

# Services Unit 4 Year Spending Plan

2019 – 2023

Version 1.1 – 24/6/2020

## 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.

## Update June 2020

A new model of replacement hardware became available last year, and indeed was purchased as part of the 2019 – 2020 spend. This is the Dell R740dx2 server:

DellR740dx2 server, 24 x 8TB, 96GB RAM, Single processor - £11104.24

## 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.

## Update 2020

We will shortly be moving to a new model for charging research groups for storage which will no longer provide storage indefinitely. This should in theory reduce the amount of extra storage required each year though how this will work out remains to be seen.

## 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)	Actual storage gained (TB)	Actual 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	192	+24	39628	
2020-2021	Decommission gresley, stanier, ivatt, peppercorn, bull	240	Center: 1x R740xd2 KB: 1 x R740xd2	384	+144			22208	

	eid								
2021-2022	Decomission fairburn, Maunsell	144	KB: 1 x R740xd2 Extend warranty on collett, pergamum.	192	+48			11104	
2022-2023	Decommission collett, lemon, pergamum.	96	Center: 1 x R740xd2 backup server Extend warranty on churchward	192	+96			11104	Storage does not include backup servers