The Managed Web Service

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Introduction

The Managed Web Service (MWS) was originally launched in 2000 as a free service. It was intended to provide a service to the University and reduce security incidents from vulnerable systems managed by people inexperienced in running Unix systems. The needs of the customers has been evolving over the years, along with the system. The system had a major upgrade in 2006 with the launch of MWS v2. And then a further major upgrade to MWS v3 in 2016. In 2016 the UIS started charging for the service. The charges range from £100/year up to £300/year. At each iteration the users were empowered to do more themselves with less assistance from the MWS team. Also along with greater functionality more automation was introduced to keep staff time required to run the service to a minimum.

The service consists of managed Virtual Machines (VMs), with a Linux OS, along with a set of web-related applications and database software all curated by the UIS. Limited administrative privilege is then granted to the customers to configure their Managed Web Service instance. The primary features (as described in the documentation) are:

- a server with 1 Core CPU and up to 2GB of RAM running Debian 9 (Stretch)
- Apache (2.4), PHP 7, Python 3.5, Perl (5.24.1), MariaDB (10.1.26)
- Replicated SSD disk storage (you have a choice of 10GB, 20GB, or 50GB of usable disk)
- a hostname ending .cam.ac.uk
- a public IPv4 address and a public IPv6 address
- access to a simple web-based control panel
- integration with University DNS services
- integration with UIS authentication and authorisation: UIS password via Raven for access to the control panel, UIS password for interactive login to sites, Lookup groups for access control
- backups and user access to frequent file system snapshots as standard
- geographically-diverse dual-location high-availability as standard

The service was intended to be a bare bones solution, with minimal staff support, and users meeting their own needs through the control panel. The total staff cost is slightly

less than £200,000. This means that the current cost to the UIS of running the service with 200 sites is just under £1000 per site per year.

This does not seem to be an appropriate use of UIS resources. This paper discusses options to improve the cost and utility to the University.

Current situation

The MWS (as of 11 Nov 2019) hosts 206 MWS sites, this number has remained relatively static over a number of years. The sites are spread across 48 University institutions, 13 colleges and 16 other external institutions. The school of Medicine (10 departments), Department of Physics (7 research groups), Department of Engineering Modern and Medieval Languages all have 10 sites or more. 40 Institutions have a single site. The UIS itself has 7 sites of which 3 are used for relationship management functions. Please see Appendix 1 for additional details.

Whilst the intention was to provide a self-service solution with minimal support, in reality many of our users extract significant support from the UIS, with a direct support load approaching 1 FTE. Additionally significant ongoing development effort has been and continues to be required to maintain and develop the service. This development effort is approximately another FTE. Additionally there is a further FTE dedicated to Service Management.

As stated above, the service delivered is not currently in line with the cost. Either the cost to the UIS needs to be decreased or the scale needs to be increased.

To inform this properly review of customer needs is required. However an initial survey of the larger Departmental and College customers found:
- The users like the service
- They recognise that it is good value for money
- Many are moving to the managed CMS solution (Falcon) where that meets their needs
- Very few take advantage of the snapshot solution
- Many like the benefit of being able to request a site, have the DNS managed for them.

Risks and Ongoing tasks

- There are several individuals who represent single points of failure. One has announced their retirement.
- It is currently using its own hardware to provide the Virtual Machines. This hardware is coming to the end of life, and the system needs to be migrated. The agreed plan is to move to the HPCs OpenStack cluster. This does not offer any significant infrastructure cost savings but it does reduce complexity for the MWS.
  - Moving onto a new VM stack is already under way, but involves considerably more development effort to complete and change the back end, but those enhancements should make future moves less challenging.
  - The SLA for the target VM system needs to be established. The currently published plans would permit the service to be unavailable every Tuesday between 10am and 6pm. I have been assured that this is not the intention, but the wording needs to be tightened up before the MWS can publish a sensible SLA itself.
- The OS deployed on each of the 206 VM hosts is Debian, which is different to the agreed standard for other UIS Linux hosts (RedHat Enterprise Linux)
- Deprecated hostnames in the .csx.cam.ac.uk domain need to be phased out.
- Day to day administrative, billing, user administration, support and security tasks are still labour intensive despite significant automation.

Options

In order to align cost and value the following options are being considered:

1. Closing the Service Down
2. Outsourcing the service to a commercial provider
3. Decreasing the amount of staff time required to run the service
4. Increasing the scale of the service
5. Charging more for the service
6. Merging with other services that are sufficiently similar or complementary

Closing the MWS down

There are 77 customer institutions. Some of the sites could be migrated to the Falcon service, many of the remainder would find another way to meet their needs, eg external hosting. It should be acknowledged that some institutions/groups would be inconvenienced.

Outsourcing the service to a commercial provider

There are a large number of companies which offer similar services to the MWS. It is likely that an appropriate one could be identified which would offer an appropriate alternate solution. I have contacted 2 companies. Tsohost.com (who are part of Paragon) and Mythic Beasts, a local Cambridge company. Their initial prices, without going into a detailed negotiation, were £25,000 and £15,000 respectively.

Decreasing staff time

The member of staff providing support is due to retire in the new year. It may be possible to drastically scale back the support that we offer. This will have a significant effect on several institutions and groups who rely on this support to use the service.

Increasing the scale of the service

It is likely that marketing the service could increase the scale, that there are potential customers who would benefit, and take advantage of the service if they were aware of what it offers them. Realistically doubling the number of customers seems the most optimistic outcome from delivering a service to this latent demand. If there were no resultant staff time changes this would still mean that each site cost the UIS £500 per annum.

Charging more for the service

Charges could be increased to cover more than just the infrastructure costs. It has been suggested that this may be complicated due to the staff largely being paid for from the CHEST. It is probable that some customers would cease to use the service if the charge went up, however the price has remained static since version 3 of the service was released, so it seems likely that the majority would tolerate a moderate increase. Certainly the current price to the customers is cheap compared to a commercial offerings with the same level of functionality.

Merging with other services

Another option around increasing scale is to use the back end systems for other purposes. An obvious option would be to merge the MWS with the Falcon Drupal service. Whilst that service is out of scope for this service management exercise the feasibility of this option has been explored. The Drupal service is expected to host around 800 sites. However architecturally each Drupal instance needs 5 VMs (2 live, 2 database, 1 Dev). Further, each instance will, in general, host many more than 1 site. It

may be possible to merge the two back end infrastructures, but it would be challenging and time consuming, and probably not as close a match as it might first appear.

There may exist other services which could fit this model. They can be characterised as managed virtual appliances. No currently extant UIS service appears to fit this pattern however. Further, it is likely that those services would naturally be run in "the cloud".

Recommendation

Given that the service is being used it clearly has value to some institutions within the University. The current cost to the University is too high though. If the price were increased then it wouldn't be seen as reasonable to charge enough to cover all the current staff costs. It would be difficult to merge the infrastructure for the MWS and the Drupal service and no other opportunities to merge services to use the same infrastructure have been identified. It does not seem practical to scale up the MWS infrastructure in house to make it cost effective. In the short term it will be hard to significantly decrease the support given by the service, and if the service continues as it has for the last 20 years then significant development time will be needed. The outsourced version may not be a perfect match to the current service, but sufficiently similar options have been found that it seems to be viable option to explore.

Given this I recommend

- Publishing this recommendation.
- Engaging will the MWS community to explore requirements for an outsourced solution.
- Exploring options to migrate some customer sites to the Drupal service.
- Identifying a proposed outsourced solution.
- Identifying the appropriate charging and support mechanism for that solution.
- Start the process of moving customers across to the new solution.
- Closing the current MWS down.

The cost for the new service should be similar to the current charges to our customers. This move change would either remove or greatly decrease the need for in-house development. Most, if not all, of the in-house support could cease. The Service Management would either be removed or reduced depending on how the outsourcing was carried out. This would greatly lower the cost to the UIS and free up current staff time to bring greater value to the University.

Decision Requested

The Service owner is requested to select an option to explore, with a view to implementing, or request any additional information in order to be able to make such a decision.

Appendix 1: Information about MWS customer base

Name	Institution	Number
Unite	Admin	5
UCU's webserver	Admin	
new DAAD Cambridge	Admin	
AV Services	Admin	
REF2021	Admin	
MAA sites	Arch and Anth	2
MAA	Arch and Anth	
cuneifyplus	Archaeology	2
LCHES	Archaeology	
CDT Astronomy	Astronomy	2
Gaia servers	Astronomy	
Biochemistry Managed Web server 3	Biochemistry	2
Hyvonen Group server	Biochemistry	
Latin American Studies	Centre of Latin American Studies	1
CSAS 1	Centre of South Asian Studies	2
CSAS 2	Centre of South Asian Studies	
Chemistry UTBS Certificate Server	Chemistry	1
C & D	CRASSH	5
Making Visible	CRASSH	
GLOKNOS	CRASSH	
nnCRASSH	CRASSH	
T & D	CRASSH	
Scopic Server	Criminology	3
Pads Server	Criminology	
Crim Server	Criminology	
http://www.lightmicroscopy.cruk.cam.ac.uk/	CRUK	3
CRUK CI	CRUK	
Redcap CRUK CI	CRUK	
CAmapP	Earth Sciences	1

Fac Econ Server	Economics	1
Steve Watson's server	Education	3
Dialogic Evidence Toolkit	Education	
OER	Education	
edpc-mentoring-prod	Engineering	10
JML server	Engineering	
EDC inclusive design	Engineering	
Division B Website Server	Engineering	
Physical Computation Lab's Web Server	Engineering	
DSG web server	Engineering	
infos2019-conf	Engineering	
innoLAE	Engineering	
esas	Engineering	
dbslice server	Engineering	
nena	Faculty of Asian & Middle eastern Studies	2
AMES Managed Server	Faculty of Asian & Middle eastern Studies	
Extra webserver for Classics	Faculty of Classics	1
Faculty of Divinity MWS server	Faculty of Divinity	1
Fitzmuseum Main	Fitzwilliam Museum	1
Gurdon Computing	Gurdon	7
Rawlins-Gurdon	Gurdon	
Ahringer-Gurdon	Gurdon	
Ma-Gurdon	Gurdon	
Jackson SGV	Gurdon	
Kouzarides Group Web Server	Gurdon	
Gurdon Institute MWS Server	Gurdon	
The Haddon Libary	Haddon Library of Archaeology and Antrhopology	1
econsoc	History	3
History & Policy	History	
History Intranet	History	
NewCCRAC	History of Art	1
HMS server	HPS	2
HPS Projects	HPS	

HSPS secondary site	HSPS	2
Max-Cam Server	HSPS	
CIS Server	Islamic Studies	1
Public Law Conference server	Law	6
Law BA server	Law	
Law MCL Server	Law	
Law LLM Server	Law	
Law IRLM Server	Law	
Fac of Law server	Law	
DMG Webserver	Materials Science	7
MSM Doitpoms	Materials Science	
MSM Webserver	Materials Science	
Superspin	Materials Science	
ASCG	Materials Science	
WEMS server	Materials Science	
Optical Nanomaterials	Materials Science	
qi.damtp server	DAMTP	2
CTC server	DAMTP	
PAVE Research Group	McDonald Institute	1
Matheson Lab	Medicine: Matheson lab	13
GOdogs Database	Medicine: Metabolic Science	
MRC-BSU METAMATCHED	Medicine: MRC BSU	
BGX	Medicine: MRC BSU	
MRC BioRepository Server	Medicine: MRC Epidemiology	
MBU web backup	Medicine: MRC MBU	
Cambridge Prostate Cancer	Medicine: Oncology	
Cam_rt_oncology	Medicine: Oncology	
CCC	Medicine: Oncology	
HDGenomics@CEU	Medicine: Public Health & Primary Care	
PCU2	Medicine: Public Health & Primary Care	
PCU1	Medicine: Public Health & Primary Care	
CUHP	Medicine: School of Clinical Medicine	
Ante-well	MML	10
LTL Website	MML	

Welsh dialect atlas server	MML	
MEITS	MML	
Dr. Sitaridou's server	MML	
MML-Projects	MML	
Education First Unit	MML	
LTL CRAB	MML	
TalkingResearch	MML	
sihps-anno	MML	
CMPCP Webserver	Music	1
Teaching Server	Pathology	3
Pathology server	Pathology	
Virology server	Pathology	
Cell tracking server	PDN	3
CTR-BFX	PDN	
MWS-PDN server	PDN	
Philosophy MWS3	Philosophy	1
Purple shin	Physics	12
Theories of Quantum Matter	Physics	
MoIE Server	Physics	
Centre for Precision Studies in Particle Physics	Physics	
QM group server	Physics	
Quantum Materials	Physics	
colours	Physics	
nanoforum	Physics	
Mind the gap	Physics	
Huggins Lab Server	Physics	
TCM's MWS	Physics	
Isaac Physics Admin	Physics	
Open IP Website	Plant Sciences	1
IntheLongRun	POLIS	1
MemLab	Psychology	2
psychol shared mws	Psychology	
Cambridge Grand Challenges	School of Humanities & Social Sciences	1
School of the Biological Sciences server	School of the Biological Sciences	1

Life in Glass	Sociology	1
Langcen duns and eiger server	The Language Centre	4
CULP server	The Language Centre	
Langcen lcitc and lcapps	The Language Centre	
Langcen wserv	The Language Centre	
UK 7T Network server	WBIC	1
Nicrophorus domain	Zoology	5
Imaging Facilities Booking System	Zoology	
Conduit Lab server	Zoology	
CPE Server	Zoology	
Fabre Caroline's server	Zoology	
Kemble Server	Anglo-Saxon, Norse and Celtic	1
UIS websites		
Training Feedback server	UIS	7
CITMG Webserver	UIS	
DITG	UIS	
mws3test	UIS	
mzs3	UIS	
Infrastructure & Platform Services miscellaneous	UIS	
rse	UIS	
COLLEGES		
Corpus Christi FMS	Corpus	1
Magdalene Website	Magdalene	3
Magdalene Students	Magdalene	
Centre for History and Economics	Magdalene	
Emmanuel Members Webserver	Emmanuel	1
CCWEB2	Clare	2
CCWEB7	Clare	
Trinity Hall OFMS	Trinity Hall	2
Trinity Hall Main Site	Trinity Hall	
Newhall Art	Murray Edwards	3

IT Beta Site	Murray Edwards	
MEC IT Office	Murray Edwards	
Homerton FMS	Homerton	1
CaTaLOG server	St Johns	3
St John's OFMS	St Johns	
St John's Apps	St Johns	
LCC servicedesk server	Lucy Cavendish	2
Lucy Cavendish Website	Lucy Cavendish	
Trinity EXT 2019	Trinity	8
Post Doc's server	Trinity	
Trinity Server	Trinity	
TCSSSC	Trinity	
Multi-Site Server	Trinity	
LibDVDCat	Trinity	
Ballot	Trinity	
TrinityGifts	Trinity	
Queens FMS	Queens	1
Girton College Porters Web	Girton	1
Cudos server	Gonville and Caius	8
Caius Server	Gonville and Caius	
Caius public server	Gonville and Caius	
Caius student sites	Gonville and Caius	
Caius Fellows' server	Gonville and Caius	
Meal Booking System	Gonville and Caius	
Caius May Ball	Gonville and Caius	
AToM	Gonville and Caius	
Pembroke Development	Pembroke	2
Pembroke Test	Pembroke	
External institutions		
Woolf Institute	Woolf Institute	1
NRI server	Needham Research Institute	1
Tyndale House	Tyndale House	1
Henry Fund	Charles and Julia Henry Fund	1

Wesley House web server	Wesley House	1
CE-WWW-Sandpit	Cambridge Enterprise	4
CE-WWW-Live	Cambridge Enterprise	
CE-Intranet	Cambridge Enterprise	
CE-Intranet-Sandpit	Cambridge Enterprise	
Westminster College's server	Westminster College	1
WestcottHouse	Westcott House	1
Ridley Hall Website	Ridley Hall	1
IOCS web server	Institute for Orthodox Christian Studies	1
CASP server	CASP	1
Hitachi Cambridge Laboratory	Hitachi Laboratory	1
CTF web server	Cambridge Theological Federation	1
Great St Mary's server	Great St Mary's	1
Westfield House server	Westfield House	1
MBIT Server	Margaret Beaufort Institute of Theology	1