

COMP312-09A Communications and Systems Software

Scaling and Wholesale
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COMP312 Wholesale

Wholesale Networking

- Access Network Structure
- Overlay Networks
- Scaling RADIUS using Proxies
- Scaling BRAS's with Logical Routers
- L2TP in a Wholesale Environment



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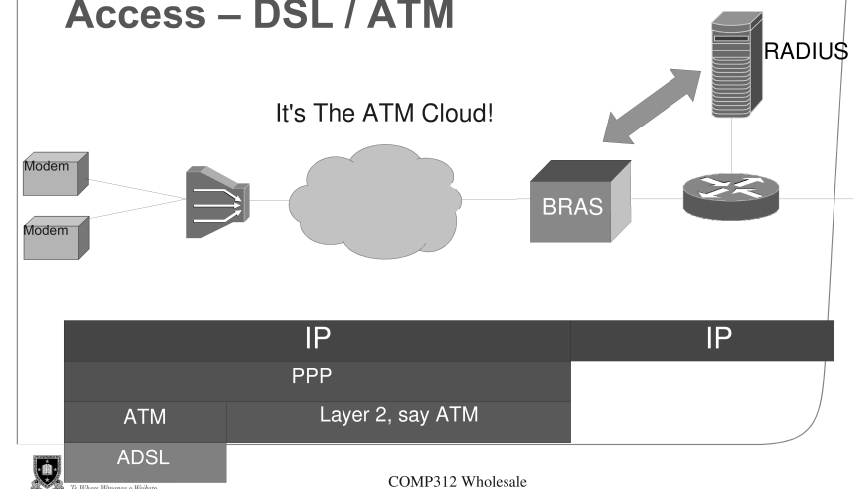
Access Networks

- Aggregation
- Transport
 - To provide multiple virtual IP networks, runs at layer 2. e.g. ATM, ethernet. (Contrast "Layer 2 VPN's")
- Some AAA components, but data and decision making located elsewhere



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Access – DSL / ATM



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On a BRAS Using ATM

- Physical Interfaces attached to ATM switch(es)
- Virtual Path carried by ATM switches to DSLAM
- VPI/VCI identify Virtual Circuit (PVC) to customer
- So one ATM subinterface per customer ATM device.
- BRAS terminates all those ATM PVC's. Aggregation is the name of the game.
- BRAS also terminates PPP sessions.
- May allocate addresses from local pools (or by DHCP).
- Routes packets, including advertising routes for local pools.
- Applies QoS policies to subinterfaces.

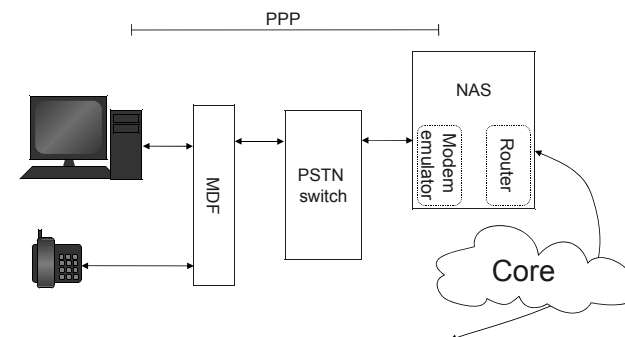
From Here, Not About DSL

- From this point, DSL for example only. Scaling and wholesale considerations also apply to dial and wireless.
- Not about ATM, either.

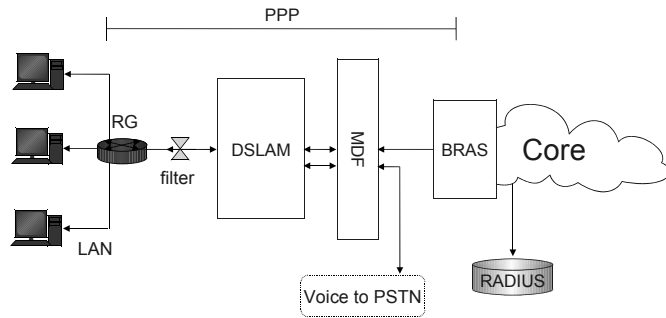
Overlay Networks

- Build a network by using another network as underlying transport.
- Original Internet was overlay on the telephone network.
- VPNs are overlay on public Internet.
- Overlay networks have virtual links (tunnels). May have virtual nodes and other resources.

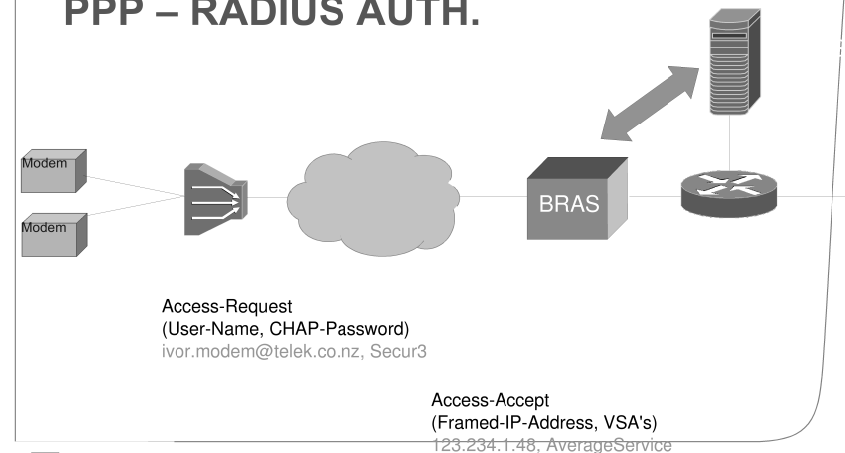
Traditional PSTN Connection



Traditional DSL connection

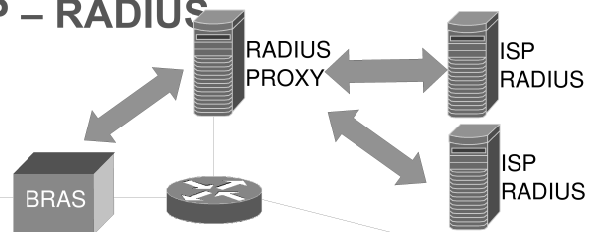


PPP – RADIUS AUTH.



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PPP – RADIUS

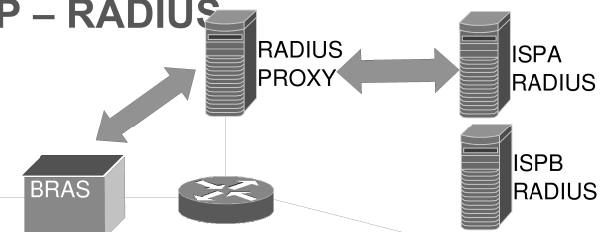


•Can proxy for both authentication and accounting.



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PPP – RADIUS



Access-Request
(User-Name, CHAP-Password)
ivor.modem@telek.co.nz, Secur3

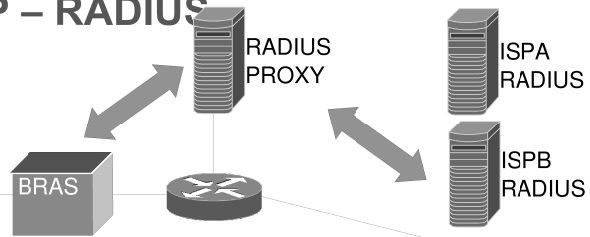
Access-Accept
(Framed-IP-Address)
123.234.1.48

Access-Accept
(Framed-IP-Address, VSA's)
123.234.1.48,
AverageService, ispA



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PPP – RADIUS

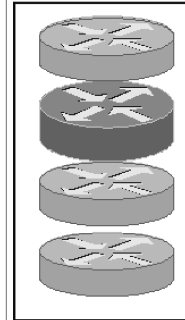


Access-Request
(User-Name, CHAP-Password)
ivan.otherone@goblin.net.nz, S3cure

Access-Accept
(Framed-IP-Address)
123.234.64.48

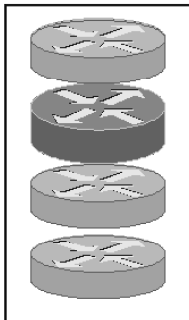
Access-Accept
(Framed-IP-Address, VSA's)
123.234.64.48,
AverageService, ispB

Logical Routers



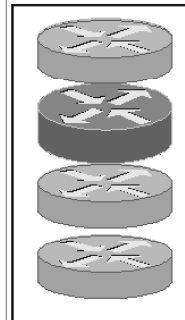
- aka Virtual Routers
- Some shared configuration
- Each logical router has its own peers and its own routing/forwarding table (DHCP configuration, DNS, RADIUS accounting ...)
- Complex vs. MPLS

Why use Logical Router?



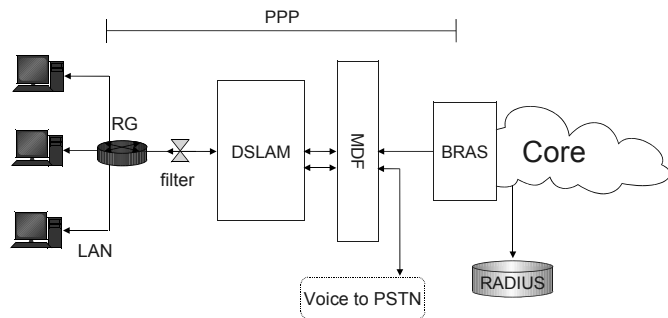
- Separate config for different ISPs
- Simpler clean config
- Different routing tables
- Separate settings for DNS, Radius etc
- Better security

Which Logical Router?

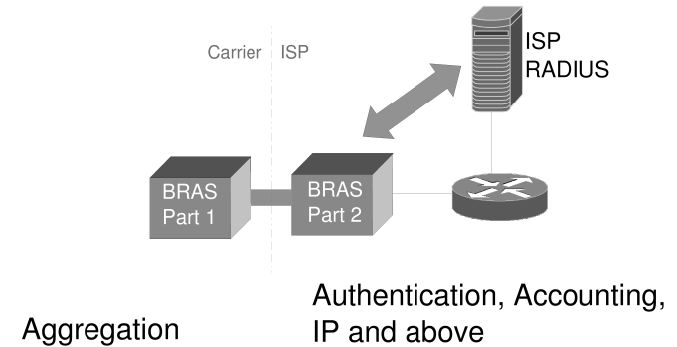


- All incoming PPP requests come to one logical router.
- As part of PPP negotiation PPP interface is created in appropriate logical router.
 - e.g. by realm
 - simple static config

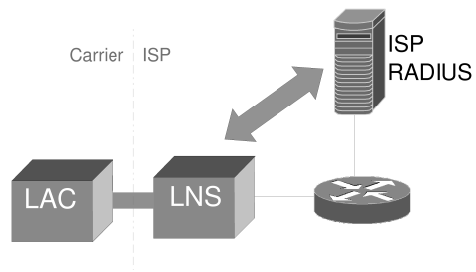
Traditional DSL connection



Layer 2 Service - Same Network

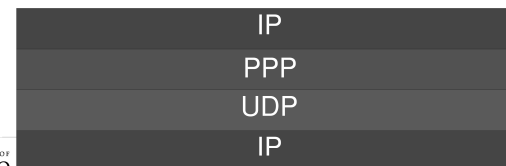
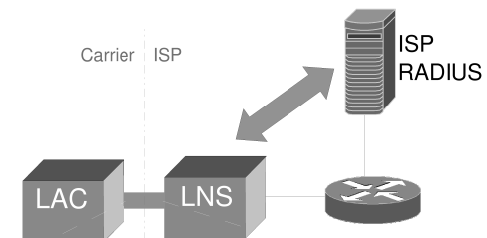


Layer 2 Service With The Same Network

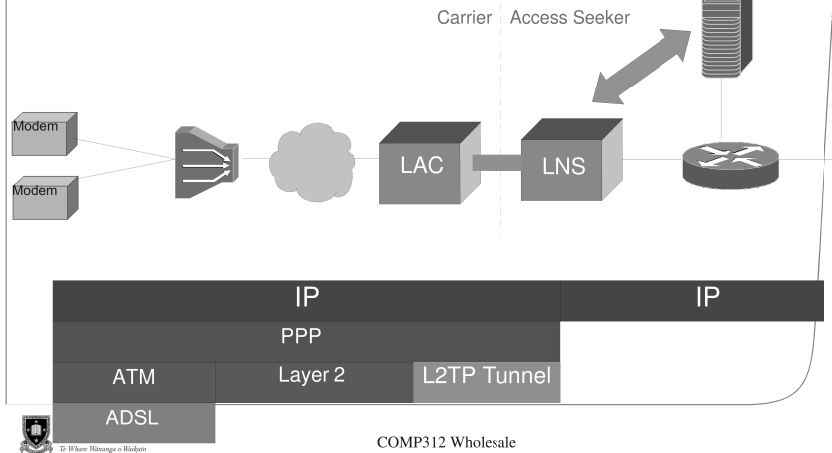


"L2TP extends the PPP model by allowing the L2 and PPP endpoints to reside on different devices interconnected by a packet-switched network. ... instead of requiring the L2 connection terminate at the NAS (which may require long-distance toll charge), the connection may terminate at a local circuit concentrator, which then extends the logical PPP session over a shared infrastructure" - RFC2661

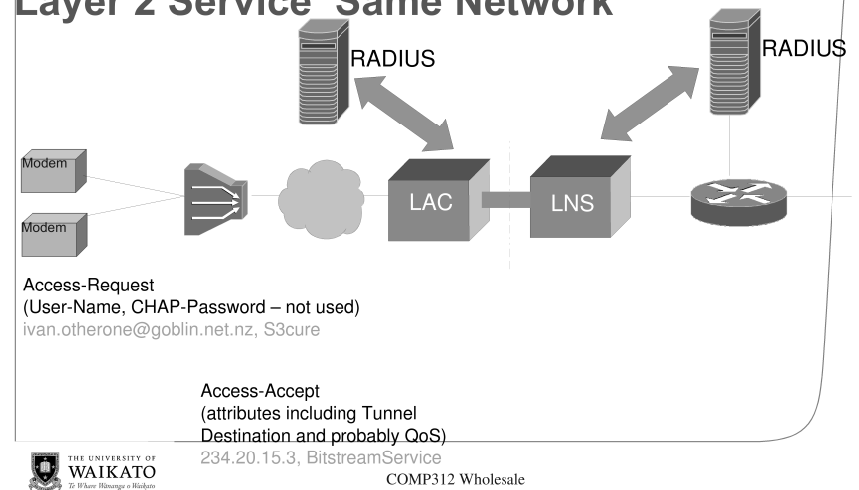
Layer 2 Service With The Same Network



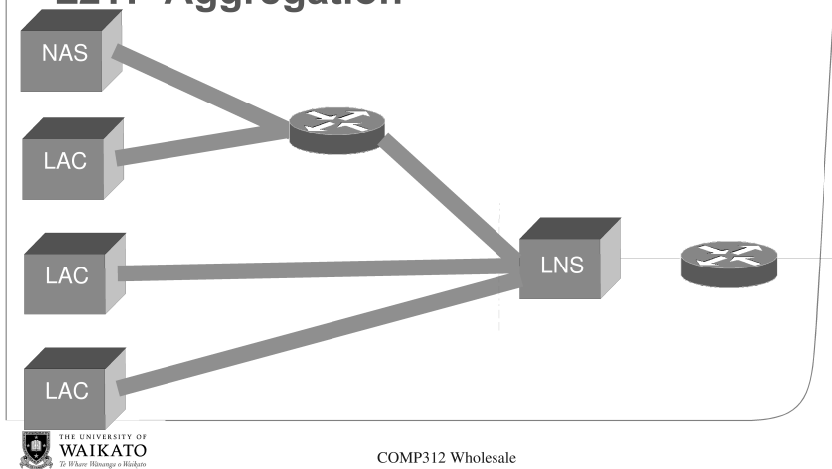
Layer 2 Service - Same Network



Layer 2 Service Same Network



L2TP Aggregation



Summary

- Wholesaling is achieved through building overlay networks to connect customers to Access Seeker ISPs
- Radius can be scaled and distributed through proxies
- Routers can be overlaid using virtual routers
- Customers can be connected to ISPs and layer2 using tunnels.
- The technologies are changing, but the concepts are the same