Layer 2 Aware NAT
draft-miles-behave-l2nat-00

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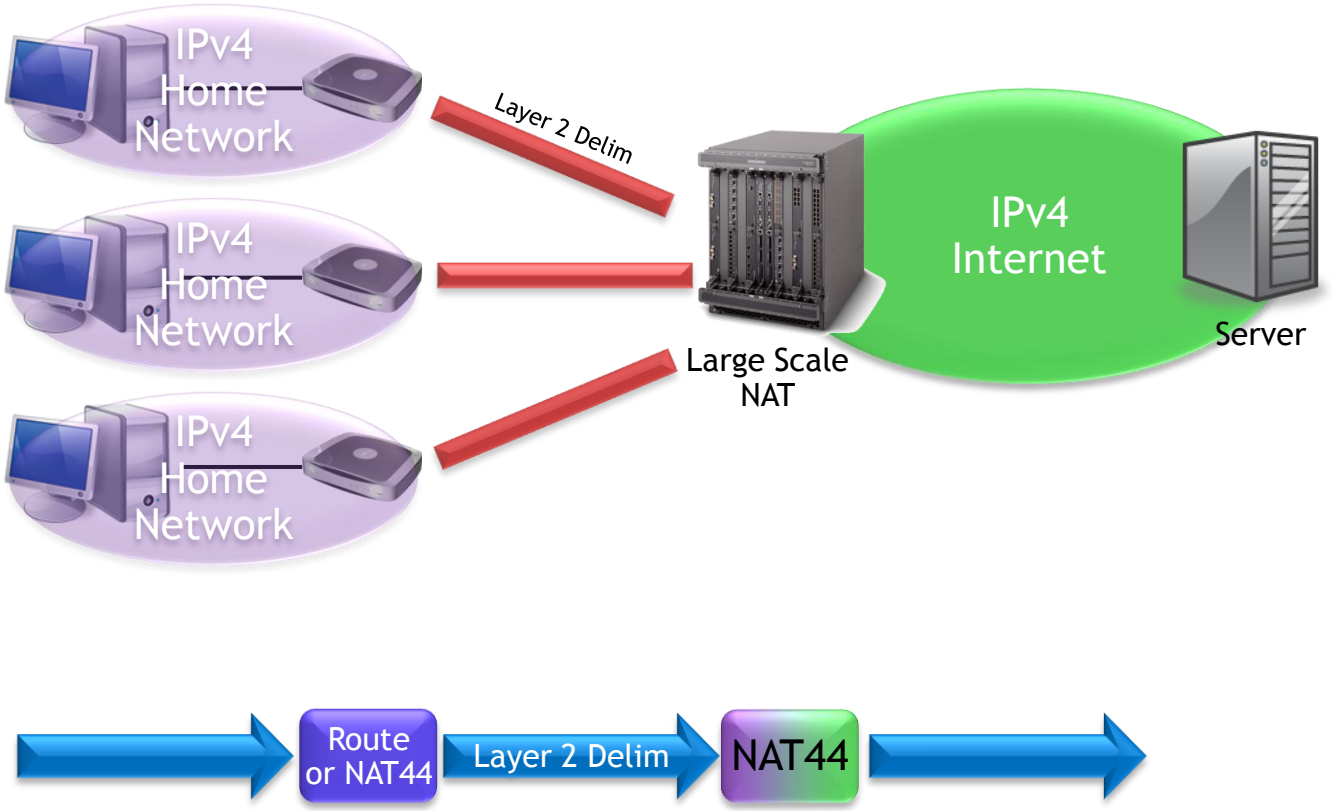
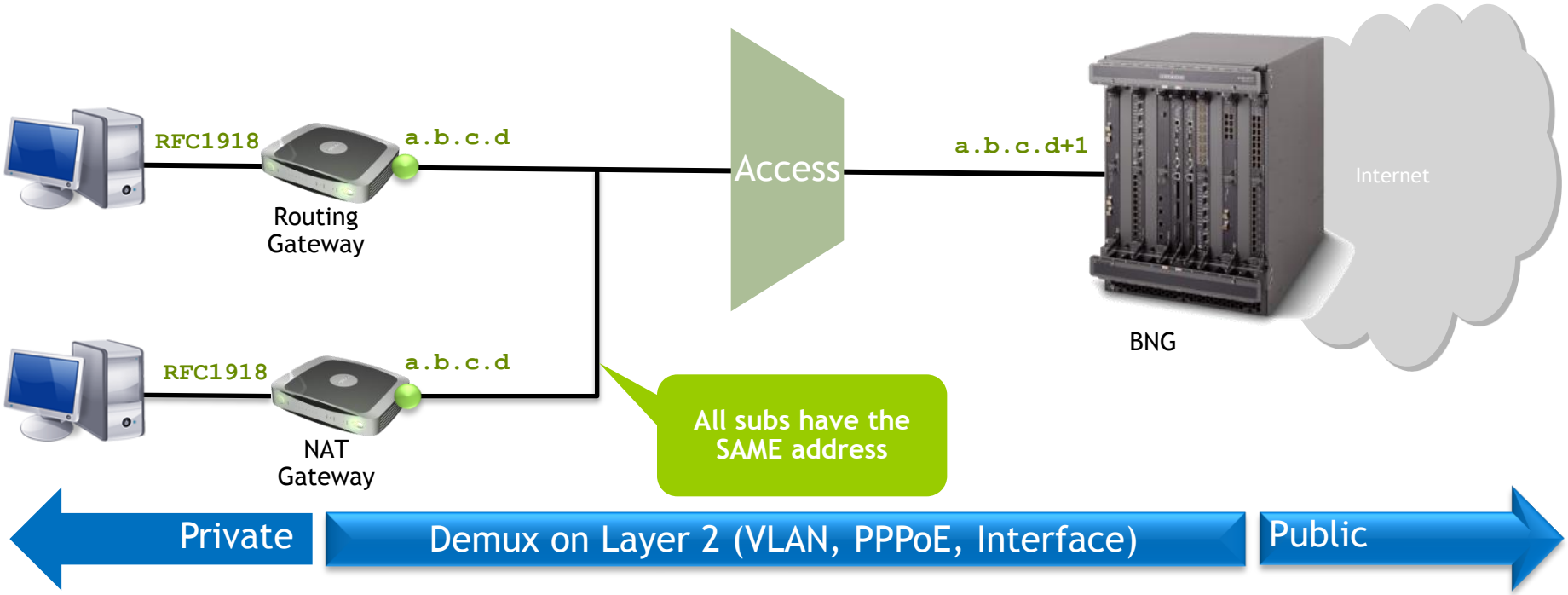
Layer 2-Aware NAT



Layer2 Aware NAT

- Attempts to support existing CPE (routers, NAT or hosts) with minimal change
- Is not an original idea – takes the common-IP concept from Dual Stack Lite and applies it to other tunnels/link-layers
- Supports a NAT444 mode for existing NAT home gateways
- Subscriber Aware NAT can support existing Windows 3.11, XP, Me, 98, XP, 2000, Vista, etc (direct host attachment – NAT44 mode)
- Can support routing CPE to achieve a NAT44 mode
- It can support a variety of link-layers and topologies: DSL TR-101, DHCP PPPoE, PPPoA, WiMAX, Mobile, Dial-up
- Must be implemented in a device aware of the Layer-2 termination

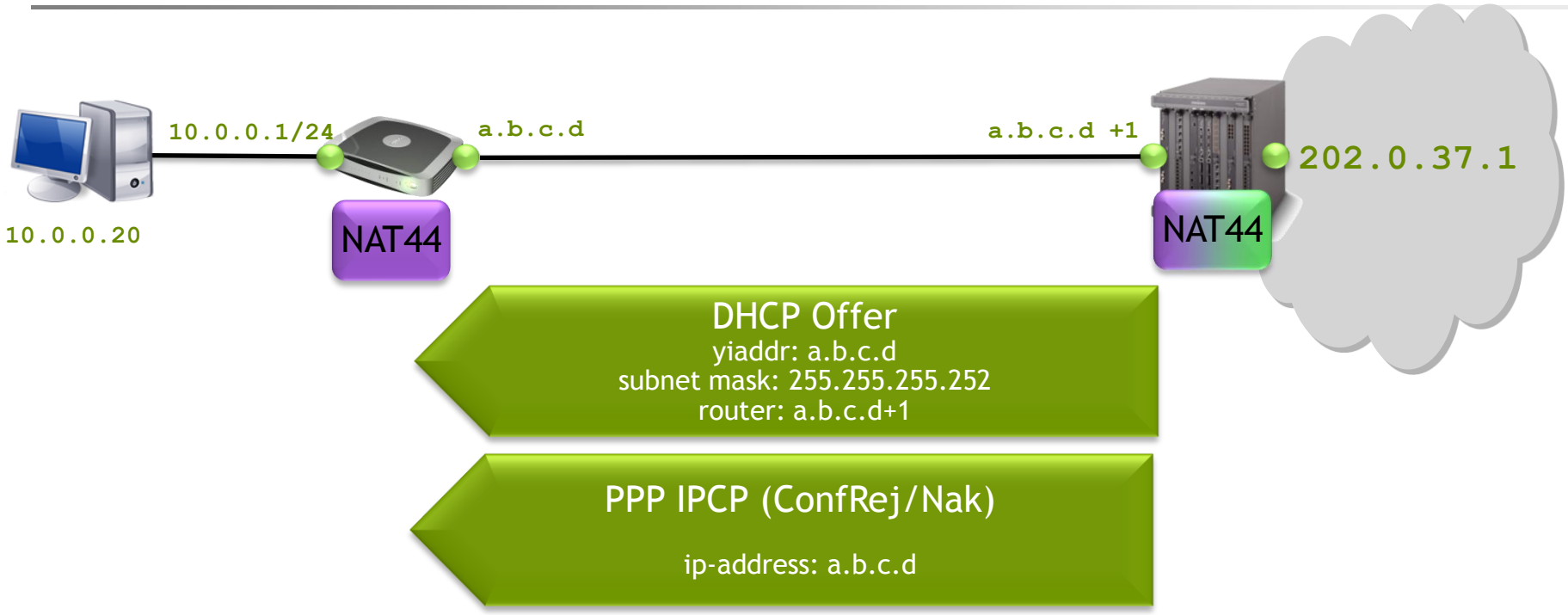
Layer2-Aware NAT



Layer 2 Aware NAT

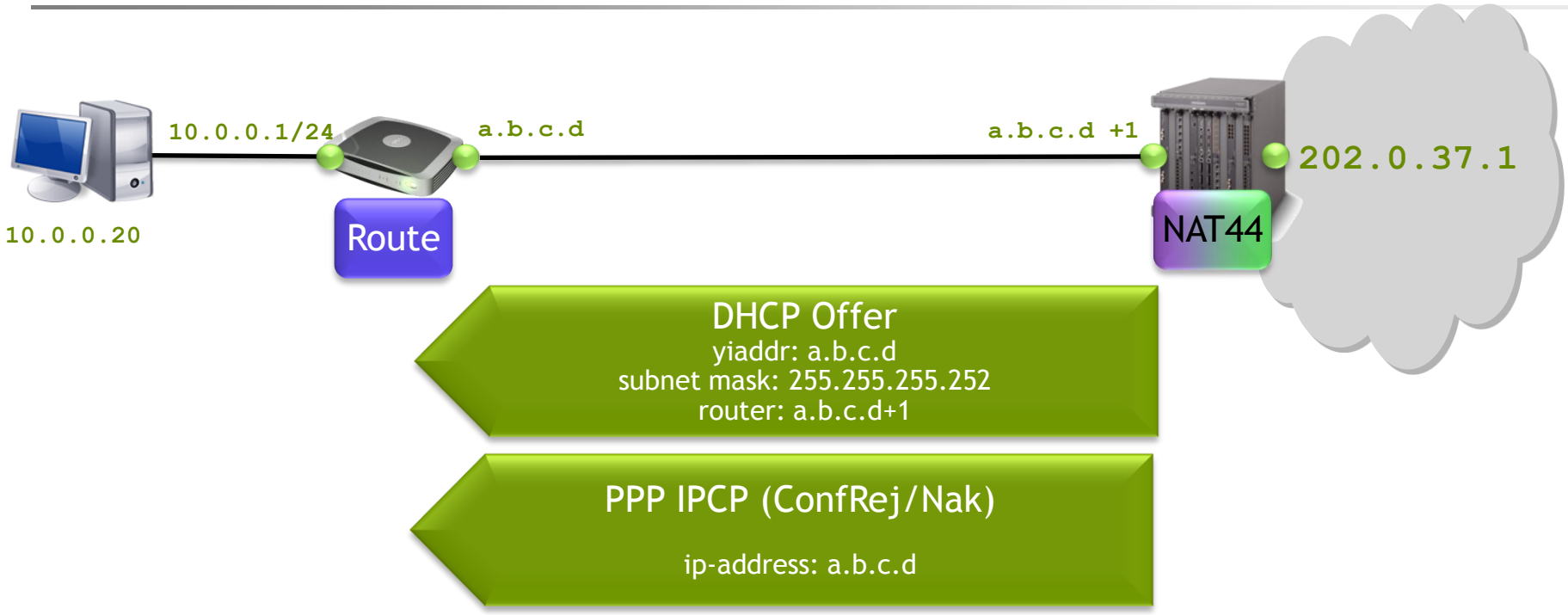
- Creates a virtual NAT table for every Layer 2 connection
- Supports a variety of link-layers like:
  - Ethernet
  - 802.1Q
  - PPPoA
  - PPPoE
  - L2TP
- Performs Network Address and Port translation on all IPv4 traffic
- Uses IPv4 datagrams
- Can support both routed (NAT44) and NAT (NAT444) home gateways
- Does not require a routing protocol to run for routed home gateways

Home Network with existing NAT (NAT444)



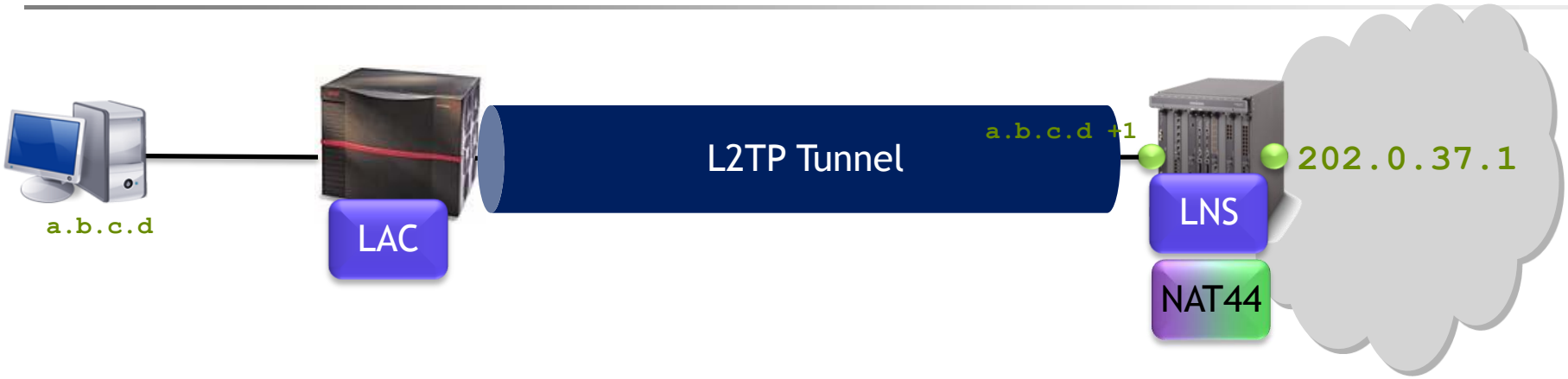
Inside IP	Inside Port	Outside IP	Outside Port	Dest IP	Dest Port	Proto
a.b.c.d	6631	202.0.37.1	8897	88.3.4.2	80	TCP
a.b.c.d	7765	202.0.37.1	9822	88.3.4.2	80	TCP
a.b.c.d	7766	202.0.37.1	9893	88.3.4.2	80	TCP

Home Network with routing (NAT44)



Inside IP	Inside Port	Outside IP	Outside Port	Dest IP	Dest Port	Proto
10.0.0.20	6631	202.0.37.1	8897	88.3.4.2	80	TCP
10.0.0.20	7765	202.0.37.1	9822	88.3.4.2	80	TCP
10.0.0.20	7766	202.0.37.1	9893	88.3.4.2	80	TCP

Or Dial-Up hosts via L2TP Access Concentrator (NAT44)



PPP IPCP (ConfRej/Nak)

ip-address: a.b.c.d

Inside IP	Inside Port	Outside IP	Outside Port	Dest IP	Dest Port	Proto
a.b.c.d	6631	202.0.37.1	8897	88.3.4.2	80	TCP
a.b.c.d	7765	202.0.37.1	9822	88.3.4.2	80	TCP
a.b.c.d	7766	202.0.37.1	9893	88.3.4.2	80	TCP

Options for IPv4 Overloading

Large Scale NAT	NAT464	Address plus port	Dual Stack Lite	L2-Aware NAT
No CPE Change	CPE change	CPE change	CPE change	No CPE Change*
NAT444	NAT464	NAT44	NAT44	NAT444 NAT44
LSN location not specified	NAT64 location not specified	A+P location specified as first routing hop	DS-Lite location not specified	L2-Aware NAT location specified as first routing hop
Problematic IPv4 address space between CPE and LSN	IPv4 translated into IPv6	IPv4 is tunneled over IPv6	IPv4 is tunneled over IPv6	IPv4 as it is today – no pre-requisite for IPv6
Application Servers can sit between subscriber and LSN	All IPv4 traffic must be subject to NAPT	All IPv4 traffic must be subject to NAPT	All IPv4 traffic must be subject to NAPT	All IPv4 traffic must be subject to NAPT

Thank You