

AARNet4

the next evolution of the AARNet network

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Aim of this presentation

1. Explain the current and proposed **architecture**
2. Outline the **new services** this network evolution will bring and **when**
3. Give an **example application**, and ask for **your ideas**

Topics

- Why AARNet4?
- Current and proposed network architecture
- Some technical details
- What new services this will bring
- Example use case: RDSI
- What you would like it to bring
- Timeframe

Why AARNet? (my perspective)

- Enable and encourage **innovation...**
- ...via a **high-performance, flexible** network
 - Provide connectivity options & backbone bandwidth
 - Allow various last-mile technologies (fibre, NBN, 3/4G, ...)
 - The aim being to enable present and future apps & services

Why AARNet4?

- Time for a refresh
 - The optical backbone & AARNet3 IP network installed circa 2005
- Need to support increased customer connectivity & bandwidth
 - Need to cater for ever-increasing number of 10Gbps services
 - Correspondingly, 10 / nx10 / 40 / 100 / nx100 Gbps backbone capacity
- Want to add new capabilities
 - L2 & L3 VPNs,
 - multiple concurrent services

Topics

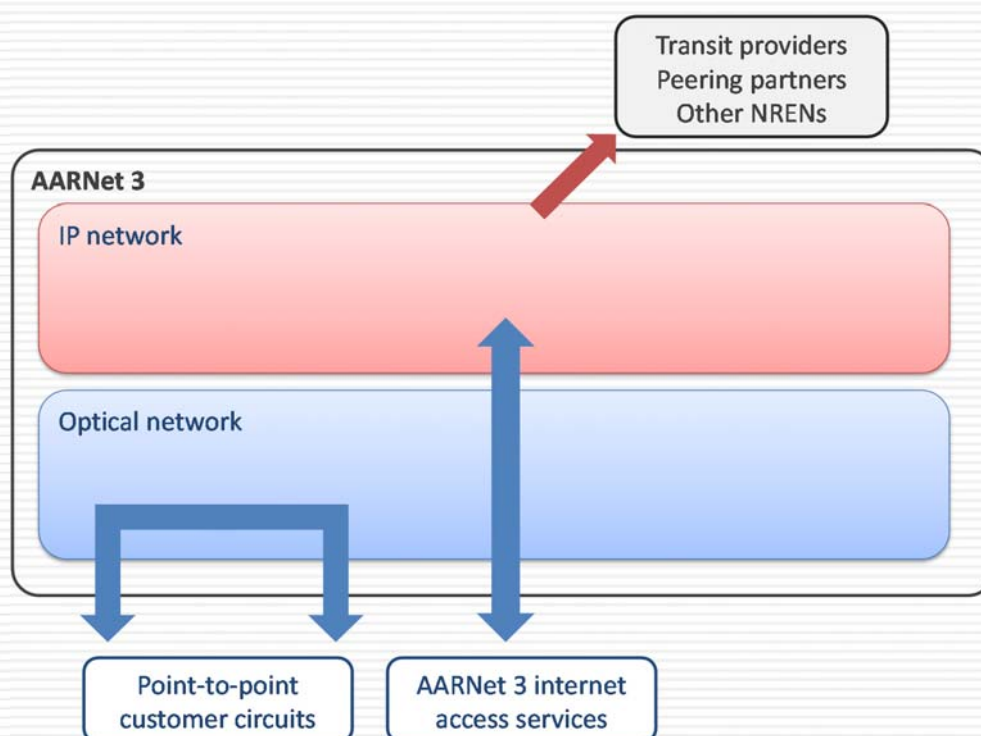
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Current network

1. Optical network:
 - Two POPs in major cities
 - Cisco ONS15454
 - Diverse intercapital legs, plus some metro fibre rings
2. IP network (« AARNet3 »)
 - Two Juniper backbone routers & Cisco aggregation switches per city
 - Customer services terminate on one or both backbone routers
 - Cisco & Juniper CPE devices
 - Cisco & Juniper border routers (domestic & international)
 - Domestic transit & peering, international transit + R&E capacity

7

AARNet3 architecture

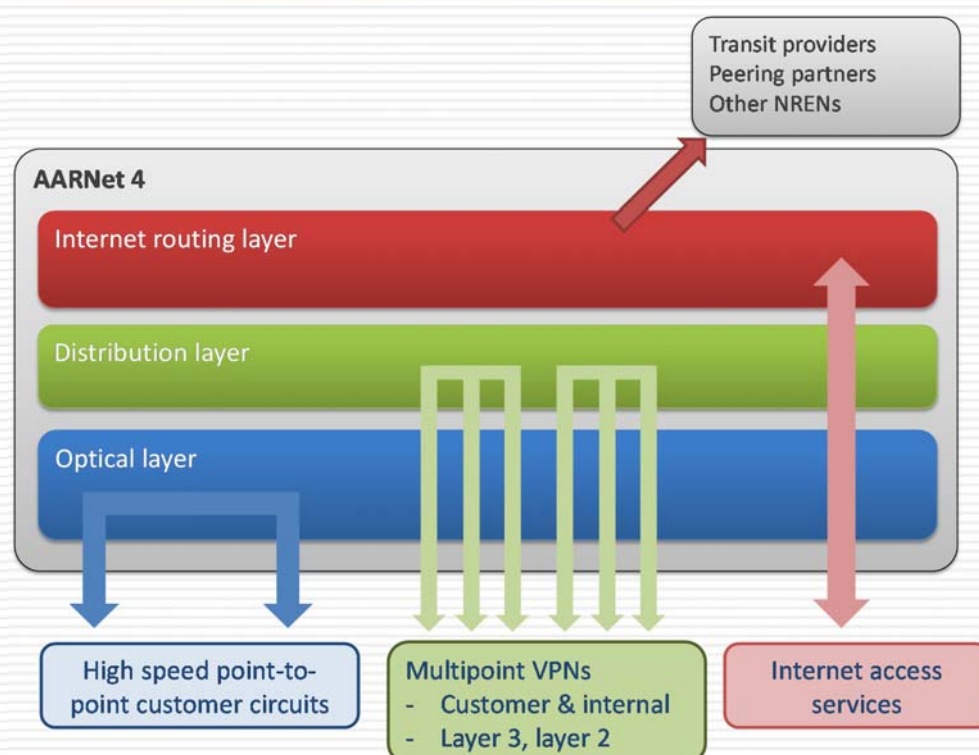


8

AARNet4 in a nutshell

1. Optical layer – bigger, faster :
 - New builds (Adelaide-Perth, Adelaide-Shepparton-Sydney, MRO)
 - Increased bandwidth (40 & 100Gbps per channel, up to 80 channels)
2. New distribution layer – faster, smarter:
 - Add MPLS backbone
 - Increase backbone to nx100Gbps
 - Add new capabilities (L2/L3VPNs, multiple services via single CPE)
 - Additional POP sites, closer to customer sites
3. Internet routing layer - faster
 - Increase international links & transit to 40 then 100Gbps

AARNet4 architecture

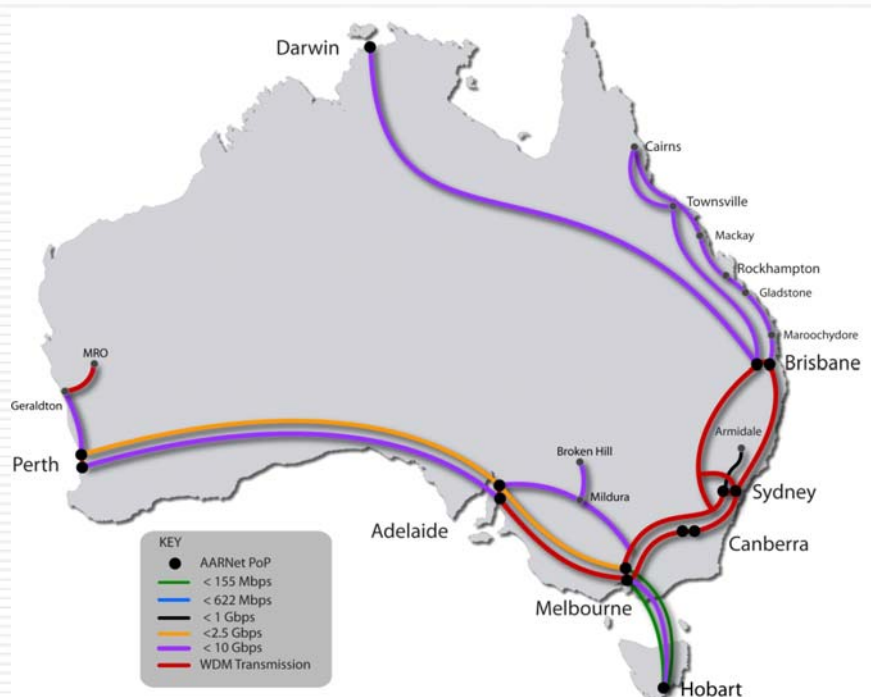


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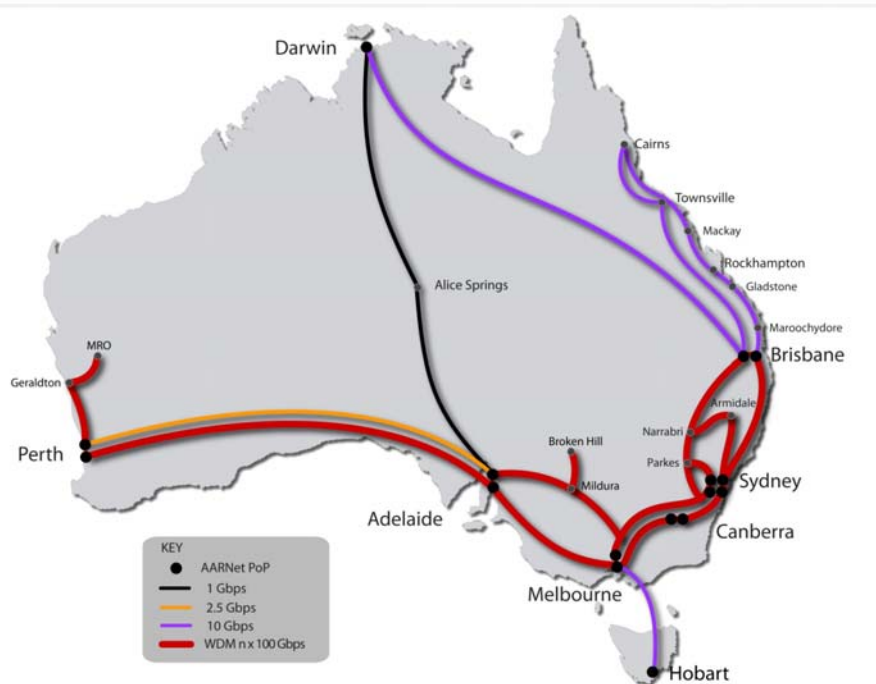
11

Current optical network reach



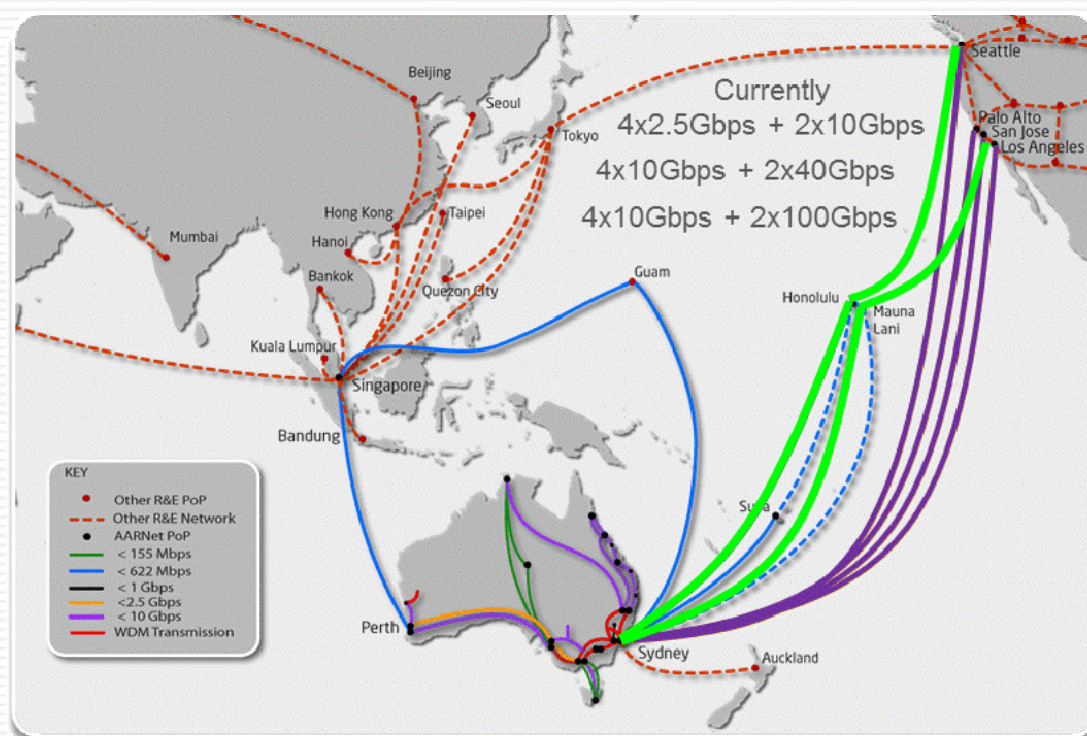
12

Future roadmap



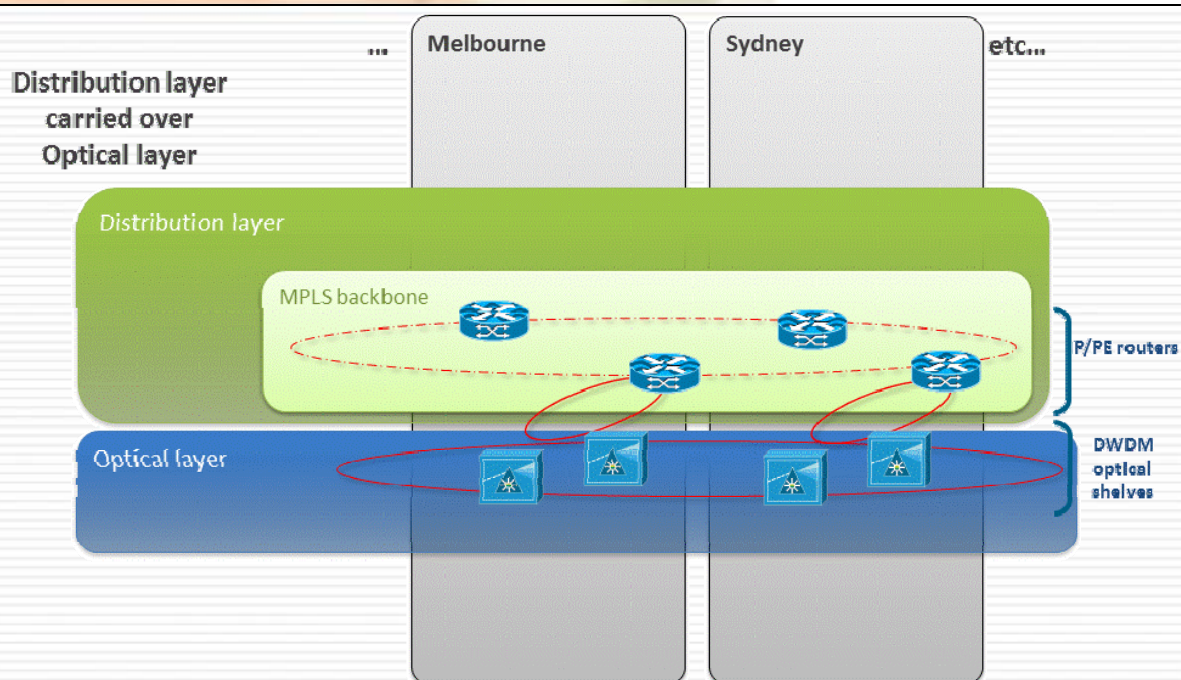
13

International capacity



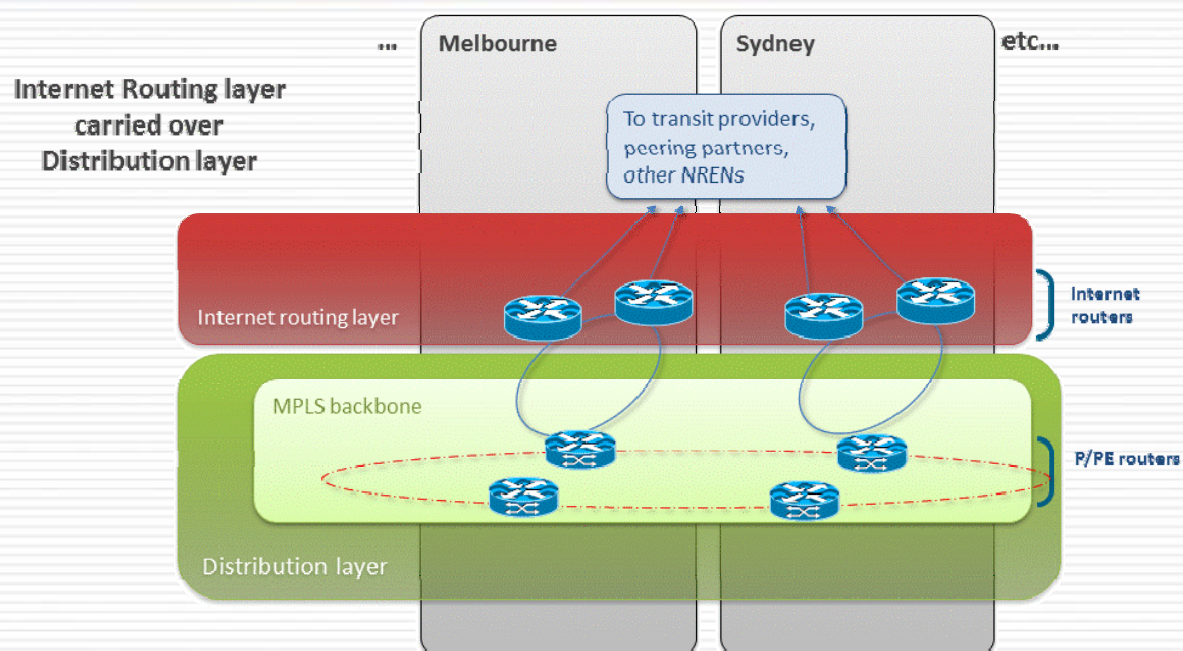
14

3-layer approach



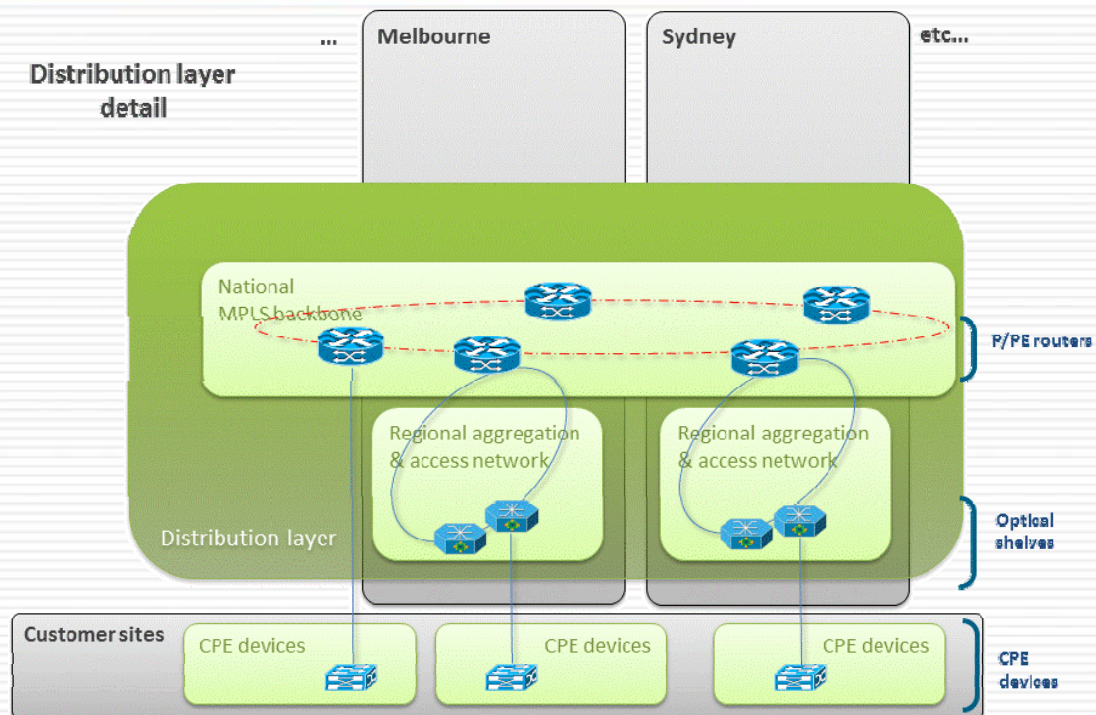
15

3-layer approach



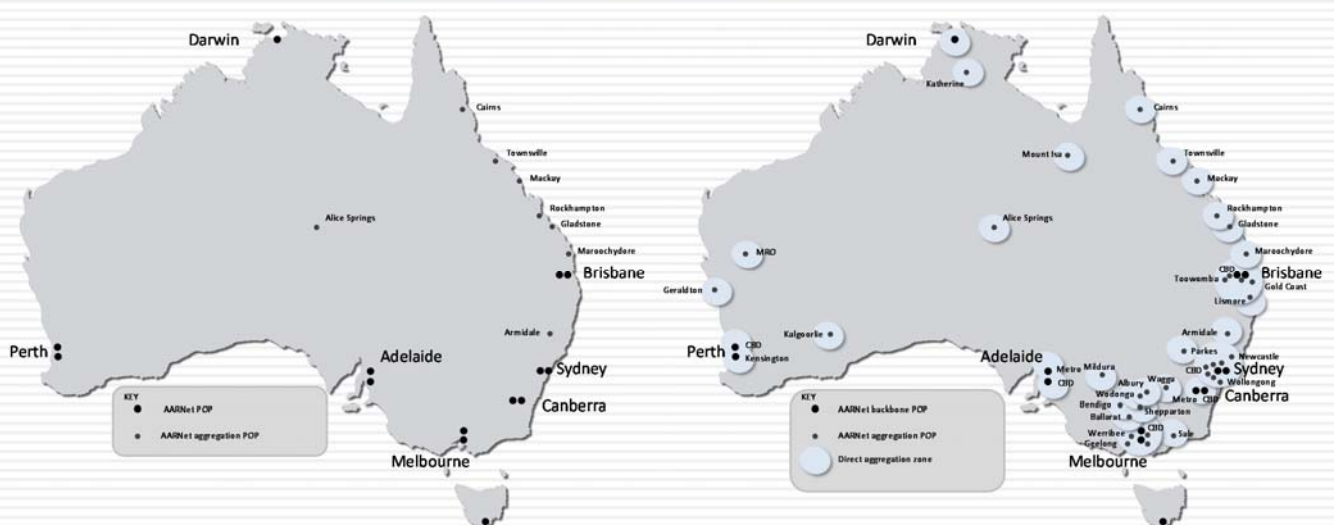
16

3-layer approach



17

POP diversity



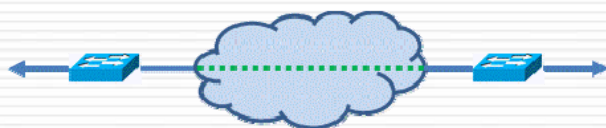
18

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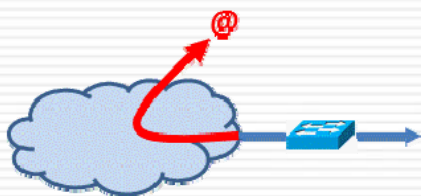
Current network-level services

- Point-to-point connectivity
 - Bandwidths from sub-1Gbps up to line-rate 10Gbps
 - Can be metro, state or national
 - Delivered via circuit, wavelength, dark fibre, VLAN



Current network-level services

- Internet access: « AARNet3 connection »
 - Connectivity up to 10Gbps
 - Dedicated CPE (1Gbps or 10Gbps) or shared CPE (sub-1Gbps)
 - Can be single or dual-homed for redundancy
 - AARNet advantages: peering, internat'l R&E capacity, no congestion
 - A p-to-p service above can be used for last-mile access



21

Future services

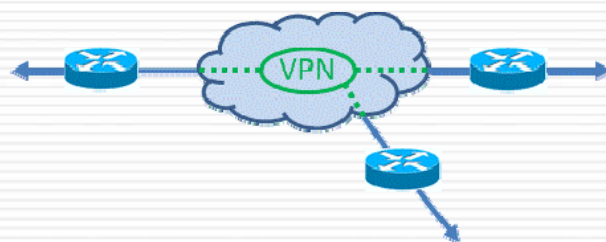
- Point-to-point connectivity
 - All same options still available, **plus**
 - National or international L2VPN (pseudowire or circuit)
 - (multipoint VPLS currently under testing)
 - Regional/national access via aggregated vlan, via optical network



22

Future services

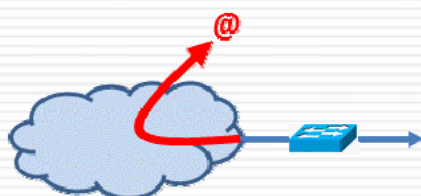
- New: Layer 3 VPN
 - Two or more sites connected via layer 3 VPN
 - Inter-site routing done by AARNet4 MPLS backbone network



23

Future services

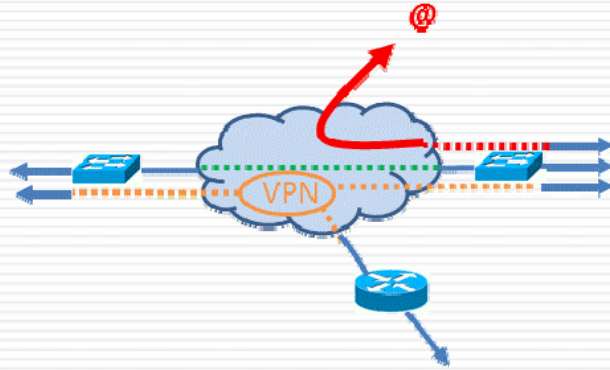
- Internet access:
 - All same options possible, but at **higher bandwidths**
 - Working on a smaller CPE (for reduced rackspace & power)



24

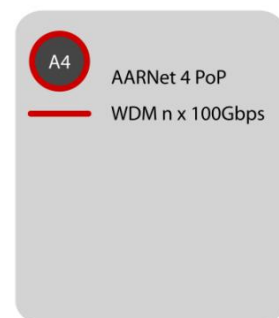
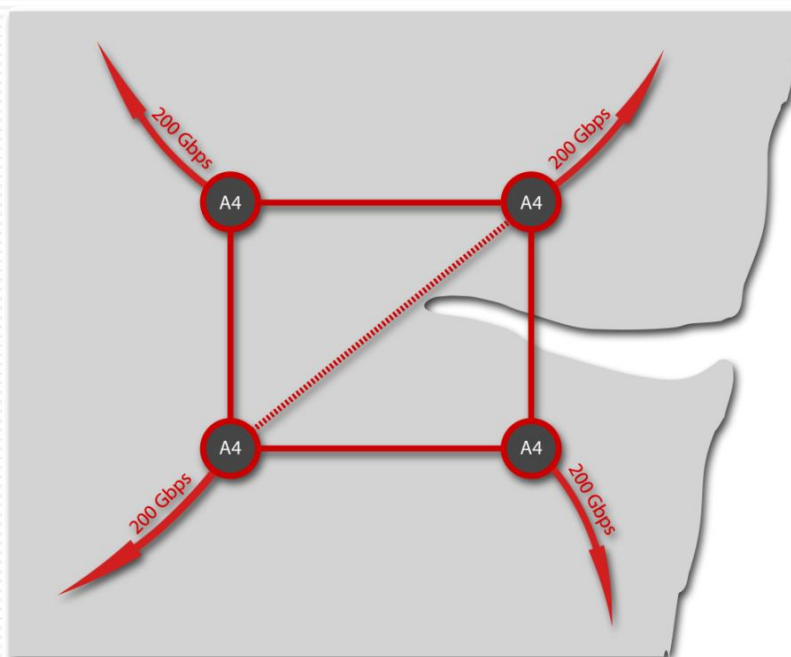
Future services

- New: Multiple services delivered via same CPE
 - Internet access + layer 2 VPN + layer 3 VPN + ...



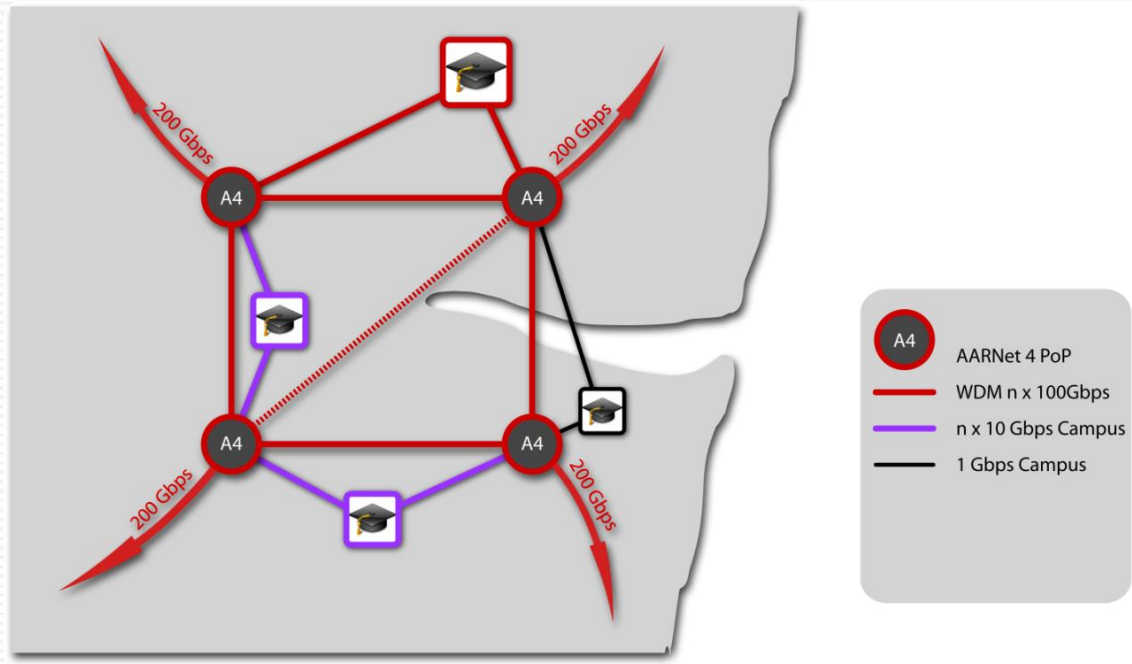
25

AARNet4 services



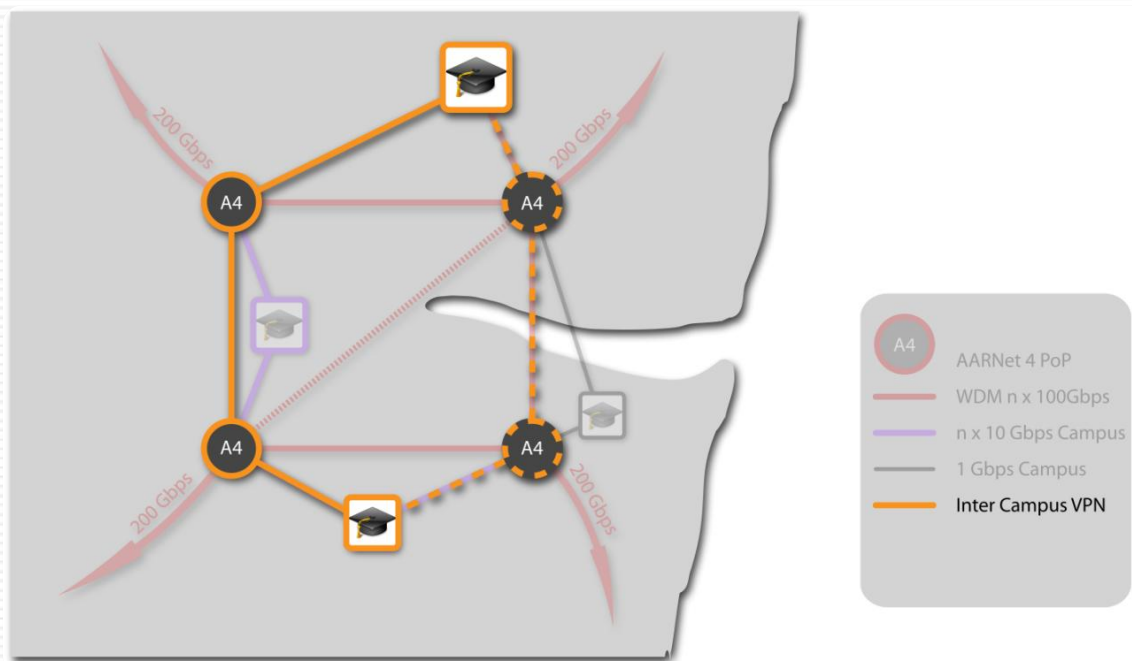
26

Internet connectivity



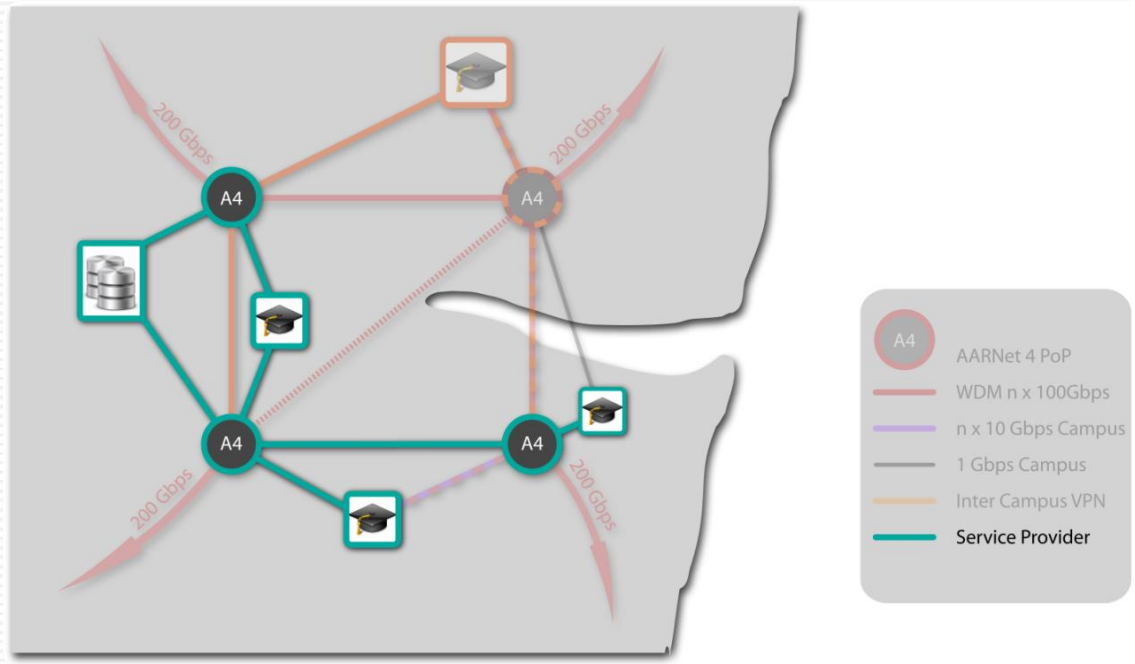
27

L2 or L3 VPN



28

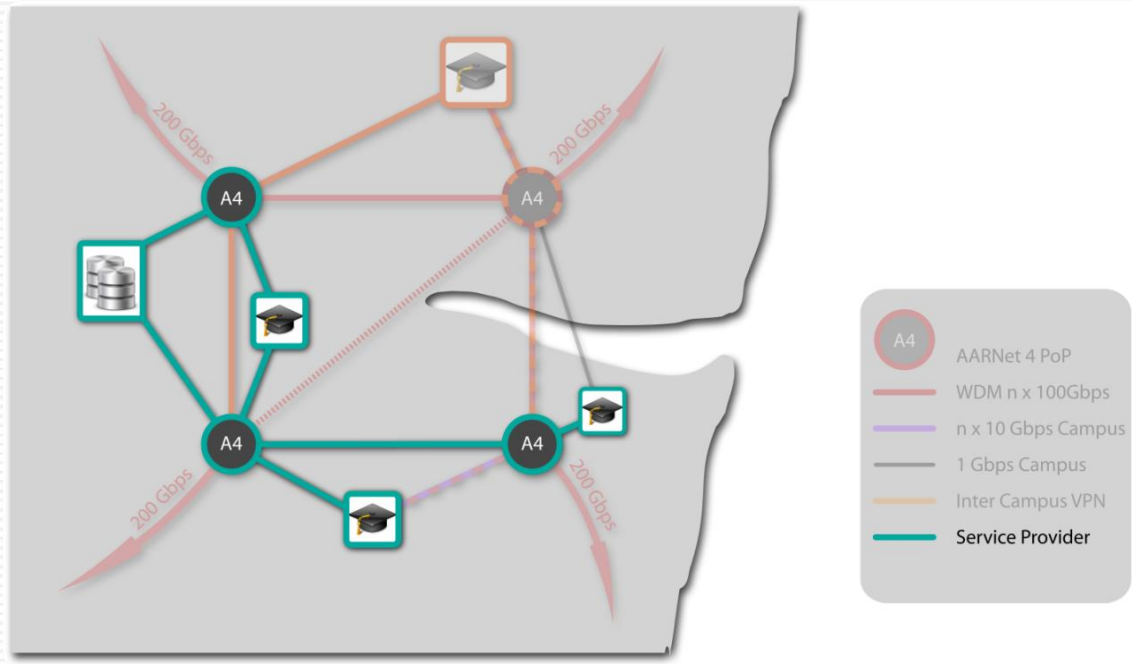
Access to service provider



Topics

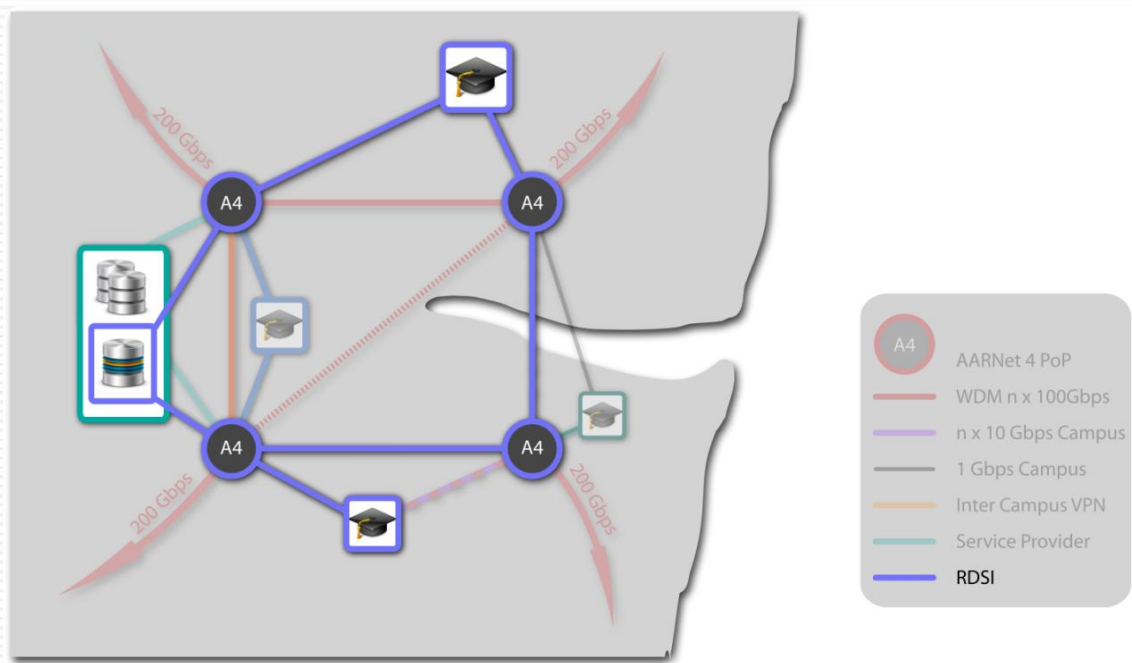
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AARNet4 services



31

AARNet4 services



32

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Question for you...

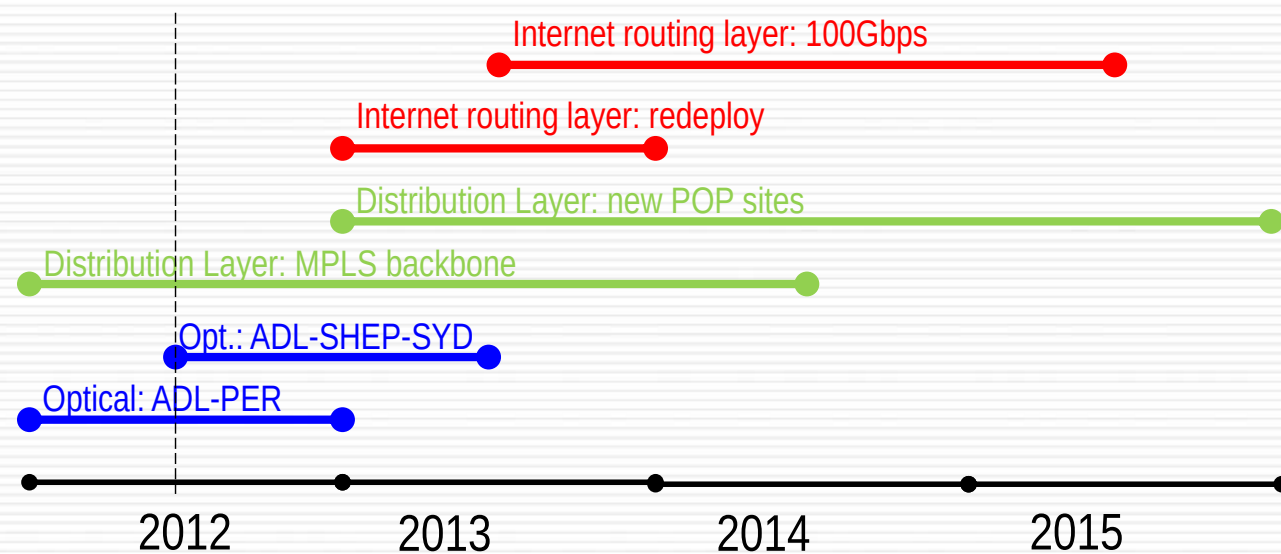
- What connectivity problem are you faced with currently?
 - Access to cloud provider, off-site backup services, DR site
 - Multicampus network with strict QoS requirements
 - Data-centre extension: ethernet q-in-q, fibre-channel, FCoE, iSCSI
 - Redundancy: backup, load-balancing
 - Strict latency, jitter requirements
 - Innovation: Software Defined Networking (SDN; OpenFlow)
 - Dynamic lightpath or circuit – GENI, GLIF, eVLBI,...
 - ???

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Timeframe

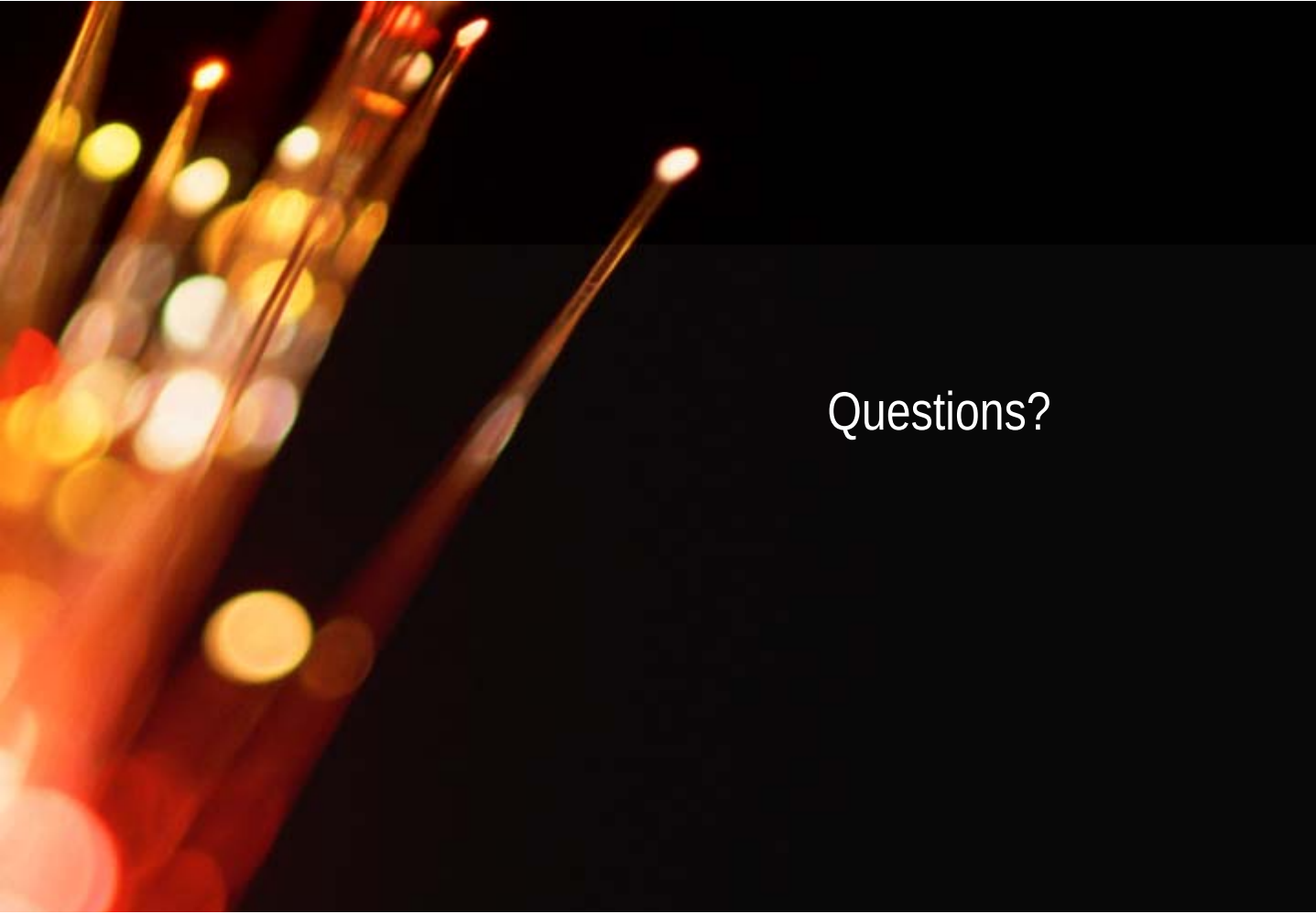


Conclusion

Exciting times...

AARNet4 is aimed at providing:

1. A national network with sufficient capacity and connectivity to accommodate the R&E community's requirements for the coming years
2. A flexible network which permits and encourages innovation, within Australia and internationally



Questions?

