

Services Unit 4 Year Spending Plan

2019 – 2023

Version 1.0 – 9/9/19

Introduction

This document presents various options for Services Unit spending for the academic years 2019-2020, 2020-2021 and 2021-2022, and 2022-2023. The likely requirements for the replacement of existing hardware and the expansion of current capabilities are described and costed. Four years are covered rather than the requested three as this covers the replacement of all the existing file servers.

Existing Hardware.

| Hostname | Model | Specification | Role | Warranty Expires | Location | Notes |
|--------------|--------------------|----------------------------|----------------------|------------------|----------|--|
| bahookie | R620 | | Web | 6/2019 | IF | Virtualise |
| skelp | R620 | | Web | 6/2019 | IF | Virtualise |
| hobgoblin | R720 | | Web DR | 6/2019 | KB | Virtualise |
| Ifevo2 | Disk Array + JBODS | 36 x 4TB Raw | Commodity file space | 6/2020 | IF | Head unit under maintenance contract. JBODS in warranty until 2020 |
| Ladon | R730 | 6 x 2TB Raw | Commodity file space | 5/2020 | AT | |
| Keto | R730 | 6 x 2TB Raw | Commodity file space | 5/2020 | AT | |
| Tape Library | Spectrallogic T680 | 6 x LTO6 drives, 500 slots | Commodity backup | 8/2020 | KB | Outside the scope of this document |
| stanier | R730xd | 12 x 4TB raw | Commodity file space | 6/2021 | KB | |
| peppercorn | R730xd | 12 x 4TB raw | Commodity file space | 6/2021 | IF | |
| ivatt | R730xd | 12 x 4TB raw | Commodity file space | 6/2021 | KB | |
| gresley | R730xd | 12 x 4TB raw | Commodity file space | 6/2021 | IF | |
| bulleid | R730xd | 12 x 4TB raw | Commodity file space | 6/2021 | KB | |

| | | | | | | |
|------------|--------|-----------------|-------------------------|--------|----|--|
| collett | R730xd | 12 x 4TB raw | Commodity file space | 6/2022 | AT | |
| fairburn | R730xd | 12 x 4TB raw | Commodity file space | 6/2022 | KB | |
| maunsell | R730xd | 12 x 4TB raw | Commodity file space | 6/2022 | KB | |
| pergamum | R730 | 6 x 4TB | Backup server | 3/2022 | KB | Needs space for min 3 expansion cards |
| churchward | R730xd | 12 x 4TB raw | Commodity file space | 4/2023 | KB | |
| lemon | R730xd | 12 x 4TB raw | Commodity file space | 4/2023 | AT | |

Disk Space

It will be seen that by far the greatest commodity needing replaced is disk space. The following table summarises the amount of raw disk space needing replaced over the next 4 years

| Financial Year | Raw disk space out of warranty(TB) | Notes |
|----------------|------------------------------------|--------------------------------|
| 2019-2020 | 168 | |
| 2020-2021 | 240 | |
| 2021-2022 | 144 | Does not include backup server |
| 2022-2023 | 96 | |

This table takes no account of increases in available file space required over the next 4 years. This will be discussed later.

Replacement Hardware.

For the last few years, commodity disk space in the School has been provided by servers containing several 4TB disks. Recently, we have been exploring the cheaper option of attaching additional storage, in the form of JBODs, to our existing servers. At time of writing, the 6TB 7.2K RPM 12GB/s NLSAS drive appears to be in the sweet spot for capacity, cost and performance and the specifying of this size of disk is assumed in all costings. Costs from the latest quotes obtained are as follows:

Dell R730XD server, 12 x 6TB, 64GB RAM, Single processor - £11208

Dell MD1400 JBOD 12 x 6TB - £8606

Both prices include VAT. Needless to say, in view of current events, these prices are no more than a finger in the wind as to what we might be required to pay in the next few years.

In the past year or so, the possibility of extending the warranty for Dell Hardware beyond the standard 5 years has become much more attractive. Future spending plans should take this possibility into account, especially as a means of smoothing out the spending profile.

Additional Demand for Disk Space

A review of user numbers and quotas, and requests for additional group space over the last three years suggest that the demand for additional disk space is at least 20TB/year. Pressure to further increase student quotas, and increasing requirements for courses suggests that this figure should be considered a bare minimum when planning future storage purchases. It must be remembered that for the majority of additional disk space purchased, an equivalent amount of mirror space must also be bought and that this 20Tb is useable space. Since we use RAID 10 on our storage, this means that over 40TB of raw storage must be purchased to provide 20TB of usable storage.

Proposed Spending

In view of all of the above, the following course of action for the next 4 years is proposed:

| Financial year | Actions | Raw storage lost (TB) | Purchase | Raw storage gained (TB) | Delta (TB) | Cost inc VAT (£) | Notes |
|----------------|---|-----------------------|---|-------------------------|------------|------------------|---|
| 2019-2020 | ifevo2+JBODS, keto, laden | 168 | Center: 2 x servers, 1 x JBOD KB: 1 x JBOD | 288 | +120 | 39628 | |
| 2020-2021 | Decomission gresley, stanier, ivatt, peppercorn | 192 | Center: 2 x servers KB: 1 x server, 1 x JBOD Extend warranty on Bulleid | 288 | 96 | 42230 | Tape Library OOW |
| 2021-2022 | Decomission bulleid, fairburn, collett. | 144 | Center: 1 x server, 1 x JBOD KB: 2 x servers Extend warranty on maunsell, pergamum. | 288 | 144 | 42230 | |
| 2022-2023 | Decommission maunsell, lemon, churchward, pergamum. | 144 | Center: 1 x server KB: 2 x server, backup server | 216 | 72 | 41624 | Storage does not include backup servers |

