
@REANNZnews


—fin—