

6 Computer Networking (awm22)

(a) For IPv4 ISPs, each domestic installation typically gets a /32 network. You have a complicated configuration requiring NAT and multiple IPv4 subnets.

(i) Why would an IPv6 based provider allocate four /64 networks for your premises when each /64 represents 2^{64} addresses? [2 marks]

(ii) A colleague has IPv6 with another provider; they only allow one /64 for each domestic installation. In the past your colleague has used a NAT and many IPv4 private address blocks, but keenly adopted IPv6 permitting them to upgrade their home network. They are now using blocks of the allocated /64 and a router in their home to interconnect the subnets.

Not everything is working as they hoped; for example, sometimes IoT devices can't connect to the Internet to update and your colleague can not connect to their front-door camera when at work.

Explain what sort of problems your colleague may face along with methods by which they could verify the root cause. [6 marks]

(iii) Explain to your colleague why you might not be able to *lend them* one of your /64 allocations, even though the /64 blocks (provided to you by your ISP) are each globally routable addresses. [2 marks]

(b) A local area network may carry several different LANs simultaneously; such a network would be designated for known sets of HomePlug devices.

Describe a physical line coding approach for the HomePlug devices that: allows two or more simultaneous virtual local area networks to fairly share the same physical channel, but does not permit trivial interception of network traffic.

Outline your approach along with its benefits and drawbacks, comparing it with the simplest use of VLAN tags in Ethernet. [10 marks]