

REANNZ LUNCH '19 – 14TH AUG

# INTERNATIONAL NETWORK

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REANNZ

## TRAFFIC TYPES

1. International R&E
2. Domestic
3. Caches
4. Commodity Internet

## TRAFFIC TYPES

### INTERNATIONAL RESEARCH & EDUCATION (R&E)

- Generally encompasses any traffic to/from another National Research Network (NREN) connected institute around the world eg an overseas university.
- Data rates are not limited at all.
- Currently the majority of this traffic is picked up at Pacific Wave in Seattle.
- We also peer with AARNET in Sydney being the Australian NREN.

## TRAFFIC TYPES

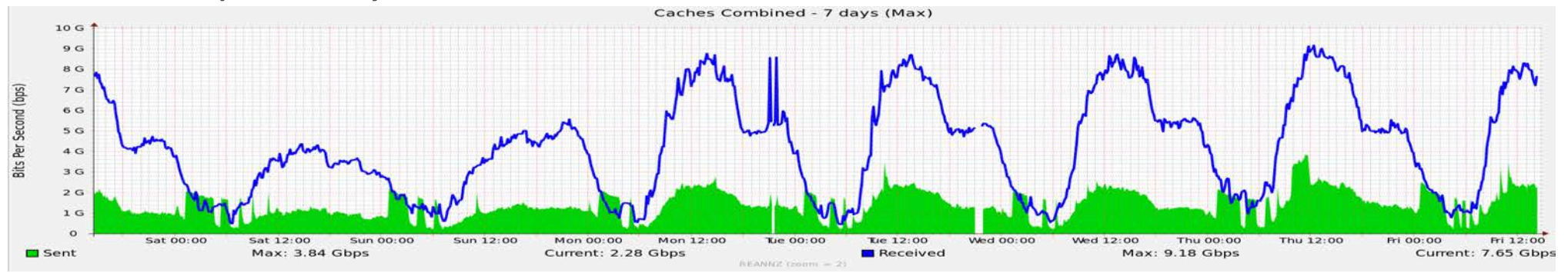
### DOMESTIC

- Traffic we pick up locally within NZ.
- Includes Peering Exchanges such as APE, WIX, CHIX and AKL-IX as well as direct links we have with various Network Operators.
- REANNZ member to member (on-net) traffic.
- We do not limit this traffic at all.

## TRAFFIC TYPES

### CACHES

- We host a number of Caches within NZ including Netflix, Akamai, Facebook and Google.
- Faster access speeds as content is brought closer to our members.
- Lower latency.
- Doesn't consume our members International Bandwidth.
- Hosted primarily in Hamilton.



## TRAFFIC TYPES

### COMMODITY INTERNET

- Any traffic to destinations that are not learnt Domestically or via our dedicated R&E Peering.
- Each member has a specific allocation.
- When the Network has free capacity members may burst significantly over their bandwidth allocations.
- If we learn a route from both an R&E path and a Commodity Internet path we would always prefer R&E meaning we only use Commodity Internet when required.

## TRAFFIC

### TRAFFIC FLOW RECAP

- Member to member traffic (on-net) remains fully on the REANNZ Domestic Network. (This traffic is not policed at all)
- Domestic traffic will remain on the REANNZ Domestic Network until it reaches one of the various Peering points where it will be handed off. (This traffic is not policed at all)
- International R&E traffic destinations learnt over our dedicated R&E peering is preferred vs other paths eg IP Transit. (This traffic is not policed at all)
- Any remaining International Traffic will transit either our International Peering points or IP Transit as a last resort. (This traffic is policed based on per member allocations)

## MEMBER PORTAL

# MEMBER.REANNZ.CO.NZ

- Provides monthly usage statistics as well as a breakdown of the different traffic types used.
- Displays how your traffic volume compares with other members from within your sector (eg CRI / Universities).
- If you don't have access to this please let us know.
- For more detailed reports we can manually provide these.





## INTERNATIONAL NETWORK

### WHAT MAKES UP AN INTERNATIONAL NETWORK?

- Physical links to other countries eg undersea cable systems.
- Peering with other Network Operators which provide direct access to them and their customers.
- Dedicated links with large content providers eg Google.
- R&E Peering – Provides direct access to the various other National Research Networks around the globe.
- IP Transit – Provides a way to reach all internet connected destinations that we can't get to via one of the above.

## HAWAIIKI

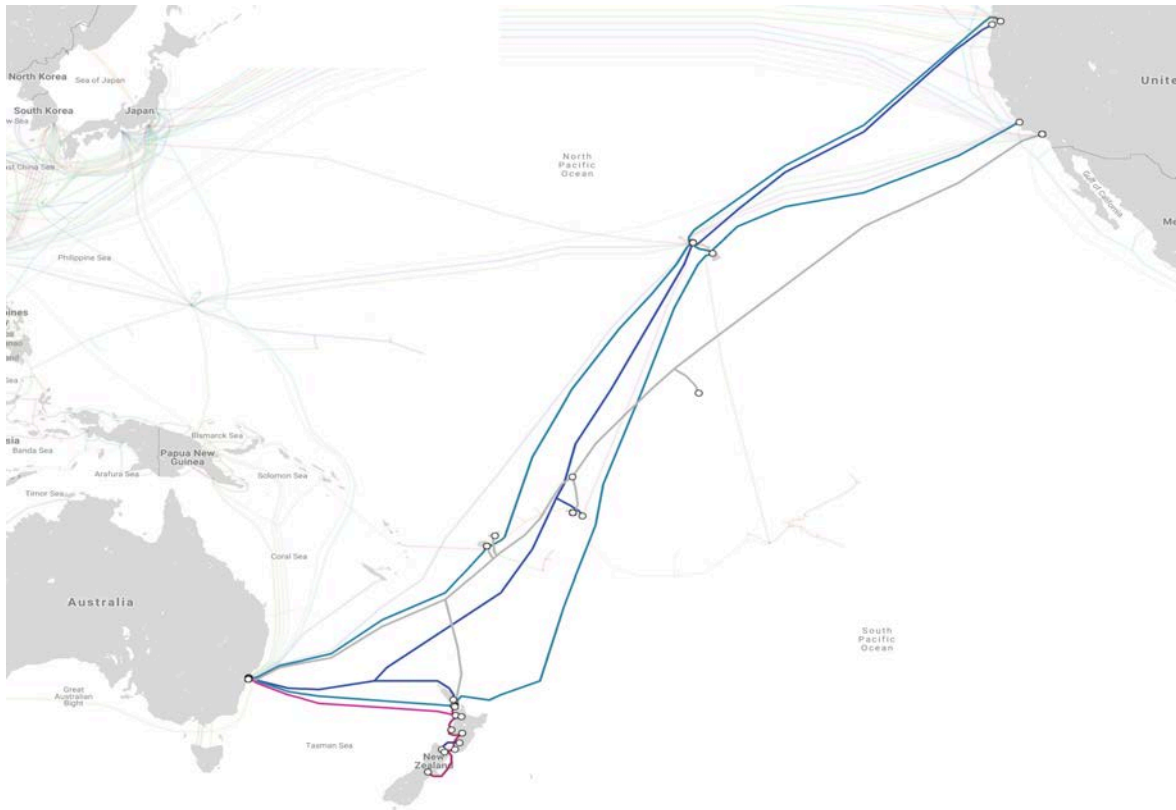
### HAWAIIKI CABLE

- REANNZ are an anchor tenant on this new cable system.
- Went live mid last year.
- Provides us with 20Gbps to both Australia and the USA.
- Our Bandwidth increases yearly over the course of the 25 year contract ending up at over 2Tbps.



## INTERNATIONAL NETWORK

# INTERNATIONAL CABLES



- Hawaiki
- Southern Cross
- TGA
- Southern Cross NEXT ( Not yet completed)

## INTERNATIONAL NETWORK

### RESILIENCY

- We currently purchase IP Transit from Vodafone that is delivered to us in Auckland.
- IP Transit covers the full Internet routing table meaning we pickup the routes that we don't otherwise learn via our existing Peering.
- As Vodafone uses different Cable Systems this service will remain functional in the event of a Hawaiki fault.
- Vodafone does **not** provide dedicated R&E traffic resiliency at all.
- This is a temporary arrangement with a long term design for International Resiliency to follow.

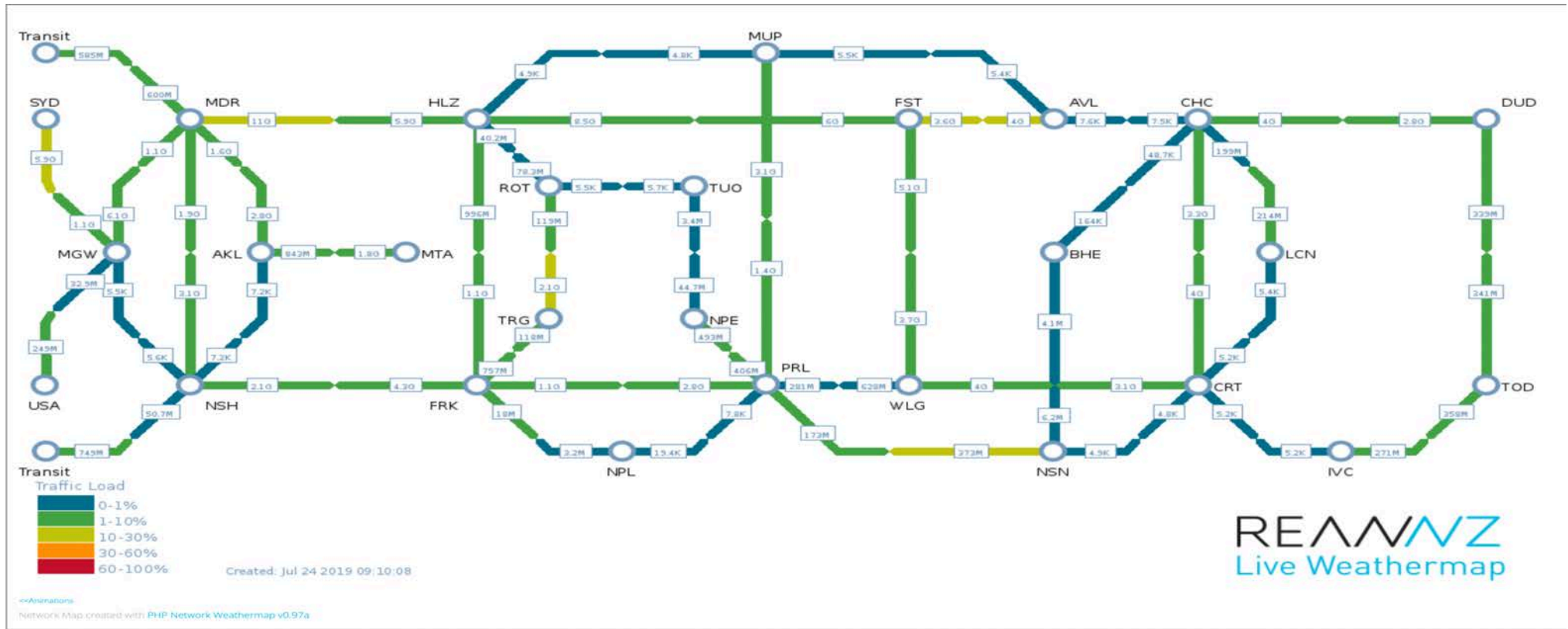
HAWAIKI

## HOW IT FITS INTO THE NETWORK

- Lands in New Zealand at Mangawhai north of Auckland.
- Hawaiki connects us directly to both the USA and Australia.
- PoP in Sydney – All the main content providers peer here.
- PoP in Oregon and Seattle – Large R&E Peering Exchange.

# WEATHERMAP

## WEATHERMAP.REANNZ.CO.NZ



## INTERNATIONAL NETWORK

### AUSTRALIA - SYDNEY

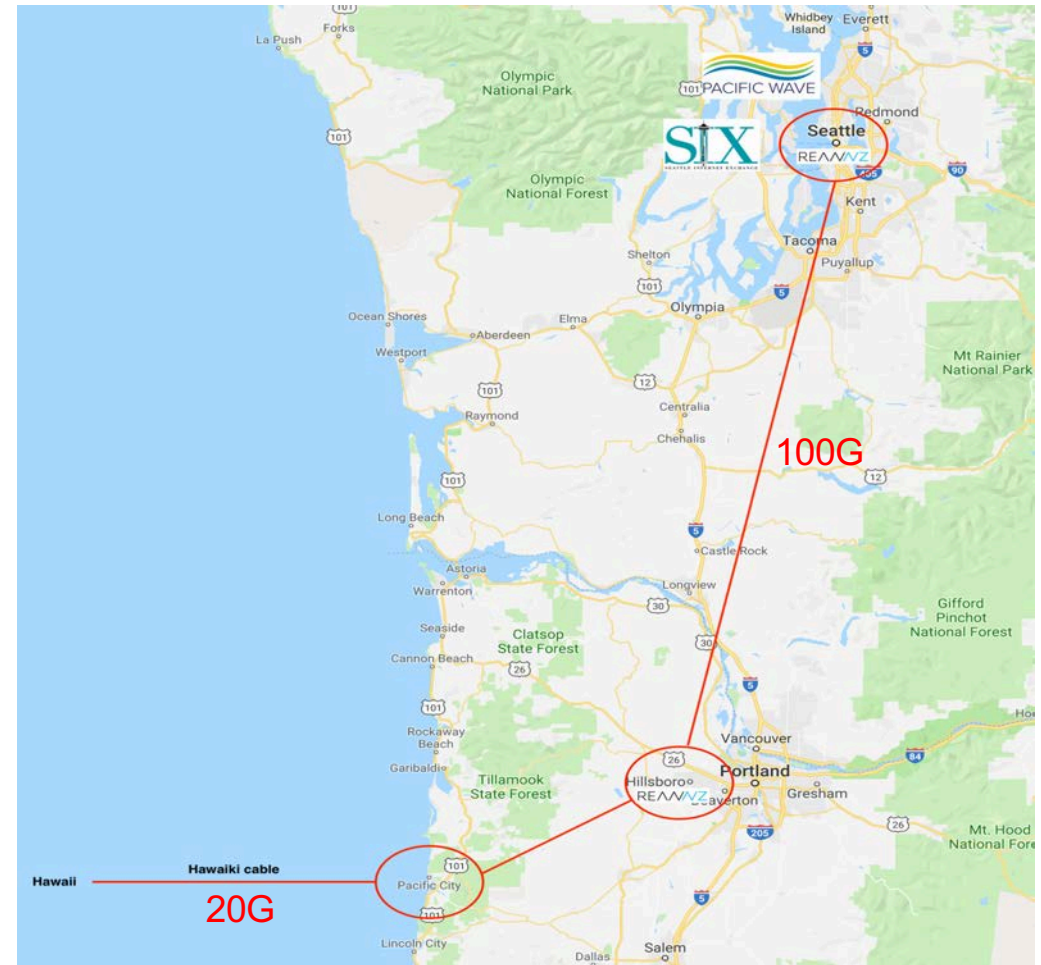
- REANNZ have a PoP in Equinix SY4 which is also the CLS.
- Most of our Hawaiki traffic comes from Sydney.
- AWS / Azure Interconnects are onsite.
- AARNET Peering – R&E.
- We peer at all of the large Peering Exchanges onsite.



## INTERNATIONAL NETWORK

### USA – OREGON

- REANNZ have a PoP located in Hillsboro Oregon where the Hawaiki cable comes ashore.
- As most of the traffic we need is served out of Seattle we have a 100G link from Oregon up to Seattle.

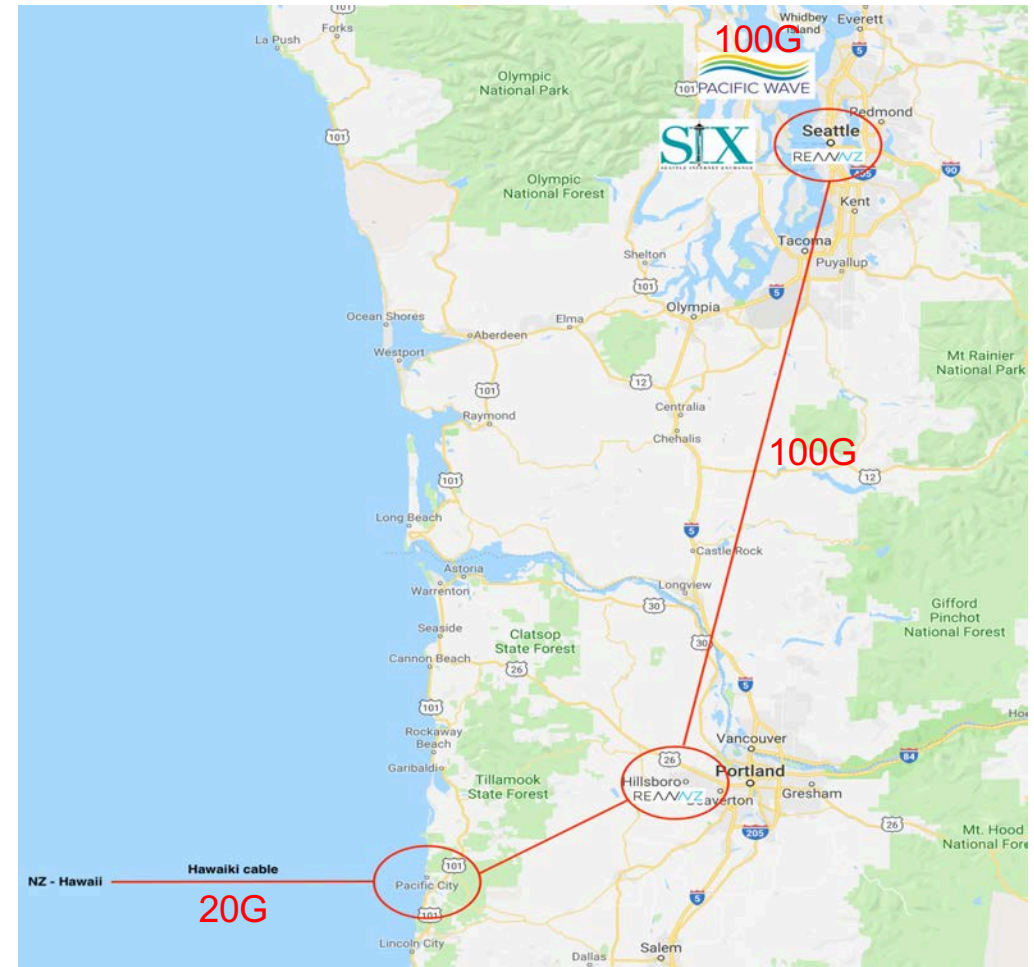




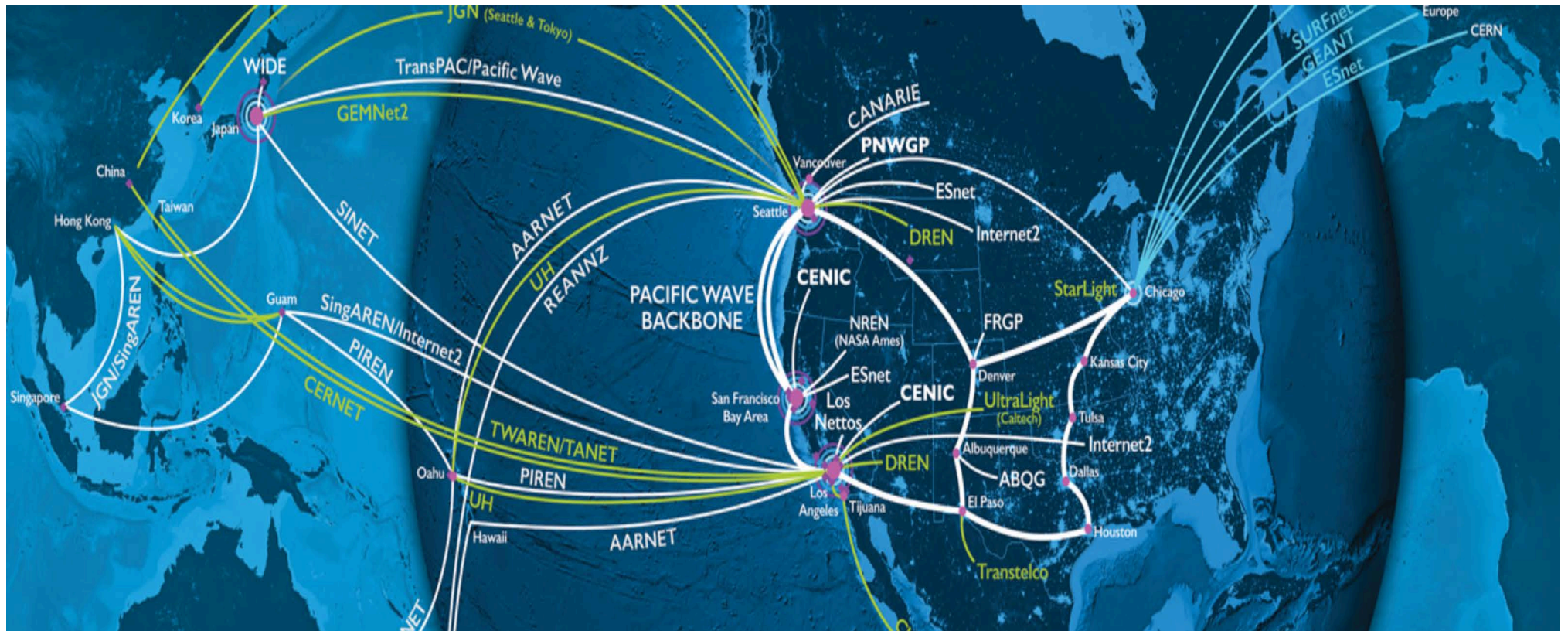
## INTERNATIONAL NETWORK

### USA – SEATTLE

- Almost all R&E traffic network wide passes through here via Pacific Wave – 100G.
- Pacific Wave's members include NREN's from around the world giving us direct access to their membership.
- We also peer with many large providers via SIX.



# PACIFIC WAVE @ SEATTLE



## TRAFFIC FLOWS

### TRAFFIC FLOW EXAMPLE: NZ TO JAPAN

- University in NZ sends data to University in Japan -



## FUTURE OUTLOOK

### WHAT ABOUT THE FUTURE?

- We have been investigating the long term future options for the International Network to provide resiliency for the Hawaiki Cable System and to replace the temporary Vodafone service.
- The end result should provide greater connectivity with our R&E partners and full protection for our International Network.
- As part of this process, we will be working with the membership to evaluate options
- Options being considered leverage existing and future NREN partnerships, such as those with University of Hawaii and University of Guam.

THE END

QUESTIONS?

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