

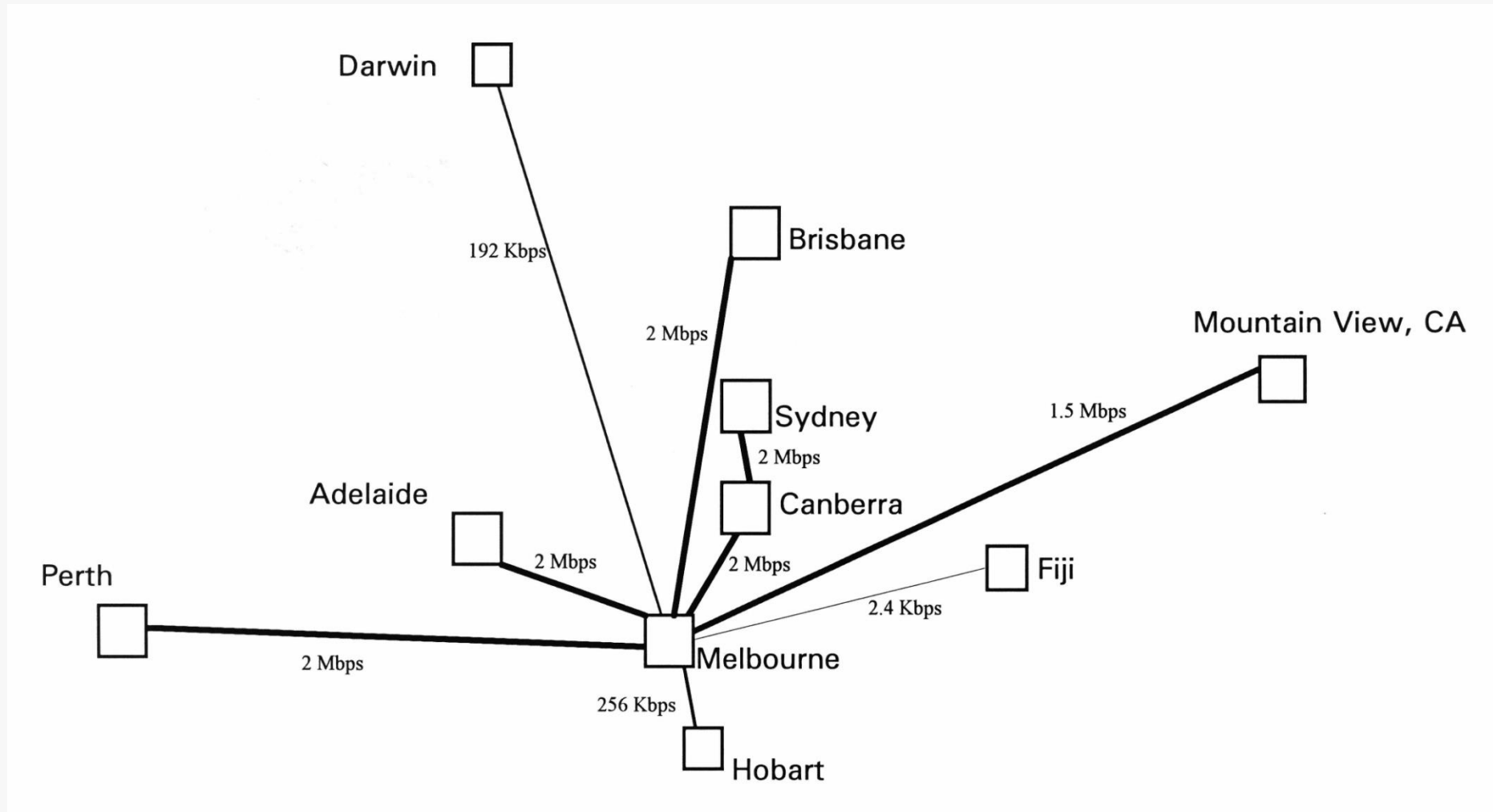


The Australian Wide-Area SDN Testbed

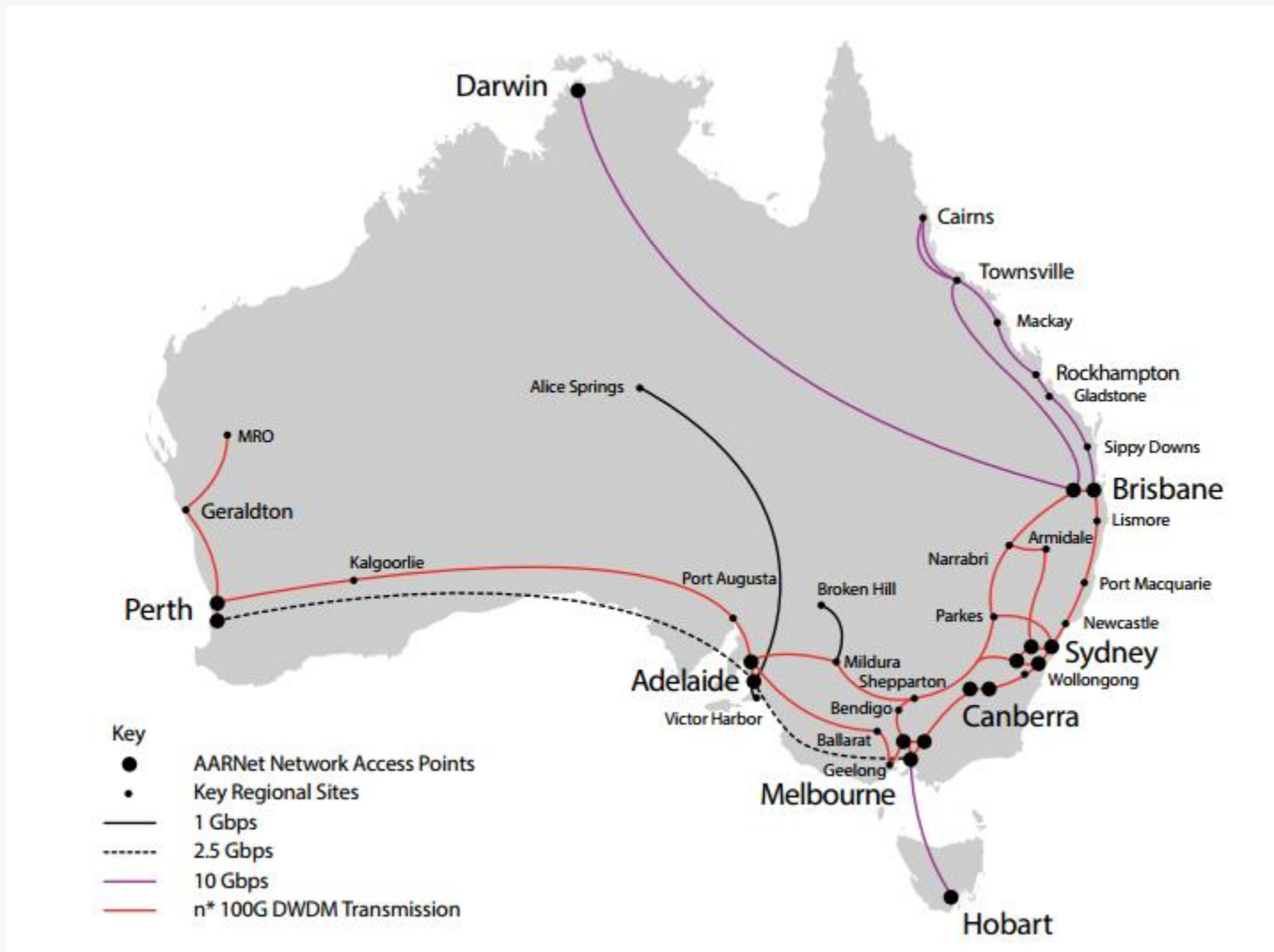
AusNOG, September 2015

David Wilde, AARNet

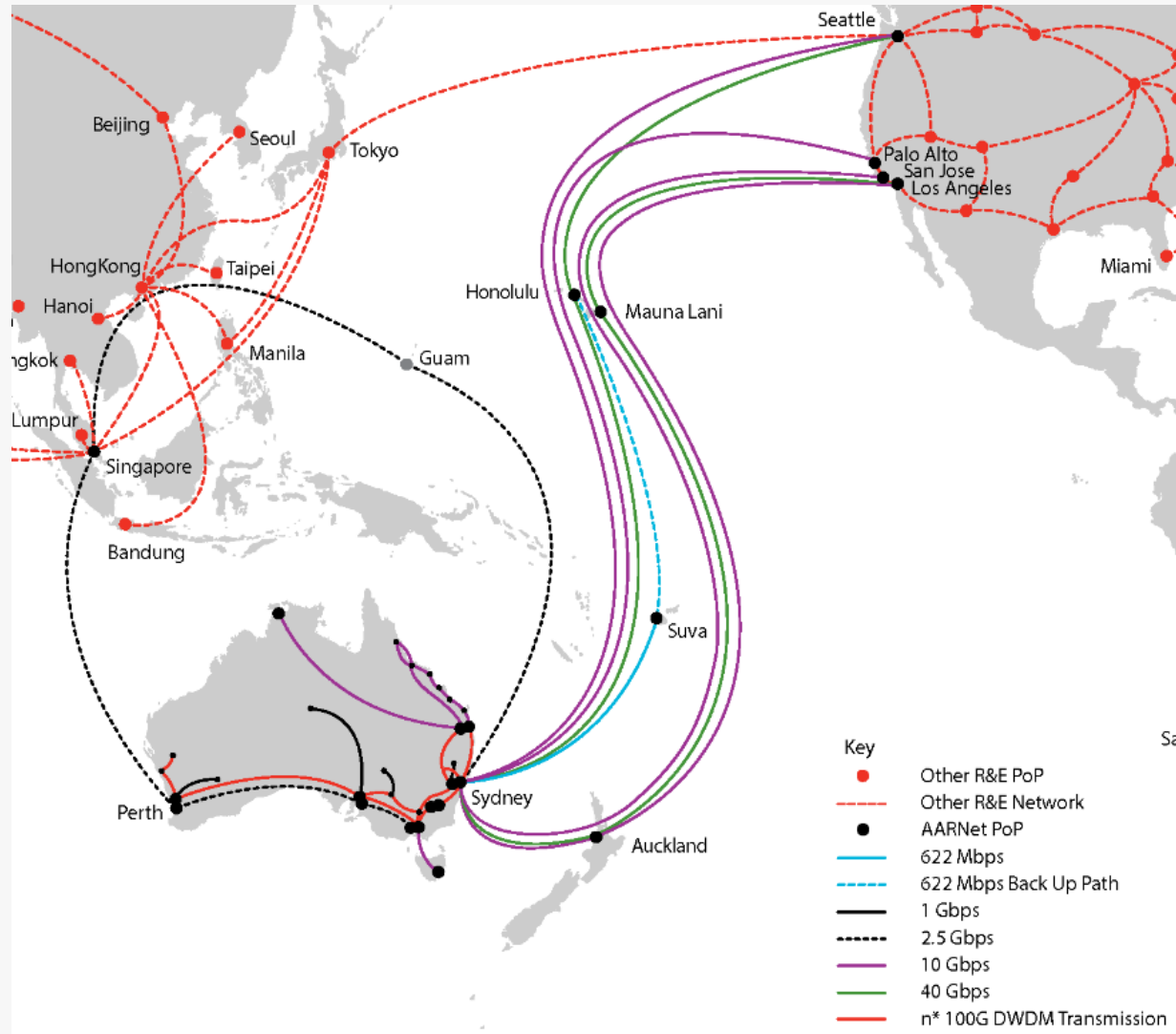
AARNet network circa 1993



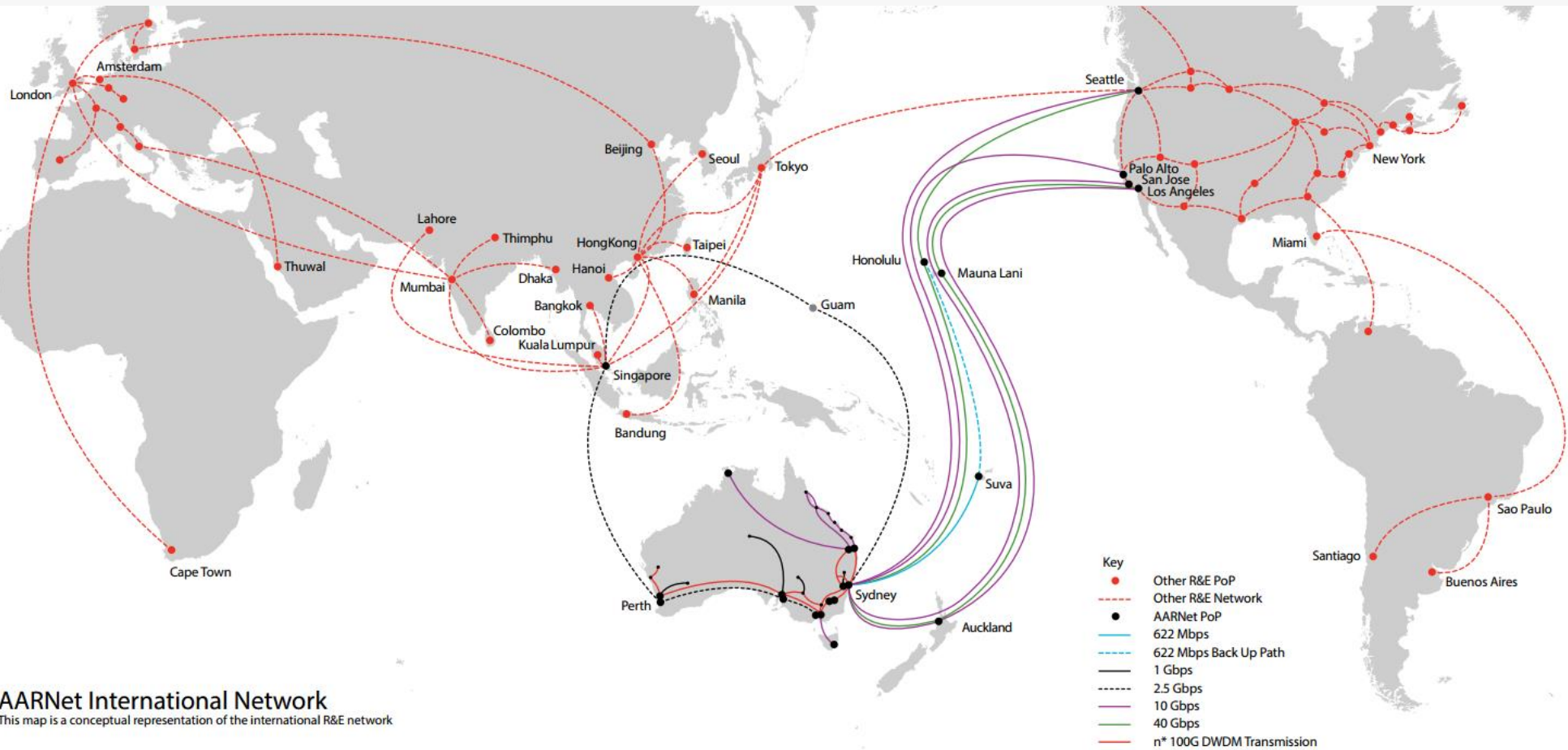
AARNet: national network 2015



AARNet: international network



AARNet: global R&E



AARNet: known for...



Australia's research and education network

AARNet's Mirror

[Home](#)

Browse
[Using HTTP](#)
[Biomirror](#)

About
[The Mirror](#)
[Mirror FAQ](#)
[AARNet](#)

Contact
[Feedback](#)

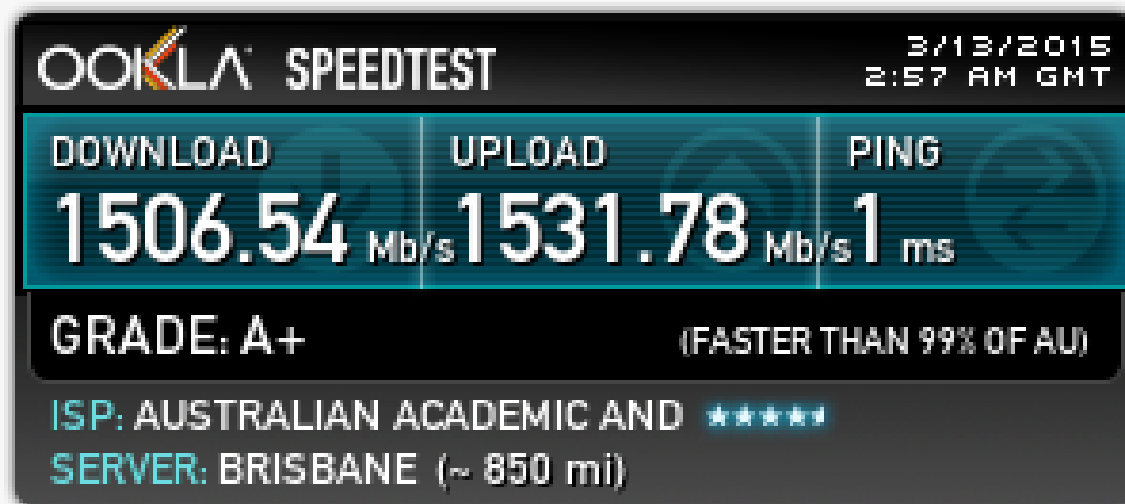
Welcome to the AARNet mirror. We welcome all feedback to mirror@aarnet.edu.au.

Most Popular Mirrors

Biomirror	Centos	CPAN/Perl	Fedora
FreeBSD	Kali Linux	Kernel.Org	Linux Mint
MacPorts Project	NetBSD	OpenBSD	openSUSE
Sage Mathematics	TED Talks	Ubuntu	VideoLAN

Feedback or queries are welcome to mirror@aarnet.edu.au
 CDN Copyright AARNet Pty Ltd

... and:

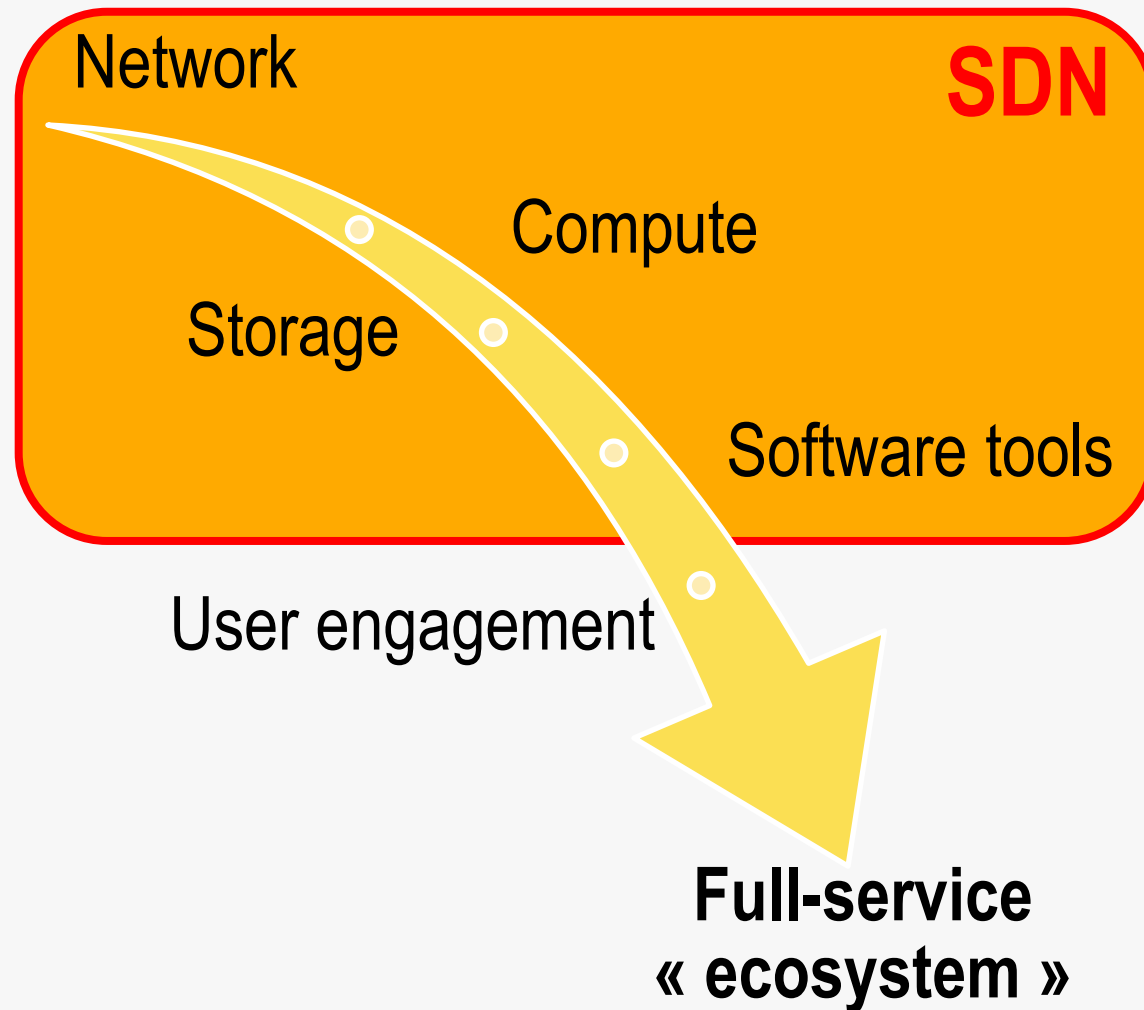




Software Defined Networking

SDN: WHY?

SDN as enabler



SDN potential

Users

Administrators

**NFV ... Virtual CPE ... SDN LSR ... capacity management ...
policy vs CLI ... virtual FW/LB ... intelligent edge**

DC/cloud

ISP/telco

Campus/enterprise

**Commodity silicon
Cheap compute + virtualisation**

**Single view of network
Integrate compute/storage/network**

Lower cost

More features



Australia-wide SDN Testbed

ENABLING SDN RESEARCH

Background



Australian Government

Australian Research Council

LIEF: Linkage Infrastructure, Equipment and Facilities

Participating institutions



Australian Government

Australian Research Council

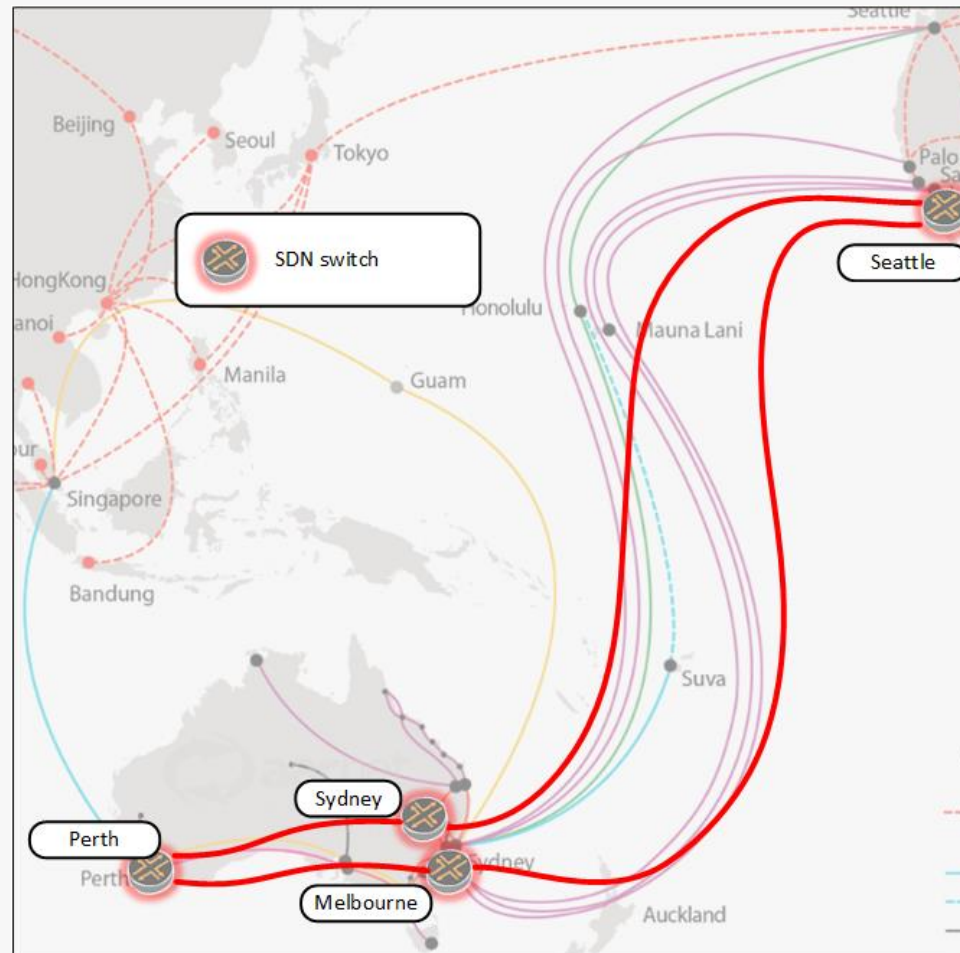


LIEF: Linkage Infrastructure, Equipment and Facilities



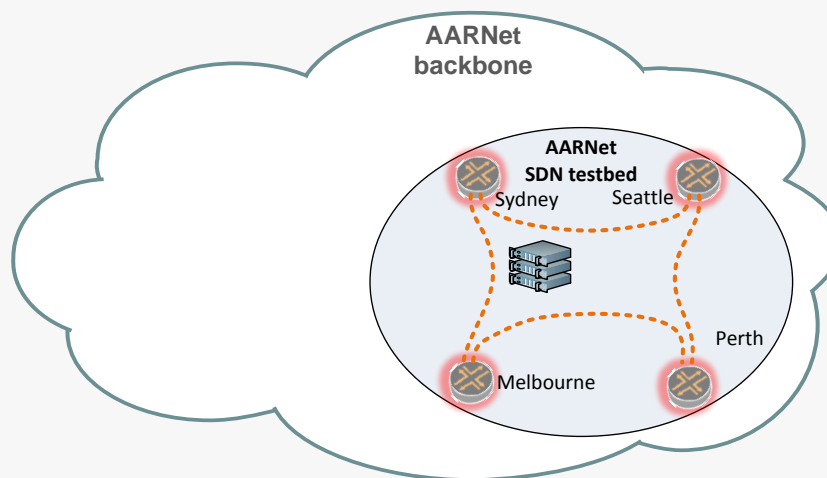
Towards an SDN testbed

Step 1: the AARNET SDN testbed



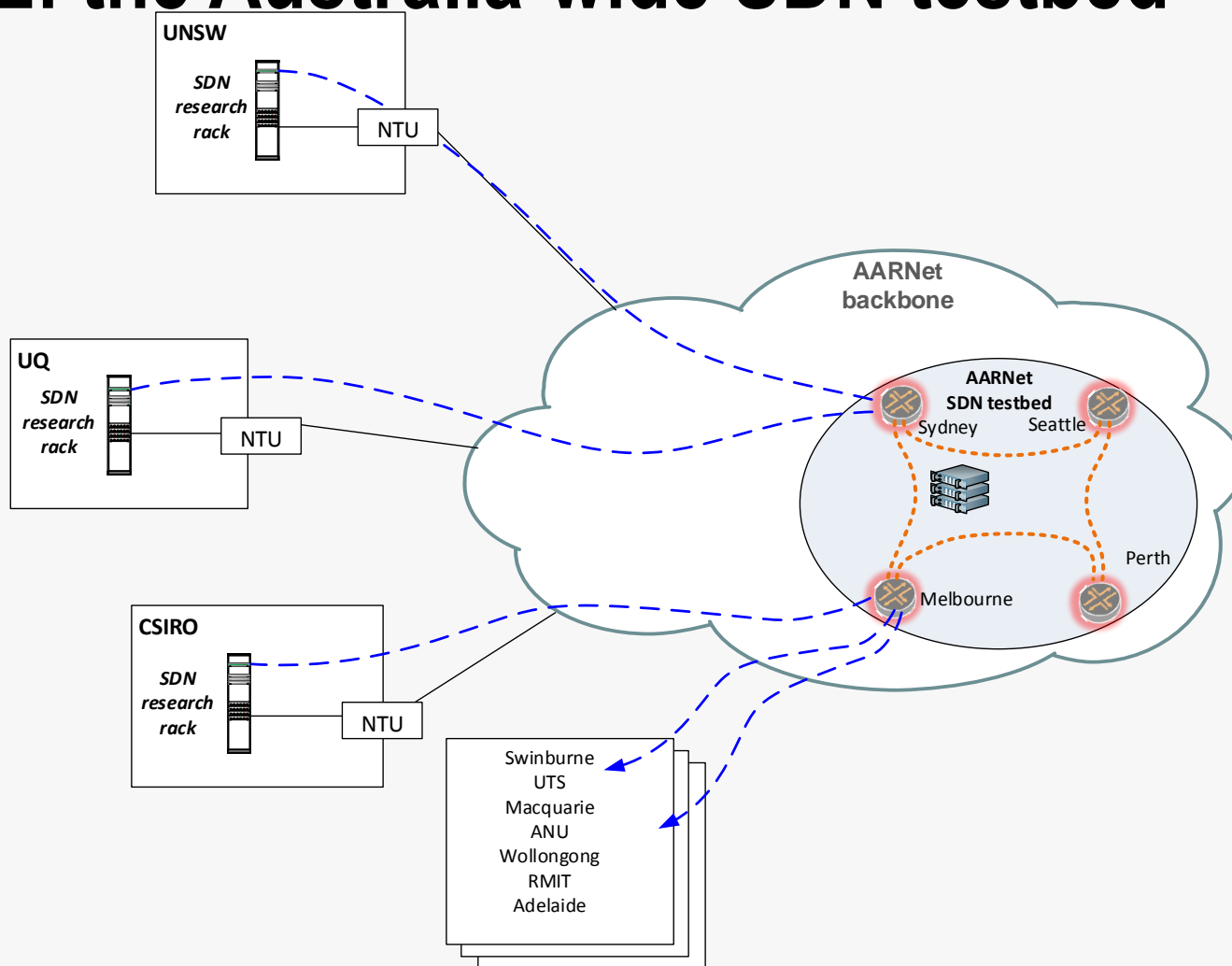
Towards an SDN testbed

Step 2: *extend...*



Towards an SDN testbed

Step 2: the Australia-wide SDN testbed



Towards an SDN testbed

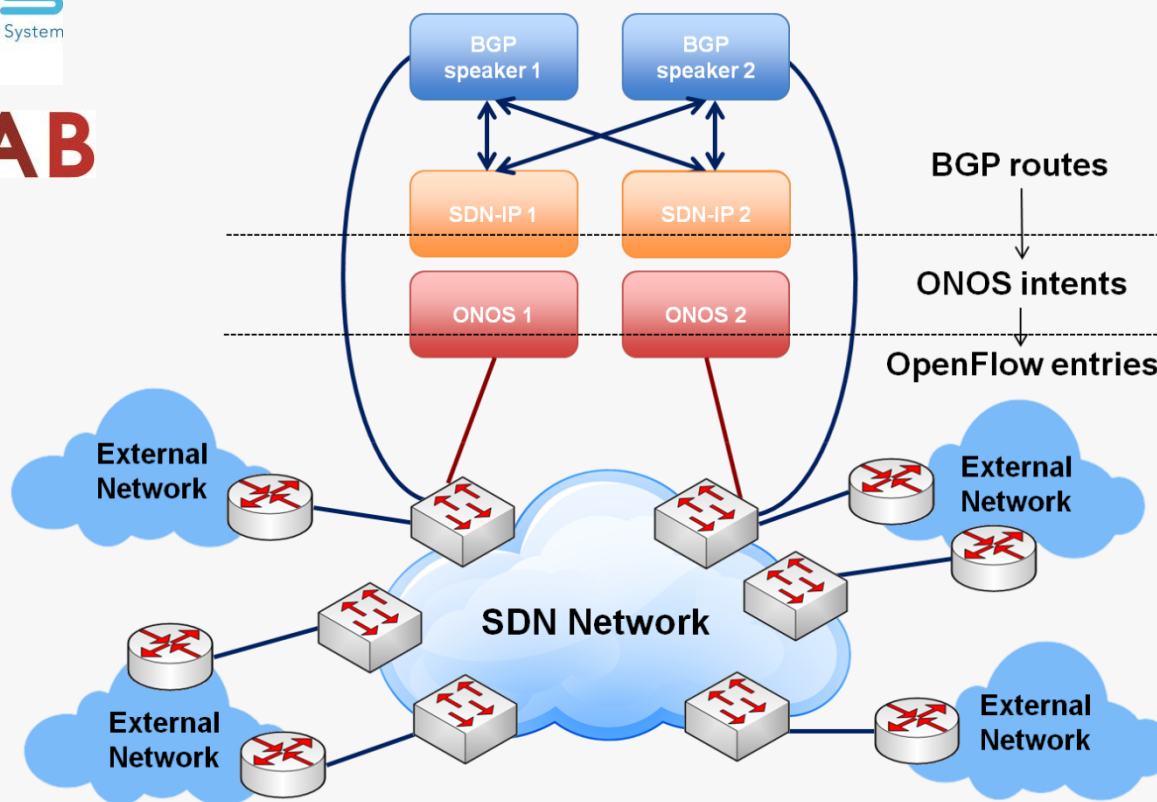
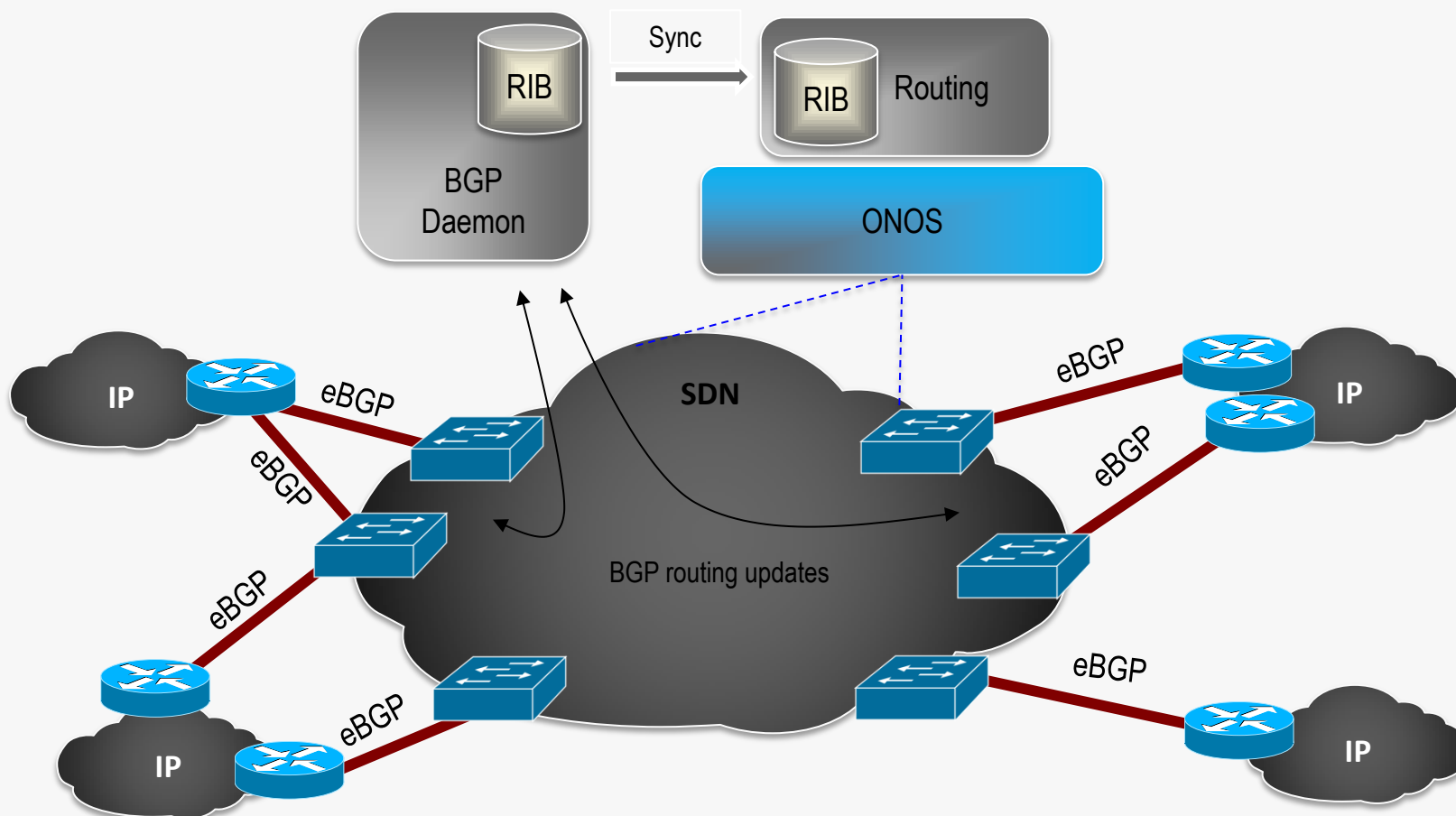


Image: <https://wiki.onosproject.org/display/ONOS/SDN-IP+Architecture>

The internals



Considerations

Entire SDN AS appears as a single big router to external peers



Australia-wide SDN Testbed

RESEARCH DIRECTIONS

Research possibilities

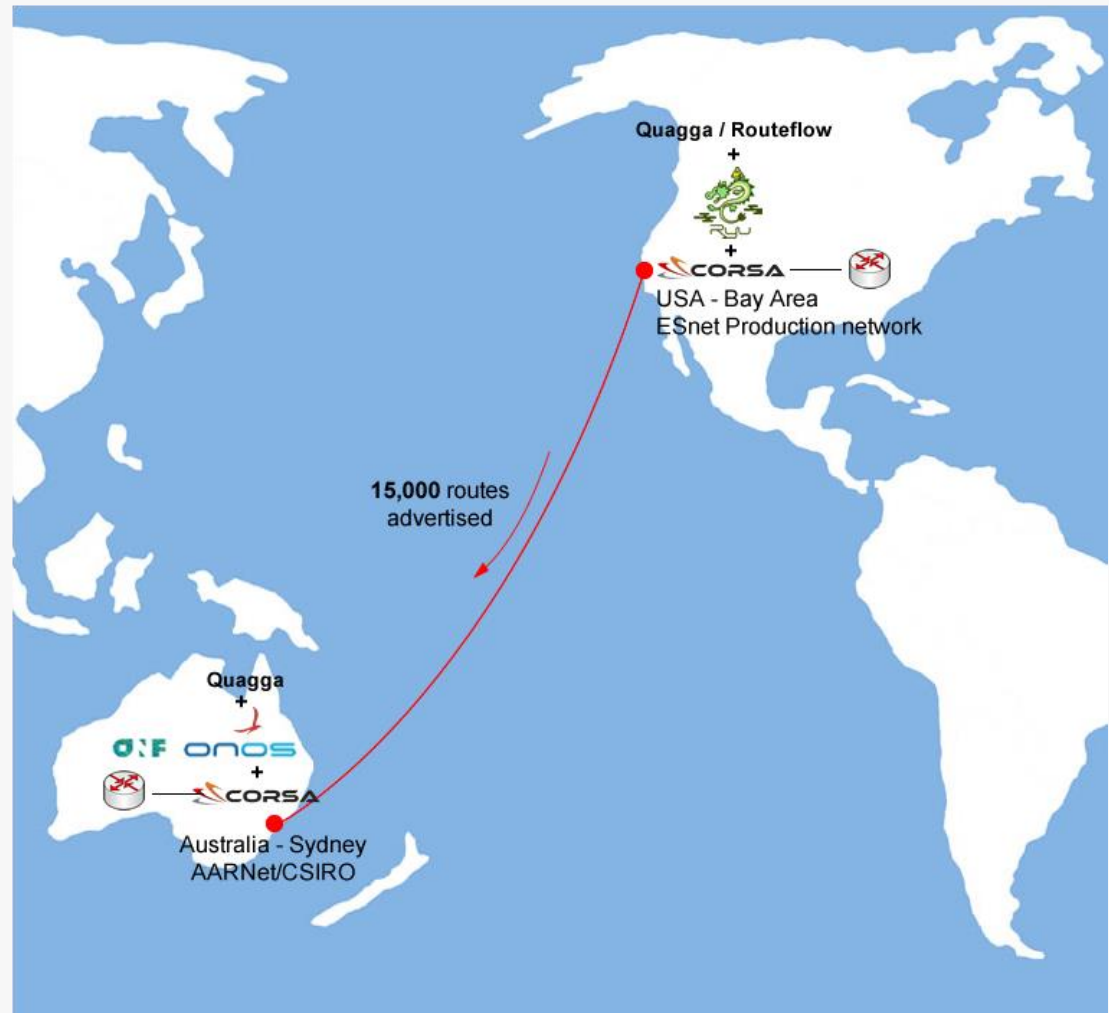


« Esnet Coalition Partners Announce Global Breakthrough for Software-Defined Networking »

- **ONOS Atrium**
- **Corsa DP64x0 switches**
- **15,000 BGP routes**

http://www.theregister.co.uk/2015/05/12/international_sdn_demo_just_the_start_for_aarnet/

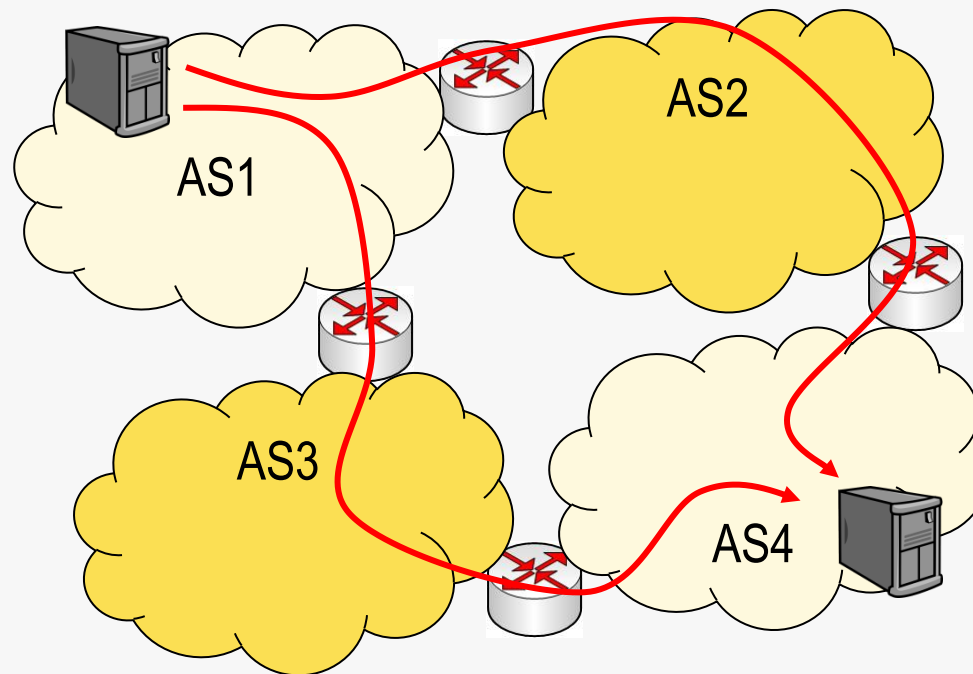
<http://news.aarnet.edu.au/coalition-announces-global-breakthrough-for-software-defined-networking/>



Research possibilities

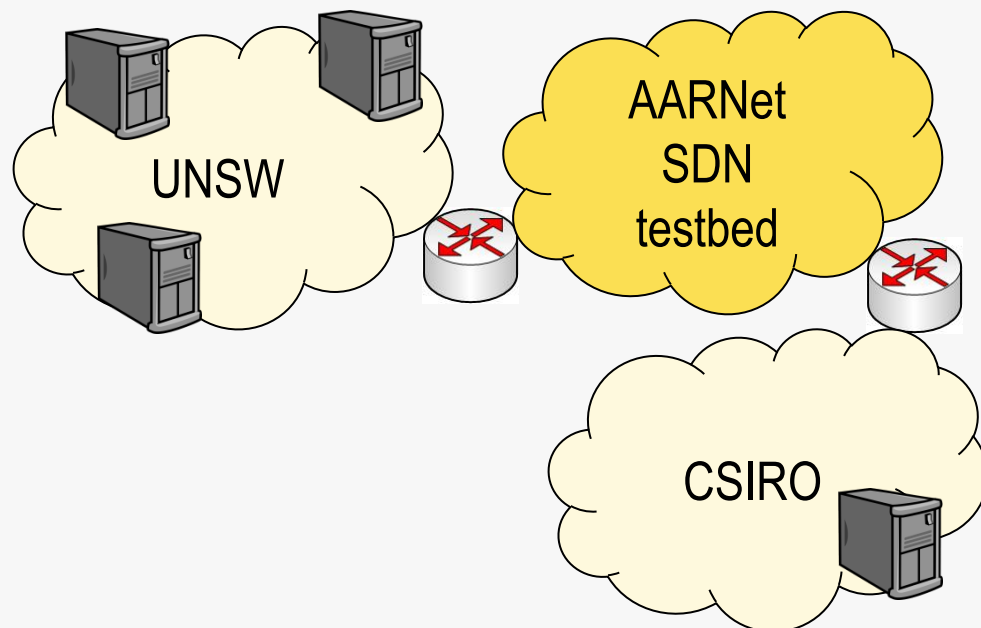


SDN + IXP + end-to-end service guarantees



Research possibilities

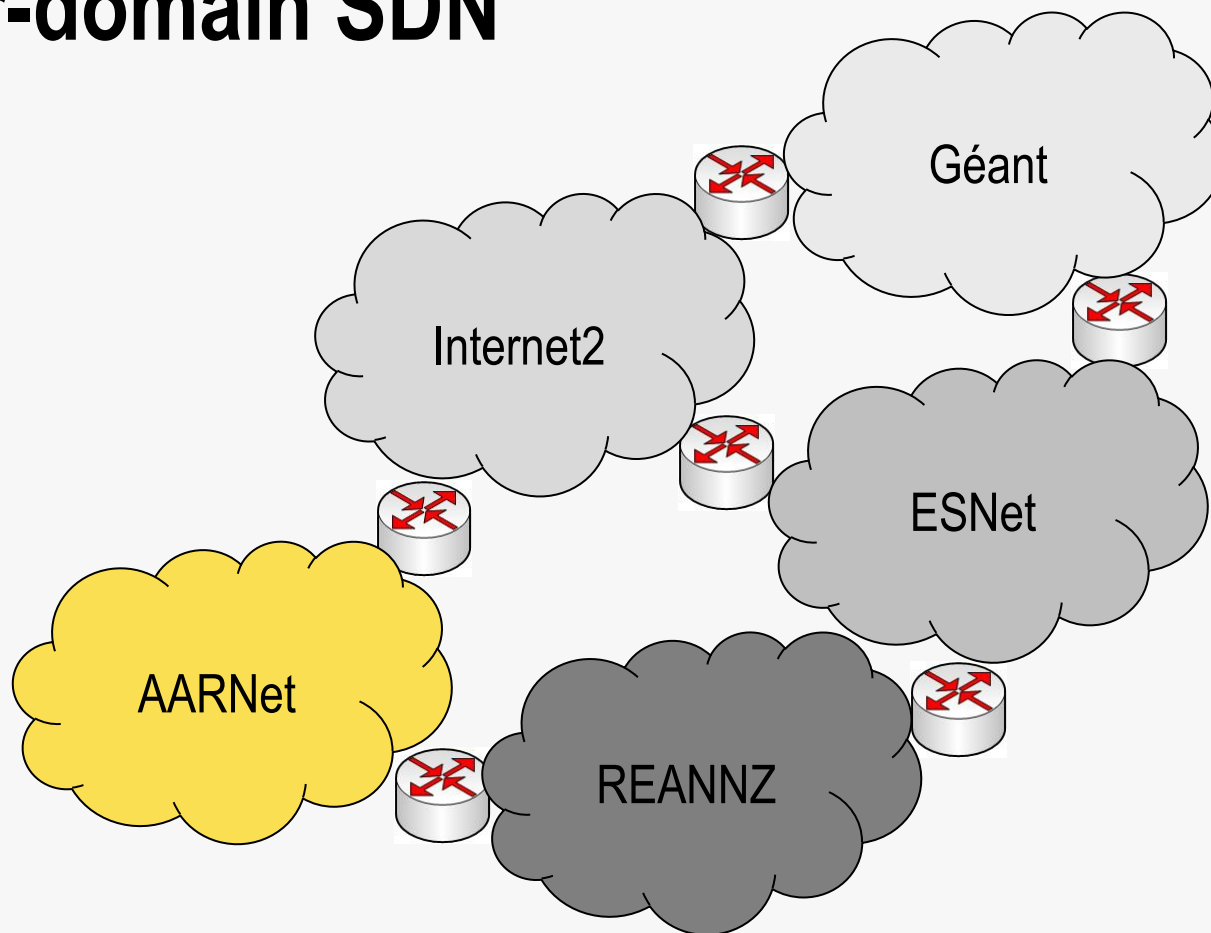
Intra- vs inter-domain SDN



Research possibilities

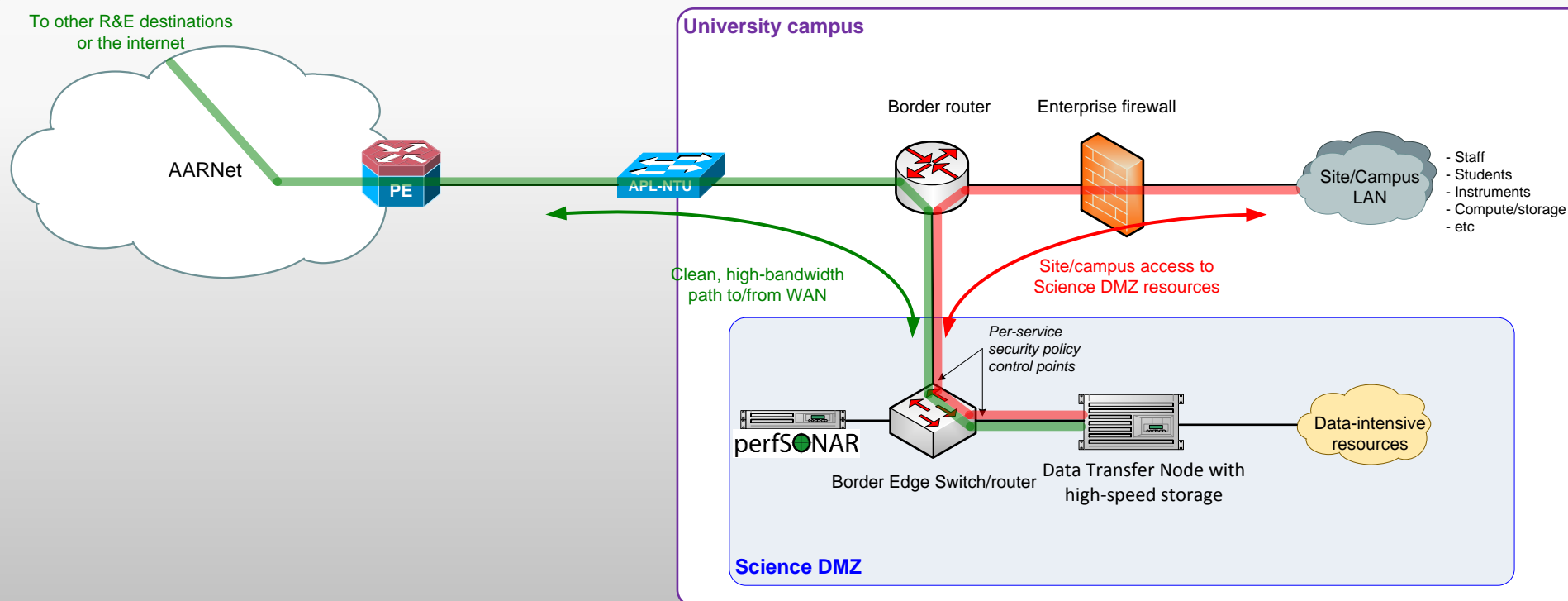


Inter-domain SDN



Research possibilities

« Science DMZ » + security



Looking forward

- Connect more researchers
- Encourage collaborations
- Run interesting tests
- Add complexity...

**Collectively build understanding
of the SDN ecosystem**



David Wilde

david.wilde@aarnet.edu.au

Vijay Sivaraman

vijay@unsw.edu.au

Craig Russell

craig.russell@csiro.au