AQQA Campus Network

BSc (Hons) Computing and Internet Technology
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Being able to deliver a network that suits AQQA needs has been the driving force behind the development of this network. Adhering to the companies main priorities has been of the utmost importance.

Single Manufacturer:
HP has been chosen to supply network devices for the proposed design. Their place in the enterprise market is well established. Their range of devices has allowed the choice of devices that best suits AQQA's needs.

Flexibility for the successor company:
This point, more than any other, has shaped the network. The design has never tried to tie itself down to AQQA's own traffic requirements. Instead, it offers generic paths and expectations about future development. For example, although not immediately required; 10GbE links have been set up in TAG and Poole House C. These allow internal department restructure by AQQA and provide the successor with plenty of choice about placement.
By keeping the design simple and generic, a potential buyer can easily see how they could use this network for themselves, improving the chance of a sale.

Low Price:
HP's products have allowed a flexible, future proofed design be made at an affordable price without compromising quality.

Congestion limited to 10 minutes:
The use of aggregate links and 10Gb Ethernet allows data to flow unhindered. QoS features of the switches will allow prioritisation of critical traffic.

Loss limited to 30 minutes:
Every building is connected to one or two others via a redundant 1000BASE-X fibre, should their primary link to the core fail. Stacked switches have been used extensively at the distribution layer and will stop a device failure from causing noticeable harm.
However; should a switch need replacing, spares are kept on-site for just this purpose. By using similar models throughout the cost of keeping spare switches becomes economical.

Other Design Elements:
The servers have been combined as much as possible. This simplifies management and physical security.

To avoid putting undue pressure on a single Core switch and to help reduce congestion, network load has been distributed across Dorset House A and B by dividing the servers.

All servers located in Dorset House A and B are connected to two separate stacked 10GbE switches to provide the most reliable service.

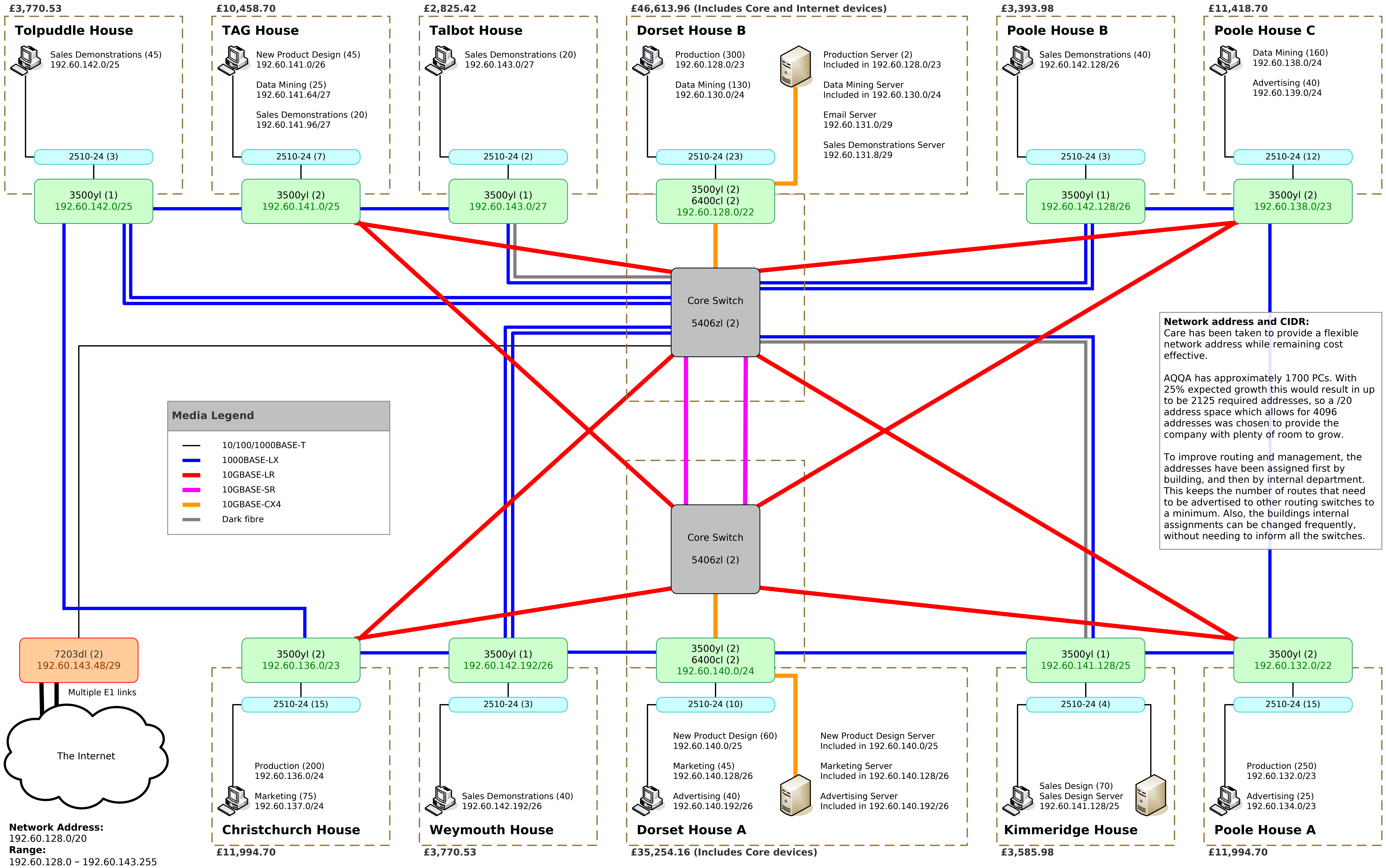
Should one of the Core switches fail, Dorset House A acts as a redundant link to Dorset House B (and visa-versa).

Talbot and Kimmeridge Houses' current bandwidth usage is particularly low. To reduce costs but provide flexibility in the future, they both have an unlit fibre link to the core laid.

Network Cost

Notes:
25% of expected growth has been added to the RJ45 sockets and access layer switches. Without knowing the real distances between buildings, 10GB-LR has been used for most 10GbE links. The cost could be reduced to use 10GB-SR (thus, cheaper transceivers) if real distances permit.

Equipment:	£145,081
Fibre:	£7,000
RJ45 Sockets:	£165,040
Total:	**£317,121**



Network Address:
192.60.128.0/20
Range:
192.60.128.0 – 192.60.143.255

Network address and CIDR:
Care has been taken to provide a flexible network address while remaining cost effective.

AQQA has approximately 1700 PCs. With 25% expected growth this would result in up to be 2125 required addresses, so a /20 address space which allows for 4096 address space was chosen to provide the company with plenty of room to grow.

To improve routing and management, the addresses have been assigned first by building, and then by internal department. This keeps the number of routes that need to be advertised to other routing switches to a minimum. Also, the buildings internal assignments can be changed frequently, without needing to inform all the switches.

Key Hardware

Access Switch

ProCurve Switch 2510-24

- 20x 10/100BASE-T ports
- 2x 1000BASE-T uplink ports

This switch was chosen for its simplicity and low cost that makes it suitable for access layer switching tasks.

Distribution Switch

ProCurve Switch 3500yl-24G-PWR

- 20x 10/100/1000BASE-T ports
- 4x MiniGBIC 1000BASE-X ports
- Expandable to provide 4x 10GbE ports

Its comprehensive Layer 3 features and 10GbE support make this switch up to the task of distribution.
Its placement in all buildings, even those without active 10GbE links, allow a simple upgrade in the future.

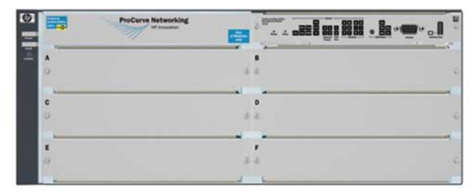
Server Switch

ProCurve Switch 6400cl

- 6x 10GBASE-CX4 ports

With six 10GBASE-CX4 ports this was the perfect choice of switch to provide a group of servers with their current and future bandwidth needs.

Core Switch



ProCurve switch 5406zl

- 6 available slots

The flexible configuration options allow a simplification of the Core to just a few devices while remaining expandable for the future. Supports a range of connections including 1GbE and 10GbE fibre.
Each pair of switches is backed up by a redundant power supply to ensure reliable function.