INTRODUCTION

The University of Cambridge currently has two centrally provided email systems: Hermes, which is a local implementation of an open-source system running on premises in the University; and Exchange Online (ExOl), an external cloud-based service hosted by Microsoft but managed by the University Information Services department (UIS). The University’s Information Services Committee (ISC) decided in March 2019 to conduct a strategic review of centrally provided email services to consider the current and future needs of the University. To do this they co-opted a volunteer Email Review Team (ERT) consisting of 4 senior members (3 current staff and an Emeritus Fellow) of the collegiate University chaired by an external ISC member. A notice was published in the 9 May 2019 edition of the Reporter setting out the review’s remit and seeking views, requirements and recommendations from staff and other interested parties within the University. Originally the ERT was expected to report by early June 2019 but, given the volume and elongated period of input, the ISC extended the timeline of the review and announced this in the 19 June 2019 edition of the Reporter. There was a further delay due to an additional email security review following an email related incident in the latter part of 2019. This has resulted in a decision for all central official administrative staff mail to be protected by two factor authentication (2FA).

THE REMIT FROM THE ISC

The following terms of reference and request for submissions appeared in the 9 May 2019 Reporter (No. 6546).

The Information Services Committee (ISC) has commissioned a strategic review of the centrally-provided email systems in the University and is seeking contributions from staff and other interested parties within the collegiate University on the areas under consideration (see below). The ISC has appointed Mr Keith Turnbull, one of its external members, to chair the review, with support from:

Dr Richard Clayton, Department of Computer Science and Technology
Dr Andrew Herbert, Emeritus Fellow Computer Science * Wolfson College
Dr James Knapton, University Information Compliance Officer
Dr Rachael Padman, Department of Physics

Following a two-year programme of rationalisation, the University now has two centrally-provided systems: Hermes, which is a local implementation of an open-source system running on services in the University; and Exchange Online, an external service run by
Central email services in the University have, over the last decade and more, become critical to the day-to-day life of the University but a long-term strategy has not been developed which considers the current and future needs of the University. In this context a strategic review of the central email provision is timely.

The review will consider the centrally-provided email systems Exchange Online and Hermes, and the PPSwitch mail transfer agent which supports both email systems. Email systems operated by University institutions other than UIS or those operated by Colleges will not be included in the review, except in considering the dependency of these systems on Hermes, Exchange Online, or PPSwitch.

The review will consider and make recommendations on:

1. A long term strategy for email provision in the University, with specific regard to usability, reliability, eligibility, use policy, security, sustainability and value for money.
2. What part widely-available free-to-use email services from Google, Microsoft and others can play in the University’s strategy for email provision.
3. The relationship between the provision of central email and of related services, including calendar management, contact and address management, mailing lists and collaboration tools, and task and to-do list management.
4. How to support people arriving at and leaving Cambridge to continue to use archives of emails.
5. Opportunities and risks afforded by, and good practice in, providing local email solutions.
6. How the University can effectively discharge its regulatory, statutory and contractual obligations in relation to provision of email services including with regard to the personal use of email facilities by students and staff.

The review will draw on existing evidence and evidence submitted during the review, and may also commission or request evidence and advice from within and outside the University. Interested parties may contribute or request further information by emailing the review group via ucam-isc-emailreview@lists.cam.ac.uk from an @cam.ac.uk email address. The deadline for contributions to the review is Thursday, 30 May 2019.

It is anticipated that the report on the outcome of the review will be provided to the General Board and the Council later in Easter Term 2019, prior to publication in the Reporter.

EXECUTIVE SUMMARY AND PRINCIPAL RECOMMENDATION

There were 49 submissions to the review, comprising a mixture of departmental and individual comments. The responses were heavily weighted to those working in UIS, computing and scientific disciplines and otherwise were principally the views of IT staff who worked in the departments or colleges. Every submission welcomed having a strategic email review. Some however thought the review’s original timescale too short and recommended a longer and more in-depth investigation of user requirements and solutions. There were calls for a more transparent and phased project methodology and further extended consultation. There were many detailed concerns, some of which needed additional technical due diligence. There were very strong opinions expressed, both for maintaining or moving away from Hermes and for using or discontinuing Exchange Online. Experienced users tended to be advocates of their current system and were hostile to any change. Overall the ERT was surprised that very few who submitted evidence started from a position that acknowledged that integrated new ways of working would be possible and improve productivity and communication. There was instead
concern expressed about the effect on staff of additional workloads if there were changes to current systems.

During the review period, while considering the submissions, the ERT and ISC was made aware by the University’s Chief Security Officer (CISO) of relevant recent incidents and developments. This comprised a number of very serious email security breaches which had as their common cause the discovery of userid-password combinations by the attacker and consequent access to University systems, especially email accounts. To mitigate against further attacks, the CISO strongly recommended extending the Two-Factor Authentication (2FA) system, currently being trialled in some areas using ExOl, across all accounts used by University administrative staff (those using @admin.cam.ac.uk email addresses) and potentially across accounts used by all other University staff and, eventually, students.

Based on the level of security threat and the breaches experienced, and the consequent strong recommendation of the CISO to implement 2FA widely, the majority of the ERT believes the University should accelerate the rollout of ExOl as the principal University email system. Oxford University, which has a comparable structure and similarly complex IT arrangements, has already moved to ExOl (as have most other major UK universities) and its experience suggests that this can be achieved successfully. The ERT nevertheless believes that such a project requires a rigorous and transparent project methodology, to be instituted immediately, whereby all the requirements, issues, resolutions and milestones are dynamically published and there is regular communication between the UIS project owner/team and all identified stakeholders/users. The ERT also acknowledges that there is work required in some departments and colleges to migrate email-based workflows away from Hermes. UIS provide an existing migration tool from Hermes to Exchange Online to accelerate and aid further transitions. In addition, it would be helpful for UIS to set up a community forum, as part of the transition project, to share expertise and best practice. This recommendation does not discount that there may still be a perceived need by some groups for local instances of Exchange or Hermes to be maintained by some institutions. However each case should be vigorously and objectively debated as to why such an exception is needed and indeed how any outlier groups can comply with the overriding need to implement 2FA without recruiting additional specialist staff and incurring additional cost either centrally or at group level. The existing PPSwitch mail transfer mechanism (based on Exim) should continue in the interim, but UIS should investigate a current supportable secure alternative. The ongoing interim use of the current mailing list software, MailMan, is recommended but again UIS should investigate using a current secure supportable alternative such as Sympa.

COMMENTARY AND SUBSIDIARY RECOMMENDATIONS ON EACH AREA OF THE REVIEW’S REMIT

1. Long term strategy for central email provision in the University, with specific regard to usability, reliability, eligibility, use policy, security, sustainability and value for money.

1.1. Value for money. Firstly, there are no enterprise-level ‘free’ email services. Whether using Microsoft, Google G Suite or in-house Hermes there are costs (staffing and licensing) with all of these. With the provision of University-wide Office 365 licenses at Cambridge, the basic cloud email services come as part of the inclusive license fee so
there is little marginal license cost. However, there are additional licence costs for enterprise-level email security features and support coupled with the University staff costs of email management and local support. Although Gmail is not centrally supported at this time, UIS has licensed and enabled all owners of .cam.ac.uk email accounts to use Google G Suite if they so desire. Hermes is being run on very minimal and inadequate levels of management and support, having effectively not been developed much beyond 2003. It would require significant investment to bring it up-to-date, and even then it would still not have all the features and integration that ExOl/O365 has. In particular, developing a 2FA system for Hermes would take time which, given recent incidents, the University does not have. However, overall the ERT does not regard cost as a major decision-defining differentiator between these systems and notes that ExOl gives reasonable value for money as well as enterprise-class security.

1.2. Usability. O365 has had much usability development over many years; it has a very clean and function-rich native client user interface which integrates very well across the whole O365 toolset for all platforms save Linux. The Outlook/O365 web interface has also greatly improved and can run well on Linux browsers. There are even O365 extensions for Chrome and Chromebooks. Gmail can run with most native clients on most platforms including Linux as well as having a web interface that runs on the Chrome browser, which again works on most platforms in use at Cambridge. The basic Gmail web interface still has relatively clunky interfaces and lags behind many native clients such as Outlook or Thunderbird.

1.3. Reliability. Hermes has been very reliable, although it was down for several hours due to a power failure in January 2018. ExOl has suffered some temporary Cambridge-specific issues in the past 18 months as part of the initial rollout but the ERT understands that these issues have been resolved by UIS. There have been some widely reported, albeit short, regional outages from the Microsoft Cloud on at least 2 days in 2019. Gmail is also in the main very reliable, with only occasional short outages. Both ExOl and Gmail claim an SLA of at least 99.9% up-time which equates to a maximum of 8.77 hrs downtime a year. UIS maintains a real-time status page and allows anyone to subscribe to service alerts.

1.4. Sustainability. Hermes relies on a dwindling skillset as the base opensource Cyrus code is used by a decreasing number of institutions. Carnegie Mellon University, which created the original Cyrus codebase, transitioned its own staff to ExOl and students to Gmail in 2016. From a career progression point of view, Cyrus/Hermes-specific code and administration skills are not in any commercial demand. The Cyrus source code relies on updates from a small commercial company, FastMail, and other volunteers. ExOl and G Suite continue to be very actively developed and continuously updated to secure best practice. They are both supported by much larger global teams together with integration across related tools and native client support for updated mobile platforms. The administration and support skills for both are readily available in the job market and there are many established online and classroom based training courses, exams and certifications producing a constant stream of qualified people.

1.5. Migration from Hermes to Exchange Online. A web interface at https://migrate.hermes.cam.ac.uk has been in place since 2016 to allow people to migrate email from Hermes to Exchange Online. It also automatically updates @cam.ac.uk and @hermes.cam.ac.uk email redirections. As of May 2019, 2325 people
had used this to migrate email to the main Exchange Online tenancy, and 1882 people
had used it to migrate to the alumni tenancy.

1.6. Security. The commercial cloud platforms are in an aggressive quality cycle of
continuously being tested internally and by external bounty and academic researchers,
leading to frequent and rapid automated patches. Updates on the server side are
transparent and have little local management overhead as they are dynamically run on
the cloud-based servers. The on-premises service Hermes has had occasional patches
which have to be tracked and manually implemented by University IT support staff. The
underlying on-premises Linux platform for Hermes would need patching on a much more
frequent basis given the high rate of discovered security vulnerabilities which afflict all
operating systems.

2. What part widely-available free-to-use email services from Google, Microsoft and others can
play in the University’s strategy for email provision.

2.1. Technically no enterprise-level service is free. However ExOl is already being used as a
built-in part of the O365 subscription. As UIS is already on that path with ExOl, and given
the strong recommendation to further extend the 2-factor authentication that is being
piloted with ExOl, the majority of the ERT recommend making ExOl the core central
email service. This is already the case in many enterprises and in other UK universities.
A transition period to support Hermes and local instances of Hermes/Exchange should
be factored in to work through specific issues. However given the security implications
this period should be kept to a minimum. If unresolvable and intractable issues are found
with certain institutions, there should be preparedness to accommodate local instances
of Hermes or Exchange. However the latter should be an exception of last resort rather
than a default and with the institution taking on the responsibility for security issues.

2.2. ExOl is used successfully with a wide variety of native clients other than Outlook e.g.
Gmail, iOS, Android, Thunderbird, etc. It also has administrative tools to allow setting of
and conformance to policy, with built-in auditing and alerting. It is comprehensively
tested from a quality and security point of view to very high standards and conforms to
all common enterprise software standards. ExOl also allows easy integration with many
Two-Factor Authentication systems, one of which is already being successfully used on
a small scale within the University (Duo).

2.3. Although there are some local instances of Gmail being used by University departments,
it would require an added overhead to set-up and support Gmail centrally. As mentioned
elsewhere, there are potential technical issues with SPF that would need to be
investigated if this route was chosen. However, this does not stop individuals from using
their own Gmail client and calendars in conjunction with ExOl/O365. Gmail allows Two-
Factor Authentication via Smartphone apps, SMS, alternative emails and 3rd party add-
dons.

2.4. A more visible and active email project and project team should be established by UIS to
working with all stakeholders and other related teams. The list of requirements and
issues gathered in this limited review should be expanded and turned into a set of
guidance documents and extended functionality milestones agreed with all stakeholders.
This should use an Agile rather than Waterfall methodology given the fast-changing
landscape of technology, threats and user requirements in this area.
3. The relationship between the provision of central email and of related services, including calendar management, contact and address management, mailing lists and collaboration tools, and task and to-do list management.

3.1. There are several parallel but related University-wide projects looking at collaborative groupware, calendaring, address look up, ad-hoc video conferencing, room booking systems and so on, all of which would benefit from the examination of integration points to give a consistent and useful user experience.

3.2. The Office 365 suite can cover all of these service areas and most other specialist 3rd party products integrate with O365 given its ubiquity. These can be run via native or web clients.

3.3. Likewise, G Suite offers an alternate integrated suite which is Chrome browser based.

3.4. O365 and G Suite use standard calendar formats so can interact successfully with each other.

3.5. Hermes is a standalone email service and has not evolved to integrate with these services and functions.

4. How to support people arriving at and leaving Cambridge to continue to use archives of emails.

4.1. The current operational requirement is for anyone with an @cam.ac.uk email address to have an active ongoing role in the collegiate University. It is recommended that this should continue, with any historical exceptions being subject to a transitioning process to move those users’ content to personal email accounts of their creation. Within legal and contractual constraints, there should be a standardised process to allow for the export of approved archives to an email system of the user’s choice when leaving a University role (and thereby also giving up an @cam.ac.uk email address).

4.2. The policies and procedures in this area should make clear that tools and services signed up to with an @cam.ac.uk email account are those paid for or run by the University and therefore are not transferable to personal non-University use. Individuals should use personal email accounts to sign up for tools and services that they intend to use outside of their University activities, and also which they intend to continue using when they no longer have an @cam.ac.uk email account.

5. Opportunities and risks afforded by, and good practice in, providing local email solutions.

5.1. Local email solutions, while offering flexibility and opportunities for tailoring, are comparatively expensive to maintain and administer in terms of additional staff resources. Consequently, they often fall behind in maintenance which can lead to vulnerabilities not being patched promptly when compared to enterprise-level cloud systems.

5.2. Modern cloud systems continuously patch and update functionality and security on a 24x7 basis normally with zero downtime and with little or no overhead for University IT teams.

5.3. Modern cloud-based email systems have sophisticated spam filtering which is continuously updated and also smart anomalous behaviour detection. They also use
and/or can support a rich variety of multi-factor authentication methods. All of these make them highly secure as standard with no additional overhead on University staff.

6. How the University can effectively discharge its regulatory, statutory and contractual obligations in relation to provision of email services including with regard to the personal use of email facilities by students and staff.

6.1. Going forward there should be a clearly stated usage policy statement setting out how @cam.ac.uk email addresses should be used (or not used) in regard to University and private business, covering issues such as legal ownership, acceptable use, user confidentiality, institutional access and so on. This statement should be referred to in employment contracts (or equivalently universal documentation) and could be reinforced by the mandatory acceptance of the statement when subscribing or registering for University email services.

6.2. Current practice allows the arbitrary forwarding of @cam.ac.uk email to any internal or external mail service whilst the individual has an active University role. While it might seem inadvisable that email of a potentially confidential or sensitive nature, covering numerous types of University business, should reside outside the central University email system, in practice this is very difficult to control as all non-web clients download locally. Where particular confidentiality is required there could be a forwarding restriction enacted on specific accounts. There may also be a case for some form of encrypted solutions or policy-based Digital Rights Management (DRM). Office 365 has a built in DRM feature to dynamically protect and track sensitive documents. This works natively across Windows, MacOS, iOS and Android though not Linux, where the web client would have to be used.
APPENDIX 1. OBSERVATIONS ON THEMES ARISING FROM SUBMISSIONS TO THE REVIEW

1. There are many policies and sub-policies covering the use of email accounts that are documented in many different places across the University. Cambridge is more complex than most universities in this regard.

   - Most submissions stated that there should be a much clearer statement of policies for the use of centrally provided @cam.ac.uk email versus personal email accounts. While this separation of professional and personal email via multiple accounts accessed by a common client is widely accepted in the commercial world, historically in the University there are those who have relied and still rely on their @cam.ac.uk as their sole email account.

   - Many submitters stated that their users simply automatically forward all @cam.ac.uk email to their internal (Hermes) or a personal email external provider. Forwarding externally might compromise confidential or otherwise sensitive information so policies must be clear on what is acceptable from a data exfiltration perspective.

   - The standards of governance required by organisations today require that, given the correct legal controls, email must be searchable by organisations to support civil and criminal investigations. Therefore individuals who choose to use their centrally-provided email for personal use must be aware of the potential limitations of the privacy afforded to their correspondence.

2. The Hermes system is based on the Carnegie-Mellon(CMU) University developed Cyrus system (https://en.wikipedia.org/wiki/Cyrus_IMAP_server). CMU have retired Cyrus and replaced it by ExOl for staff and Gmail for students. Cyrus is now an Open Source project (cyrusimap.org) supported on a volunteer best effort basis. The major support comes from FastMail, a commercial organisation which uses the codebase for their own separate cloud-based, paid-for offering.

   - The current implementation of Hermes does NOT support shared mailboxes. Currently, shared email addresses and passwords are in common use amongst some staff. This is insecure and not a recommended practice.

   - Hermes/Cyrus has very limited University support staff and resources and only supplies 2GB mail quotas, which are too small for most users. There was a mixture of diametrically opposite views expressed on whether to either invest in or deprecate the Hermes system.

   - Existing Hermes users are concerned that, if forced to switch to another system, there could be a loss of functionality (especially IMAP compatibility) and additional overheads on users and IT support staff.

   - Hermes still runs a very large number of email accounts although all new students (since the 2018 academic year) now start with ExOl as the default. There are currently around 26,500 active accounts (i.e. at least one login each week) on Hermes as of 20/5/19, compared to around 33,500 at the same time last year. ExOl itself has circa 32,000 University accounts.
• The existing 2GB default mail quota in Hermes was stated as inadequate by most. ExOl has 50GB as a default. Some felt this could be addressed by investing in new Hermes hardware. Others, including those who were very technically proficient with Hermes, made the case that the investment required to make it totally resilient would take considerable resources and time over and above merely purchasing additional disk space. In addition, some clients in use may have issues with large local mailboxes of 50GB.

• Hermes hosts email for some retired staff (currently approximately 1067 accounts) and possibly other affiliated people who would not qualify for accounts on Exchange Online. A decision will need to be made on whether to continue support for these users by migrating them to ExOl, or asking them to migrate to their own email provider.

3. The ExOl system was introduced as part of introducing the Office 365 suite. ExOl licensing comes as part of the integrated suite of standard Office 365 products (Word, Excel, PowerPoint, etc.) that are an accepted standard in both commercial and academic organisational environments. While there is minimal incremental cost for ExOl as part of Office 365, there are additional costs for enterprise-level support and additional enterprise features (e.g. Advanced Threat Protection) that the ERT would recommend that UIS should take up. Originally ExOl was rolled out into UIS in 2017, with other institutions and departments opting in voluntarily.

• A number of submissions queried the fact that the rollout was not run as a fully-fledged project with transparent user, departmental and University requirement-gathering and subsequent refining of said requirements to select and implement a target system.

• As of the 2018/19 academic year all new students have been auto-enrolled onto ExOl unless specifically opting out.

• There were comments on whether this was really ‘free’ and what would happen if licensing costs were arbitrarily increased by Microsoft if there were no alternatives.

• The major objections from submitters were around non-compliance to standards and interoperability. These were:

  3.1. IMAP compatibilities.

  3.2. ExOl does not preserve structure and formatting of messages PGP issue.

  3.3. ExOl has fixed transmission rates which need special handling and scripting.

• It was noted that the University’s instance of ExOl, at the level of licensing it had at the time of this report, does not use the Advanced Threat Protection option to reduce Spam and Phishing mail. Most major enterprises subscribe to this additional functionality.

• Some respondents claimed worse reliability with ExOl than that stated on the officially-generated UIS live status webpage. They reported that they had experienced problems even when the real-time status was showing green. It is not possible for the ERT to verify this historically in detail. However UIS has stated that there were a number of University-specific issues in 2018 and early 2019 that have now been resolved. Nonetheless, there have been well-reported occasional large-scale outages of ExOl which have affected operations, normally over a few hours.

• Currently, there are 32,919 active mailboxes on ExOl. The volume of ExOl users does not appear to be widely known, especially amongst committed Hermes users. (These include Alumni mailboxes.)

• ExOl is stated in submissions as not being under an official Microsoft support SLA agreement at the time of writing. Although incurring an additional cost per annum,
having proper support seems appropriate for the scale of usage at Cambridge and this should be reviewed by UIS.

4. G Suite / Gmail.
   - UIS has licensed and enabled all owners of @cam.ac.uk email accounts to use Google G Suite if they so wish but without Gmail at this time. This includes mostly equivalent functionality to Office 365 but is all delivered via the Chrome browser and therefore suitable for all systems including Windows, MacOS, Linux and Chromebooks. In theory it would be easy to enable Gmail as another option alongside ExO! although there are some key technical considerations regarding SPF that need to be considered. Although there was much feedback in many submissions from Linux users as to the unsuitability of web-based email, there is no doubt that Gmail interface is the most popular web-based email user interface in the world. Furthermore, if there is a preference for local native clients with local email storage for offline working, then the current native clients in use such as Alpine and Thunderbird work well with Gmail. However the need to implement 2FA as a matter of urgency means that using the Outlook web client may be required as a stop gap.
   - In contrast to free personal Gmail accounts, with paid-for G Suite Gmail accounts, Google states that no email scanning (for targeted adverts) is undertaken and that they are compliant with appropriate data protection standards.
   - G Suite is available in Basic, Business and Enterprise Editions, with the latter having the best security and policy controls.

5. In some submissions, mention was made of a Student-Run Computing Facility Hades email system. This is a volunteer student society-run system. It is not supported by the University in any way. Some respondents stated they would move or have moved to this in anticipation of Hermes being retired. This system, like Hermes, has severely restricted quotas. The ERT feels this is not a credible alternative to support any official @cam.ac.uk email services and would advise against anyone moving to this unless for purely personal use. As per the remit this is not considered further.

6. There was concern that being tied to a cloud-based US email provider could lead to a number of issues such as:
   - Vendor lock-in (if the sole provider). The ERT believes that providing a choice of supplier with G Suite Gmail would ease this issue.
   - The potentially unrestricted access given to US-based law enforcement and security agencies. The ERT is not qualified to comment on what access US or other overseas security agencies might undertake but notes the comparably wide-ranging UK laws for account access for specified law enforcement and security purposes.
   - Emails and attachments being held outside the UK (though UIS has stated that Cambridge ExO! data is held in Dublin or London based servers. The University’s ExO! contract is held with Microsoft UK Ltd).
   - Restricting access to users who had visited countries subject to US restrictions or sanctions. An example was given of Slack removing access to users who had visited
such countries and who had used the application there. Given that the University’s contracts are all with Microsoft UK this is thought unlikely.

- An actual external security attack vector on ExOl was quoted where there was a compromised corporate support account. While there always is the possibility of a compromised support account, whether on an internal or external email system, the attack surface is clearly larger in a global cloud-based system. Set against that is the fact that systems such as ExOl have more investment in real time and AI-based security monitoring systems which quickly flag or block anomalous behaviours (e.g. ‘impossible travel’ login alerts or blocking).

7. There was clear need stated in many submissions for flexible mail routing and management of .cam.ac.uk domains and sub domains. Mail from an @cam.ac.uk address is deemed “official” by most recipients and any compromises in terms of spam mails sent from these addresses would affect the University and/or its departments reputationally. PPSW, a SMTP smart host, currently handles this task for most of the 99 different email domains under @cam.ac.uk. ExOl also runs in parallel and is responsible for the routing of a few sub domains. The PPSwitch system is currently run through Hermes. PPSwitch is based on Exim which is opensource and has only volunteer, best-effort support. PPSwitch has been stated to have more flexible rate sending limitations than ExOl which help to prevent outbreaks of spam from malware-affected machines. The current PPSwitch system appears to work well and gives the University additional local control compared to an external cloud system. It is not clear to the ERT whether a better job can be performed purely with ExOl. However more detailed and technical investigation needs to be undertaken to ascertain how it could evolve or be replaced going forward.

8. There were clearly and repeatedly stated needs for a sophisticated mail list manager. Currently, the University uses Mailman for 13160 mailing lists of which half have been active within the last 18 months. It appears that ExOl can only provide basic facilities compared to the current Mailman system. However, the ERT also note that Mailman is deemed by its support staff to be end-of-life and in need of replacing. However, this could be with another package such as Sympa (used by Oxford University amongst others) rather than ExOl given the latter’s limitations with:

- Message moderation
- Automated management of subscriptions and bounces
- External subscribers to mailing lists
- Mailing list archives

This needs further research and follow up by UIS to determine a course of action.

9. Continued native client (as opposed to a pure web interface) support for Linux users was requested.

- There appear to be numbers of Linux users who want to continue to use their native mail clients e.g. Thunderbird. While there have been some initial issues (that UIS in the main have solved) this client works with ExOl using either POP3 or IMAP4 via the ExQuilla plugin. UIS publishes instructions for this on their email help page.
Some users use the Linux Alpine client. It is possible to use ExOl with these old clients but UIS only gives setup help for Thunderbird/Exquilla and Evolution clients.

The Outlook web client is very close to a native client now in terms of performance and user experience so the ERT would recommend users try the latest versions.

However, given the University CISO’s recommendation to move to 2FA, the use of the Outlook web client will provide an easy way to implement this until UIS have assessed whether and when they will be able to integrate 2FA into any of the native Linux clients.

10. Good support for mobile users was requested in some submissions. Curiously, this was not raised by many respondents but it is clear that accessing email through a smartphone is an accelerating and indeed default trend for many users. Clearly webmail provides a base level of access but generally lacks the off network storage and browsing capability of a native iOS or Android App. ExOl can be used with both the native iOS and Android mail apps as well as with the specific Microsoft App so gives flexibility. The impending new Microsoft Office Mobile App will further extend functionality of O365 onto mobile devices.

11. Need to support role based email without shared passwords:

- There were many submissions emphasising the need for role-based mailboxes, especially when dealing with departmental functions or research data.

- The most secure way to handle this is to use individual logins that then have shared access to a role-based mailbox in addition to the user’s normal personal mailbox. Currently Hermes does not support this while ExOl does.

- Some respondents want to or already do use role-based email addresses with shared passwords but that is insecure and a security risk which the ERT views as bad practice. This should not be allowed and phased out rapidly from a policy/security/governance point of view.
APPENDIX 2. COMPARISON WITH OTHER UNIVERSITIES

It was observed that many other major universities in the UK have already moved fully to an ExOl based email system. An incomplete but representative set is: Oxford, Warwick, Leeds, Imperial, Reading, Glasgow, Bristol, Edinburgh, Nottingham, Exeter, Aberdeen, Strathclyde. A deeper dive to investigate the process of transitioning to ExOl and assessment of the current performance was undertaken with Oxford University’s IT department since its distributed and collegiate structure is similar to that of Cambridge. The main findings were that:

- Oxford started its move in 2016 and spoke extensively to Imperial College who had successfully transitioned to ExOl before them.
- The current status is that most groups in Oxford have given up internal email servers and use ExOl without issue.
- Oxford do maintain an additional smtp mail router to cope with those few groups who still maintain an internal mail server.
- Most day-to-day mail issues are focused on maintaining the few outlier groups with their own mail servers.
- Oxford also run a mail list server, Sympa, over and above ExOl as the demands of a large University requires the sophisticated management of many thousands of lists with modern mail list management capabilities.
# APPENDIX 3. LIST OF DEPARTMENTAL AND INDIVIDUAL SUBMISSIONS

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APPENDIX 4. REFERENCES


