EMAIL SYSTEM

ADMINISTRATOR MANUAL FOR EMAIL-NG

Postfix, Dovecot, Amavisd, Spamassassin, ClamAV, openLDAP

THIS MANUAL IS STILL IN DEVELOPMENT

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Revision History

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	• Clean up and corrections throughout. Correction of figures.
0.9.1	
	– Virtual domains
0.9	
	– Redefined how aliases for CS) are resolved. Obsoleted previous script based methods for LDAP based methods
	– Redefined the way mailing lists are created and managed to take Mailman into consideration. Obsoleted script based methods for LDAP.
	– CentOS 7 considerations in several places
	– numerous corrections and clarifications
0.8	– Mailman and Webmail description. Many other description enhancements.
0.7	– EmailNG officially launched with mail.cs.ucy.ac.cy moved to theano 18/06/2014
0.6	– New generation set-up with relay, virtual hosts etc. started
0.5	– Greatly expanded and restructured
0.4	– Dual server appendix start, added more material to almost every section
0.3	– General system description,
0.2	– Minimal explanation of the basic concepts
0.1	– Started from the user manual

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Preface

THIS MANUAL CONTAINS ESSENTIAL INFORMATION FOR ADMINISTRATORS TO GUIDE IN THE INSTALLATION, OPERATION AND TROUBLESHOOTING OF THE MAIL SYSTEM AT THE DEPARTMENT OF COMPUTER SCIENCE.

THIS IS NOT A COMPLETE MANUAL OF EITHER MAIL SYSTEMS OR THE SOFTWARE USED. SEE THE BIBLIOGRAPHY FOR LINKS ON MORE INFORMATION ABOUT THE SYSTEMS AND SOFTWARE USED.

How to use

- Each section contains a listing of the configuration files that are relevant to that sections
- in each configuration file defaults prevail unless necessary changes are made
- custom configuration changes in configuration files always start with five or more hashes (##### or ###################). It is also possible that a whole section starts with multiple hashes. Sections usually also end with multiple hashes.

Introduction

Email systems in the academic computing environment are unique. For one they are in a constant state of flux. Students come and go at a relatively steady rate all year round (with peaks around semester starts). These users are not all at the same level of expertise.

This manual shows how primarily Postfix, Dovecot and a group of popular Open Source Software (OSS) can be used to set up a fast and secure mail system. It should be noted that this is a relatively complex system and there are countless ways to install such an environment. The description here concerns the Computer Science department mail system only.

The reader is expected to extract enough information from this document to understand in sufficient detail the set-up in order to be able to operate, troubleshoot and possibly customize it. The reader is expected to be at an advanced stage of Unix knowledge.

Postfix and Dovecot make up the the basic nucleus of software and Amavisd, Spamassassin, ClamAV, Sieve, the Horde/IMP web mail suite and the RoundCube Webmail application provide important facilities for a modern mail system:

The Target Environment

The target environment is a complicated multi-user environment. It is complicated because users are at various expertise levels, their primary location is not well defined, moving in and out of their primary location, often based in remote locations such as home offices and on trips in far away lands for many days. They are, sometimes, stranded in strange lands with nothing more than a slow Internet connection and mostly a browser to work with.

Users use their own favorite e-mail devices and clients (not just web mail) and use them in the strangest ways possible and on the strangest machines and OS combination available.

Welcome to the academic environment.

Objectives

The objectives of the e-mail infrastructure system are:

- Create an email environment with advanced capabilities fit to support a complex and mobile user environment geared towards the academic environment
- Robustness, fault tolerance and availability are crucial for an e-mail system. **Ability to respond to failures in less than a few hours and ability to service systems without loss of functionality.**
- Expand-ability: ability to add more servers or to split functionality among servers (mail delivery functionality, users' access, SPAM filtering, virus filtering etc)
- Security at every level (SMTP operations, users' access, internal communications will be encrypted)
- Speed is of great importance due to the present day large mailboxes generated by multimedia messages and the necessity for clients to query servers at very small and regular intervals.
- Particular attention is paid to robustness, availability and control. No email should be lost. Ability to track server actions as soon as remote clients or servers contact it.
- Support the email functions of regular and advanced users
- Support a diverse community of entry level students and expert faculty and staff
- Integrate with it virus and spam control measures
- Give the ability to the user to control some email functionality like SPAM control, filtering, password changes, vacation auto-replies, mail sorting using filters, email redirecting, folders etc
- Interface independence. Support a variety of clients in both POP and IMAP configurations. Support for the largest possible number of E-Mail clients including IMAP, POP and Web mail in their plain and secure versions (must be tested with Thunderbird, Outlook/Live, Pine, Horde/IMP, Roundcube).
- Low cost: Based on Commodity off-the shelf Hardware/Virtual Severs and 100% Open Source Software.
- Eliminate the use of custom scripts (like /Mail/common/Mail/scripts we used in the past) and replace them with native software (Postfix, Dovecot, Sieve, LDAP) operations.
- Vendor independence. OSS provide the ability to be free from custom applications. No lock-in with any vendor.

General System Description

The general hardware setup of the previous mail system is presented in figure 1. This system made use of storage in external and internal devices mostly via simple network file system (NFS) mounts. It consisted of Postfix, Dovecot, MailScanner, ClamAV and Spamassassin software. It also made use of external SPAM databases.

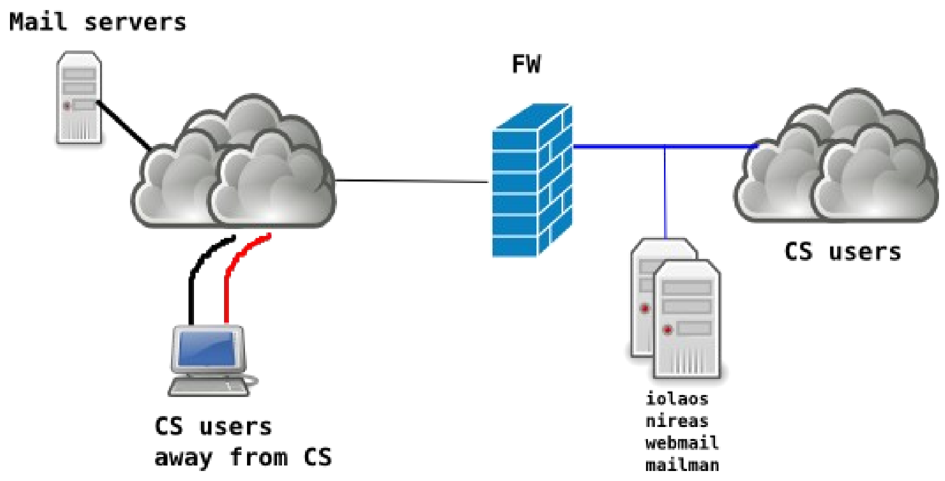


Fig. 1: The previous email system

The new generation email system “hardware” set up is presented in Fig. 2. A functional presentation of the same system is shown in Fig. 3. The server machines shown are fully virtualized hosts operating from two different virtual/hardware hosts.

The system design is based on a split front-end, back-end design. In this design there are front-end relay/proxy/filter servers and back-end mail storage management servers. All servers and services are active at all times.

The server group is based on the <u>dual server system</u> approach (total of four servers) with every function found in two places. Both system couples are active at the same time. The objective is to create a dual-server system where failure or scheduled unavailability of any of the servers will not affect the operation of the entire system.

The major characteristics of the system is its enormous flexibility, its attention to security and fault tolerance.

Figure 3 presents the system from an email protocol functionality perspective. It shows how each protocol traffic (SMTP, IMAP etc) are routed through the email network to reach its destination.

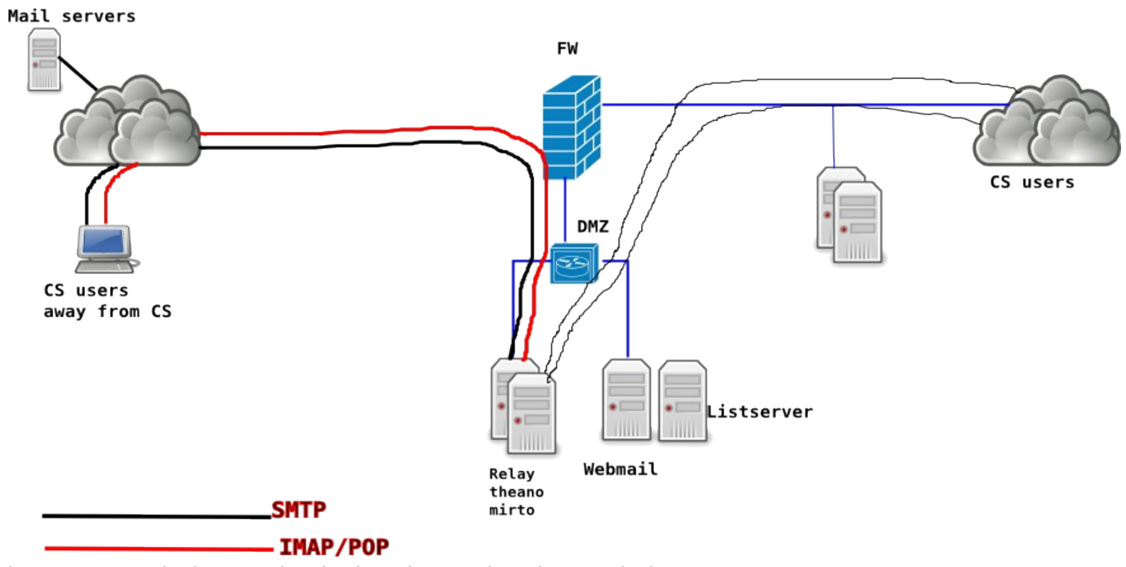


Fig. 2: General View – Physical and Functional Description

The Email system software employs the previous strategy of being interface independent. This means that it is client agnostic and client independent. The choice of interface is left to the user. The system just provides the necessary interfaces for the user to make use of it. The only interface provided is the web mail applications which are installed on independent servers. This is just a matter of user convenience than a system choice. Other web interfaces can be used.

Fig. 3 show the functional view of the system. Two distinct perspectives are shown on how the system works: user and server clients. The user perspective shows what happens when an email is sent or retrieved by a user including the web mail application. The server perspective shows how the system works when a message is received or sent by the server components. For both views hardware and software involved are shown including the processes and the message storage systems are accessed.

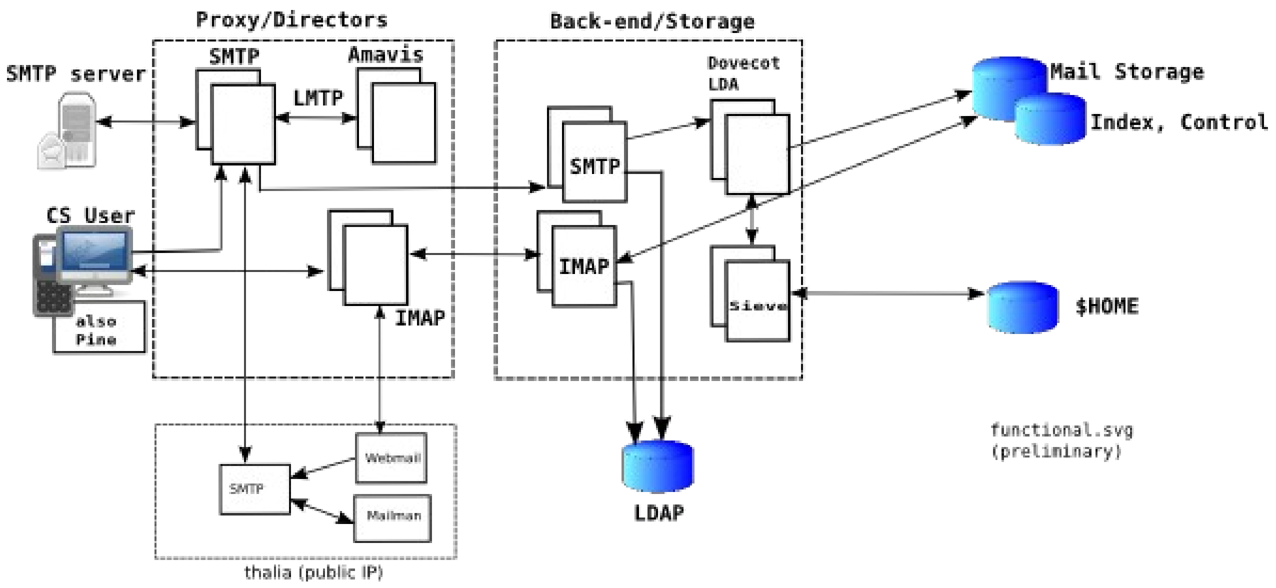


Fig. 3: Functional set-up

Server Groups Arrangement

The system is split into two groups of services/servers: the front end servers and the back end servers.

Table 1: Server groups general configuration

	Functionality	**Server name**	**VHOST**	**Notes**
1	SMTP relay #1 Dovecot front end director #1	theano	iraklis	194.42.17.130 (DMZ#2)
2	SMTP relay #2 Dovecot front end director #2	elysso	danae	194.42.17.141 (DMZ#2)
3	SMTP back end #1 Dovecot back end #1	gorgo	iraklis	10.16.1.113
4	SMTP back end #2 Dovecot back end #2	mirto	danae	10.16.1.114
5	WebMail Mailing List-server (Dovecot and SMTP client)	thalia	danae	194.42.17.136 (DMZ#2) (postfix 2.6.6)

Server functionality

	Theano Relay, proxy #1	**Elysso Relay, proxy #2**	**Gorgo Back end #1**	**Mirto Back end #2**	**Thalia Webmail Mailman**
SMTPD (receive) (Postfix MX - port 25)	√	√			√ (from relays only)
SMTPD (receive submission) (Postfix - port 587)	√	√			
SMTPD user verification *reject_unverified_recipient*	√	√			
SMTP Relay (send) (front end - LMTP)	√	√			√ (SMTP to relays only)
IMAP front end (Dovecot director/proxy) – port 143 Managesieve proxy – port 4190	√	√			
SMTP Back end Receiver (LMTP) Sieve (Global Sieve) (Users Sieve) using Dovecot LDA			√	√	
SMTP out going (postfix)	√	√			
IMAP back end Dovecot - LDA - dsync - Managesieve back end – port 4190			√	√	
AmavisD - SPAM (spamassassin) - virus (clamav) - DNSBL	√	√			
WebMail client					√ IMAP to mail.cs
Mailing List Manager (mailman) client					√

Table 2: Server services summary

Operating System Software Setup

The OS described here is the RedHat/CentOS line of distributions. The instructions in this guide are based largely on the CentOS 6 system. The Linux Installation guide (CS-wiki) is followed for initial OS setup.

The email system assumes that there is a working Linux system available with a proper connection to the network (via the individual virtual hosts) and proper access to Internet. Each virtual machine is placed in its proper network as indicated in Figure 3 and detailed in Table 1.

Of particular importance for any email server are the following:

- Proper network access provided to the server especially if behind a firewall. See the Security section for the required TCP/UDP ports that need to be open on the firewall and their functionality for proper communication between servers.
- The server has a proper DNS entry both forward (A record) and reverse (PTR record) especially for outward facing systems
- Debug utilities (dig, nslookup, telnet etc) are available

General OS Setup and Software

Prerequisites

It is assumed that the latest upgrades on the CentOS being used is available. This guide was originally created with CentOS 6 as reference. CentOS 7 is being considered in several places with the proposed changes. Follow the wiki instructions for setting it up. Below are specific software that need to be addressed:

Setup on All Servers

- The general set-up is based on the CentOS minimal install. Follow the instructions in https://wiki.cs.ucy.ac.cy/index.php/OTY_Internal:Linux_Installation_from_MinimalInstall and https://wiki.cs.ucy.ac.cy/index.php/OTY_Internal:Linux_Installation in order to install and setup the software.
- File systems should be changed to
  - /var – 10GB
  - /sys-data – 10GB
- **General Software to install and configure on all systems:**
  - parted
  - yum repositories set-up
    - *Note: need to check this every time a yum upgrade is done and remove/move CentOS-Base.repo.*
  - proper sssd configuration (only on back-end servers). Front end relays should nto have access to the user database (LDAP)
  - tcsh with link from /usr/bin/tcsh to /bin/tcsh
  - development software to compile software (postfix, dovecot etc)
    - gcc, make
  - ntp
    - See Administration/NTP for setup
  - cronie

    NOTE: PROBLEM: cronie requires sendmail, procmail, hesiod (!!!) make sure you disable sendmail when you install postfix. See the POSTFIX install below.
  - sysstat, tcpdump, traceroute, bind-utils – software for troubleshooting
  - wget, vim, man, rsync
  - logwatch
  - syslog (rsyslog) initial setup
    - syslog shuld be enabled at this realy stage to get messages that help in debugging. See the Administration section for more elaborate configuration.
  - logrotate
    - See Administration/Logging for setup

- openssh-clients
- fail2ban, jwhois (do restorecon /sbin/iptables* to fix an selinux problem)
  - See Administration/fail2ban for setup
- nsswitch configurations
  - aliases: files
  - automount: files
  - comment out publickey setting
- ~~crypto-utils (if generating keys locally) (??? - openssl is better and does not require additional packages)~~
- openldap-clients (ldapsearch) for debugging purposes (only on back-ends)
- Arrange for OS back ups (see also administration)
- create a local user <x>system as described in Linux installation.
  - useradd --home /home/<x>system <x>system
  - *Note that further user authentication is required on back-ends for proper operation. Sssd should be properly set up. See Authentication, Names, Aliases, Groups, Lists.*
- change ulimit max file descriptors for processes to increase the number of files. In /etc/security/limits.conf
  - `soft nofile 2048`
  - `hard nofile 8192`
  - `To TEST:`
    - `Logout/Login`
    - `ulimit -Sn`
    - `ulimit -Hn`
- Debugging and testing software
  - telnet
  - bind-utils (dig etc)

Logging

Producing proper logs is of critical importance in setting up a complex system. Logs will discover mundane errors like mistyping and save your day. Enable logging at this early stage. See the Administration chapter fro details on how to set up logging.

Make sure that you have enabled the syslog (rsyslog service) facilities since it is being used extensively. Make sure that logrotate package is installed and optionally logwatch is installed.

Pay particular attention to the logging configuration for each application installed since each one has different configuration parameters. In the initial phases of the installation enable debug logging to produce maximum information. This can be disabled when operations are satisfactorily stable.

OS Security

As soon as the OS is working enable security for the OS. This is particularly important for outward facing systems exposed to all k inds of threats. Visit Server OS security. Do not overlook or postpone this.

DNS Configuration

DNS plays a crucial role in mail systems. Without proper naming the email system will not work properly.

By its nature mail servers make extensive use of the DNS services.
[Consider a DNS caching server on each mail server]

A records

- theano
- elysso
- mail.cs.ucy.ac.cy 194.42.16.130 (theano) [eventually this will resolve to two]
- mail1.cs.ucy.ac.cy 194.42.16.130
- mail2.cs.ucy.ac.cy 194.42.16.141 (mirto)
- mail3.cs.ucy.ac.cy 194.42.16.130
  194.42.16.141
    - *this is for testing purposes only – users should not make use of it*
- gorgo.in
- mirto.in
    - *these are only used internally – no user usage*

PTR records

A must for outgoing servers per RFC

MX records

MX records tell SMTP delivery agents which machines receive mail for our domain.

- Load balance MX records by giving the same weight
    - @ IN MX 100 mail1.cs.ucy.ac.cy.
    - @ IN MX 100 mail2.cs.ucy.ac.cy.

SPF records

SPF records tell the message receiving systems which servers are authorized to send messages for the sending domain. TXT records were also used in older style verification procedures.

```
1. Add the following SPF records to the cs.ucy.ac.cy domain

@          IN         TXT        "v=spf1 mx ip4:194.42.17.130 -all"
@          IN         SPF        "v=spf1 mx ip4:194.42.17.130 -all"

2. In every other domain we are authorized (hosting) for ex. in.cs.ucy.ac.cy

@          IN         TXT        "v=spf1 -all"
@          IN         SPF        "v=spf1 -all"
```

`which says that no email should originate from them.`

TLS/SSL certificates

TLS/SSL certificates are used by both Postfix and Dovecot to enable the TLS/SSL software to encrypt sessions. Encryption is used throughout the communications sessions. It provides security for both the user and the transfer of data especially when there is a need to transfer user names and passwords over the network.

The same certificates are used by Postfix and Dovecot.
All certificates/keys are placed in /etc/pki/tls/{certs, private} respectively. Related files are kept under /root/certs.

Also under /root/certs or /root/mail-certs we keep the original certificates for reference. Key are kept as above for protection.

Certificates and keys are created and signed by the Terena CA via the Cynet procedures.

See the Setting up Postfix and Setting up Dovecot sections on how to install them for each one.

Mail Services Description

Generally speaking, the hardware plays only a minor role in the management of the email infrastructure. Unless we are trying to set up an extremely high volume mail system, there is no need for exotic and ultra fast hardware. Of course, the faster the systems employed the better. Often memory availability plays a much more crucial role than the the CPU speed. Also, email systems are I/O intensive and therefore good storage subsystems help greatly. Having said that, it is obvious that inadequate hardware systems for the job will suffer under load and produce unacceptable delays.

The software employed in the email infrastructure is characterized by spawning multiple processes to achieve their tasks. Examples of these are Postfix, Dovecot, Amavisd, ClamAV, Spamassassin. Especially during high loads the system should be capable to spawn thousands of processes and service them in an efficient manner. Therefore memory and I/O are quite important.

Types of Mail Servers

There are two types of servers. They are characterized by their location but also by their functionality. Front end systems are exposed to the outside network while back end systems are internal to the network.

Front end systems

SMTP

SMTP relays

IMAP proxies

Message Filters (SPAM, Virus etc)

Back end systems

SMTP storage servers

IMAP storage servers

Client systems

Webmail, Mailman

Functionality Summary Set up

For our set up we use four virtual machines for mail services and an additional host for the Webmail and Mailman applications which also functions as an active mail server. See Table 1 and Appendix E.

Server Functionality

This is a comprehensive high level detail record of how each system is set-up.

	Function	**TCPIP port**	**Front-end (theano, elysso)**	**Back-end (gorgo, mirto)**	**Webmail, MMailman**	**Comment**
1	SMTP/Server	25	√			
2	SMTP/Submission	587	√			
3	SMTP:Over quota check		√			
4	IMAP	143				
5	SASL auth: 10001			√		
6	Amavisd	10024	√			
7	12340					
8	12341					
9	12342					
10	12343					
11	12344					
12	12345					

Table 3: Server Function Listing

SMTP Relay (front end) theano, elysso:

- sit in the DMZ
- receive mail on port 25 (MX) from other SMTPs
- receives mail on port 587 (submissions) from OUR users
- Email Security
  - before queue filtering
    - reject mail from unknown (no reverse IP) hosts
    - reject mail destined to unknown local users (*verify*)
  - after queue filtering
    - SPAM and VIRUS detection
  - Blacklisting, Greylisting, rate limiting
  - Postfix PolicyD
  -
- Check for local user over quota and reject receipt
- (If everything is OK) Relay to destination back end SMTP servers for delivery

Internal SMTP (back end) gorgo, mirto:

- receives incoming messages from SMTP relays (theano, elysso)
- answers user verification requests from front end SMTPs

- uses Dovecot-LDA to deliver local messages to the message store
    - Dovecot-LDA uses Sieve to implement server filtering
    - Dovecot-LDA indexes messages at delivery
- stores and manages messages in the message store(s)
- synchronize message store to alternative location (dsync) **(pending)**
- uses the SMTP front end as a smart host relay (when needed) to send messages to external destinations (for example in case of failure to deliver messages ie message storage problems)

IMAP Director (front end) theano, elysso:

- sits in the DMZ as a widely accessible system
- IMAP proxy
    - receives IMAP connection requests from inside or outside
    - proxies IMAP (forwards) requests to the inside IMAP back-end servers
        - implements IMAP load balancing (Dovecot Director)
- Managesieve proxy
    - receives Managesieve protocol connection requests (port 4190) from inside or outside
    - proxies (forwards) requests to the inside IMAP back-end servers

Internal IMAP (back end) gorgo, mirto:

- sits in the internal network
- services requests from the IMAP proxies
- manages the message store(s) for users
- manages the Managesieve protocol for user requests to set-up Sieve filters

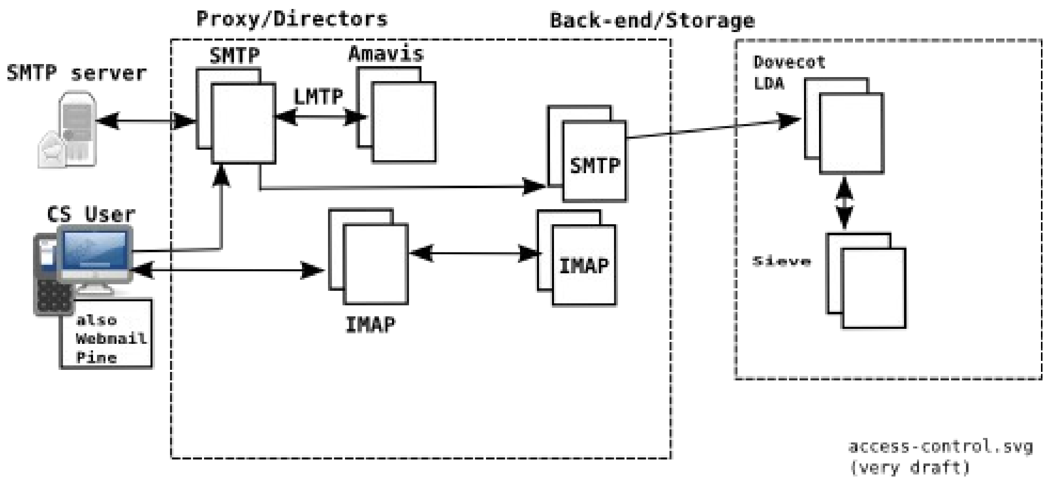
WebMail and Mailman list server

- receives message from the front end relays ONLY
- relays messages (SMTP client) to outgoing servers ONLY
- uses Mailman to manage mailing lists

Access Control Model

The access control model specifies the high level concepts of how the entire system allows access to its functions. It specifies how messages are either accepted for further processing and delivery or rejected. *This is very preliminary.*
Files/processes involved:

- *`my-networks Postfix parameter`*
- *`postfix/access`*
- *`postfix user verification (reject_unverified_recipient)`*
- *`postfix/overquota`*



*(*this needs revision – it is here as a placeholder)*

Authentication, Names, Aliases, Groups, Lists

Email delivery cannot exist without user names, which form (together with the domain) the final delivery address destination. User names have a dual role:

a) to authenticate the user and provide proper access to the system,
b) to form the final address which serves as the destination of messages.

General Description

Relay SMTP hosts (theano, elysso) need to have access either to the list of valid users or be able to verify the existence of all the names and aliases (for single or multiple users ie groups) we support. This is essential in order to reject incoming mail at a very early stage ie entry point such that messages will not need to be rejected at a later stage (on back-end machines) with a non-receipt reply producing back-scatter email. ***Any address not verified as local and not belonging to a different domain is rejected as an invalid user.***

Since theano, elysso are exposed to the outside world the decision has been made NOT to give them direct access to the list of names (LDAP) but to allow them to verify the existence of the names via the Posfix VERIFY facility. Front end systems do not care about resolving the aliases just the fact that it is a valid name for CS. Our user name DB and the preparation of aliases/groups are internal (LDAP). There are two ways to allow access from relay systems:

- the legacy way: the names and aliases are prepared on internal systems (nireas) and forwarded via a system of cron scripts so that we do not expose our LDAP DB. *This system is not described in any detail since it is being phased out*
- *a new verification system: names and aliases are verified by the relay systems via the VERIFY Postfix facility essentially using the LDAP remotely and indirectly*

    -
      ```
      smtpd_recipient_restrictions =
          .....
          reject_unverified_recipient
          .....
      ```

These two systems will work simultaneously until the legacy system becomes obsolete. For now the legacy system takes precedence over the LDAP system but this will eventually change.

Back-end SMTP hosts have complete access to both the legacy lists and the LDAP DB and authentication services. Therefore they know where each alias points to ex. andreas.kasenides --> ank or cspg --> all pg students. This is possible through both the lists maintained manually or from the LDAP DB to which they have direct access. Back-end systems provide verification services to the relay servers as described above.

Authentication

Authentication and authorization gives users privileges that enable them to make use of the system in a controlled manner. It also allows administrative users to access the OS. *Note that authetication exists only on back-end systems. Front-end systems VERIFY existence of users or proxy authentication to back end systems.*

It is (currently) based on

- SSSD which is configured to make use of the central LDAP (these are the so called system users)
- Home directories are available for these users
- Setup on SMTP back-end and IMAP/POP back-end (gorgo, mirto)
    - Install sssd
        - configure
            - /etc/sssd/sssd.conf
            - /etc/pam.d/system-auth
            - /etc/pam.d/password-auth
    - LDAP Authentication system: make sure that authentication works before proceeding (see the Wiki pages)
        - our authentication (for now) is based on SSSD therefore a correct configuration of sssd/pam/ldap is a must (install sssd).
        - With this setup users are considered “system users” as far as Dovecot is concerned which means that there are home directories on the local scale (ie NFS mounts)
    - Mail Storage - Mount the mail storage area (/Mail)
    - $HOME storage – Mount the Home Directories storage (all)
    - Install keys/certificates. The certificates will be used by both Postfix (for TLS SMTP submission of SASL authentication) and Dovecot (for encrypted IMAP sessions). See the section below. (Do we use the same keyw for DKIM??)
    - Disable authconfig application to avoid destroying setup by accident
        - chmod -x /usr/sbin/authconfig (??)
    - test authentication
        - getent passwd <user>

It should be noted that the system does not make use of virtual users ie users that exist only for the purposes of email. All CS users are defined in the LDAP repository. Also all groups will eventually be defined in the LDAP repository.

Names and Aliases

Aliases are extensively used in mail systems. This is an easy way to receive messages on more humanly readable addresses ex. george.andreou@cs.ucy.ac.cy rather than gandre01@cs.ucy.ac.cy. Aliases have a on-to-one correspondence ie an alias points to one user name.

For the CS department, each user:

- has a default user name that is identical to his/her log in name (ex. gandre01). This cannot be changed and it corresponds to his/her log in name given by the University registration system. The user can receive messages at gandre01@cs.ucy.ac.cy.
- automatically gets an alias as defined at the central University systems ie andreou.george@cs.ucy.ac.cy. *Note that the user also has a corresponding alias andreou.george@ucy.ac.cy which can receive messages through the central email systems.*
- At the CS dept email system ONLY the user can have one additional alias with a minimum of 10 characters (this is done to ensure that here is no conflict with central system names) which is only valid on the CS local systems and is user defined provided it does not conflict with already existing aliases or user names. For example george.andreou@cs.ucy.ac.cy.

Aliases used to be in legacy text files but are now being transferred to LDAP repository as explained above.

Groups and Lists

For the the mail system, groups and mailing lists are almost identical since an alias (a different name) is established that is used to redirect messages to a group of people rather than a single person.

There are three ways to configure mailing groups/lists:

- the legacy way: this method used plain text files (/etc/aliases) and scripts to retrieve list memberships from our user DB (either system defined or from LDAP). This method is becoming obsolete. See below for a minimal description.
- LDAP based definitions. Groups/Lists are defined in LDAP and the Postfix server retrieves the definitions when needed.
- Mailman Lists. This method is described below.
- For our purposes there are system groups which are defined in the LDAP system and the corresponding information is obtained from there. Example csstaff.

The Legacy method

The following configuration exists on back-end machines which resolve the automatically generated groups for Postfix. This is the legacy configuration that is slowly being migrated to a more dynamic set-up with the LDAP repository as explained above.

The respective /etc/mailaliases/aliases files are generated on nireas by /etc/cron.daily/autoaliases and transferred.

```
############################################
### Temporary aliases and groups
### eventually these will migrate to a better
### set up like LDAP
### support: :include:/etc/groups-aliases/support
############################################
##helpdesk:       support
representatives: :include:/etc/mailaliases/representatives
```

```
  taassists: :include:/etc/mailaliases/taassists
  healthware: :include:/etc/mailaliases/lists/healthware
  labsupervisor: :include:/etc/mailaliases/lists/labsupervisor
  cyta-announce: :include:/etc/mailaliases/lists/cyta-announce
  freshmen: :include:/etc/mailaliases/aliases/freshmen
  sophomores: :include:/etc/mailaliases/aliases/sophomores
  juniors: :include:/etc/mailaliases/aliases/juniors
  seniors: :include:/etc/mailaliases/aliases/seniors
  undergrad: :include:/etc/mailaliases/aliases/undergrad
  cspg: :include:/etc/mailaliases/aliases/cspg
  raadmin: :include:/etc/mailaliases/aliases/raadmin
  csassist: :include:/etc/mailaliases/aliases/csassist
  csresearch: :include:/etc/mailaliases/aliases/csresearch
  csfaculty: :include:/etc/mailaliases/aliases/csfaculty
  csvisiting: :include:/etc/mailaliases/aliases/csvisiting
  csmsc: :include:/etc/mailaliases/aliases/csmsc
  csphd: :include:/etc/mailaliases/aliases/csphd
  csstaff: :include:/etc/mailaliases/aliases/csstaff
  support: :include:/etc/mailaliases/aliases/support
  cssupport: :include:/etc/mailaliases/aliases/support
  cstspecial: :include:/etc/mailaliases/aliases/cstspecial
  csall: :include:/etc/mailaliases/aliases/csall
  csstudents: :include:/etc/mailaliases/aliases/undergrad,:include:/etc/mailaliases/aliases/cspg
  cssecretaries: :include:/etc/mailaliases/lists/secretaries
  evoting: :include:/etc/mailaliases/lists/evoting
  egee-users: :include:/etc/mailaliases/lists/egee-users
  etaps10_satellite_events: :include:/etc/mailaliases/lists/etaps10_satellite_events
  graduates: :include:/etc/mailaliases/lists/graduates
  scrat-group: :include:/etc/mailaliases/lists/scrat-group
  smartp2p: :include:/etc/mailaliases/lists/smartp2p
  smartlib: :include:/etc/mailaliases/lists/smartlib
  socialelectricity: :include:/etc/mailaliases/lists/socialelectricity
  smartlab: :include:/etc/mailaliases/lists/smartlab
  personaweb: :include:/etc/mailaliases/lists/personaweb
  commonsense2013: :include:/etc/mailaliases/lists/commonsense2013
  reconlife: :include:/etc/mailaliases/lists/reconlife
```

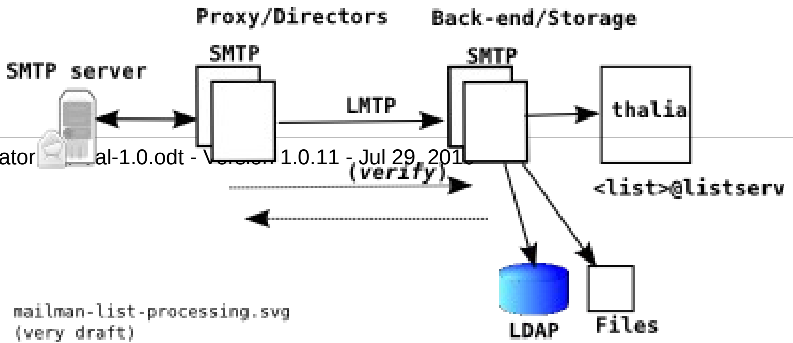
LDAP Groups

With the LDAP system lists are configured as groups in the repository and are given the ability to receive email (*mail* LDAP attribute). Manually configured LDAP lists are useful when the number of members for the list is rather small, for example less than 10, OR the list is set-up temporarily for testing purposes. These lists are defined similarly to virtual users in file CS-mailing-lists file.

Note: /etc/aliases is no longer used by the mail system to resolve user or group aliases. It is only used for system specific local aliases as define by the OS. For example mysql -> root ie the mysql user on each server is forwarded to the root user. /etc/aliases plays an important role in system monitoring. See the Linux Installation Guide.

Mailman Lists

- Mailing lists lists are genrally created using the methods of the Mailman software.
- The necessary aliases information for these lists, generated by Mailman, are placed in file CS-mailman-lists.
- List memberships are taken from LDAP groups *(uniqueMember)*. It is also possible to create entirely independent, from LDAP, lists. See Mailman in Wiki.
- List message forwarding and redirection is taken from LDAP *(mailForwardingAddress)*



NOTE: See the section in mailman mailing lists on how the mailing lists are created.

File used	**Purpose**	**Front end (theano, elysso)**	**Back-end (gorgo, mirto)**
/etc/aliases	used only for OS users, so it is static and does not need to change	√	√
/usr/local/etc/postfix/access	Universal access permissions/control	√	
UCY-virtual-alias	UCY aliases as forwarded to us from YPS – valid for both @ucy and @cs	√	
CS-virtual-alias	CS aliases as defined by CS – valid only for <alias>@cs.ucy.ac.cy	√	
CS-mailing-lists	CS custom mailing lists	√	**√ (?)**
CS-mailman-lists	CS mailing lists (mailman)	√	**√ (?)**
LDAP groups			
LDAP group of groups			

Table 4: Summary of user groups/lists and alias definition files

Temporary arrangements:

For legacy system:

- *aliases, groups and lists are prepared on nireas under /etc/postfix and are transferred to other servers via cron. See files /root/sendfiles, /root/sendmailaliases.*
- *Processing on the receivers is also done by cron. See crontab -l.*
- *This will be changed eventually when all names, groups, aliases, lists are cleaned up and the functionality is transferred to the LDAP repository.*

Note1: Some users/groups are already ONLY on LDAP (13/10/2014)

Note2: A root@in.cs.ucy.ac.cy -> root@cs.ucy.ac.cy is required to catch all servers @in sending messages since the real servers do not receive email on @in.

Protecting Internal Mail lists

(NOTE2: Policy on lists and groups. Who can send to which list (ex csall, eplxxx etc)?)

The preferred method of protecting mailing lists is by using the Mailman to define them. With Mailman a list can be configured such that only members of the list can send to it. Additional senders are also possible (ex. Administrative staff).

Internal mailing lists can also be protected from abuse by not allowing clients beyond our network to post to them. This is enforced in /usr/local/etc/postfix/access and based on the $my_network Postfix configuration setting. *This method prevents CS members from sending to the lists when away from the department.*

LDAP schema

Currently we use:

- /etc/aliases
  - on the incoming servers to resolve aliases
  - this file contains a variety of things including aliases, groups (lists of people actually) and lists (again a list of people)
  - which makes use of the legacy /etc/mailaliases directory
  - both of these are copied from /Mail/common
- /usr/local/etc/postfix/virtual-users
  - that contains a full list of users on cs.uc.ac.cy and ucy.ac.cyc as before
  - note that this also has the ability (and it does) to resolve aliases
- Mailman mailing lists which are handled by a different server

for creating aliases. Eventually this will migrate to LDAP in the following way.

LDAP Attributes used:

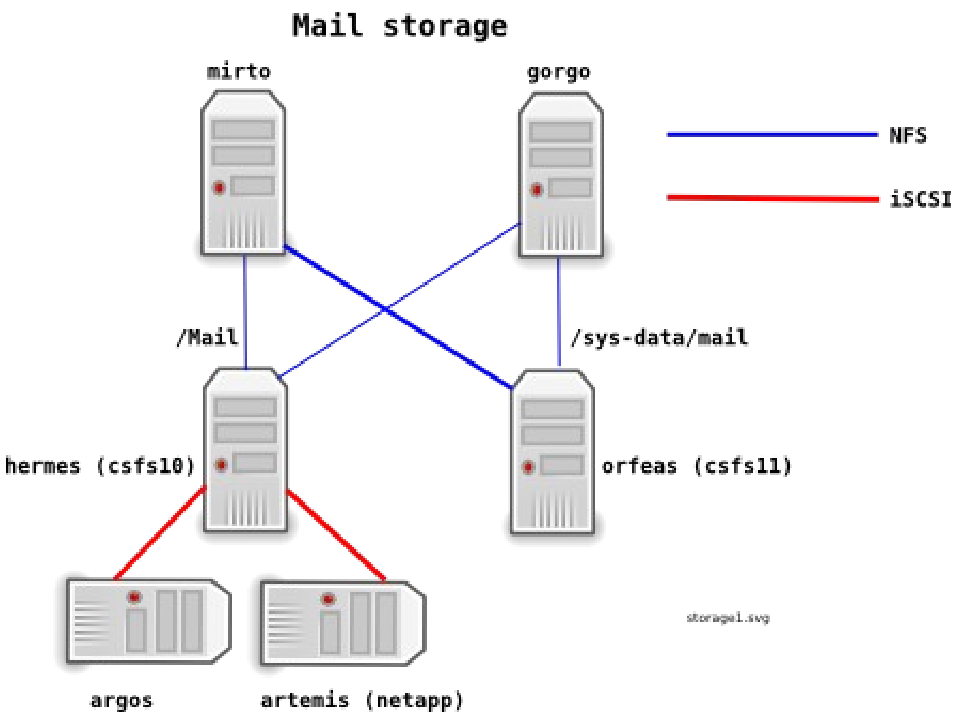
mail – <original user name>@cs.ucy.ac.cy
mailalternateaddress – <default alias>@cs.ucy.ac.cy
mailalternateaddress - <additional alias>@cs.ucy.ac.cy (user option)
mailforwardingaddress – forward of email
mailquota – quota of user
~~mailuserstatus – active or inactive~~

Mail Storage

This section describes all storage elements used by the mail system including those for auxiliary purposes like logging (/var/log) and backup. The eMail system uses a reliable, scale-able, consolidated storage based on iSCSI technology which is already in place.

- SMTP relays do not need any storage to function. Any storage required is obtained locally.
- Email back-ends (gorgo, mirto) mount the iSCSI storage elements using NFS exported by NFS servers. The following mounts are used:
  - /Mail - email message storage
  - /sys-data/mail - used by Dovecot for control and index files
- /Mail and /sys-data/mail must have correct ownership and permissions to function properly. Dovecot (LDA and Sieve) need to access them with individual user credentials to read and write.

- NFS must be operating correctly to provide the correct ownership. This largely depends on sssd to also be functioning correctly to retrieve user information.



** Future options to change to more involved network storage infrastructure (GFS or Gluster) is possible.

Quota with Dovecot LDA

Quota is implemented using the Dovecot LDA. See the Dovecot configuration for details on how to set it up.

- Currently file system based quota is used (called the fs backend in Dovecot)
- Files system quotas are based on the Unix quota implementation which sets the per user quota values outside the email system (see commands quotaon, quotarep etc on the storage server (NFS).
- In order for the Dovecot LDA to function RPC calls are made to the quota server. The quota server must be running the rcp.quotad system and allow proper access to it from the back-end mail servers.
-

Temp: -> overquota should be implimented on fron-end so that backscatteer is not produced, This requires maildir++ and th epolicy service.
-> temporarily this is done with the overquota file on both front-end and back-end: reason: aliases will pass through.

Migrating from maildir to mdbox

Replication

you need to specify

– Domain = cs.ucy.ac.cy in /etc/idmapd.conf

E-Mail Software Setup

A large number of software modules is required to implement a properly secure and robust email system. Most of these subsystems are optional. They are not necessary to have a working email system. They are however necessary if we are to build a system that will be secure, fault tolerant and user friendly. Each of these modules has a large number of configuration parameters that if combined together will produce an extremely large combination list. The system depicted in Figure 2 provides a basis for a concrete target system. The system in figure 2 will be presented below.
Details on what is needed and how to properly configure software modules to create the system in Fig. 2 are presented below. In order for a system to become operational is is necessary to install all its software.

The complete e-mail system is based on the following suite of applications and utilities software:

- Postfix MTA
- Dovecot
  - IMAP server
  - POP3 server
  - LMTP service
  - LDA service
  - Pigeonhole Sieve and Managesieve plug-in
- Amavisd-new
  - ClamAV
  - SpamAssassin
- SASL for submission
- OpenSSL (openssl software)
- TLS
- LDAP
- Webmail clients
  - Horde
  - Roundcube

Setting up Postfix

Postfix is compiled from sources for this set-up.

1. To compile and install Postfix. See Postfix – Compile and InstallPostfix – Compile and Install in Appendix A for install and configuration details.
2. Enable logging as soon as installation is successful on each server. Watch your logs for problems. See the Administration section.

The SMTP servers are divided into two groups: front-end (relay), back-end (storage).

Front-End Relay (theano, elysso)
Front-end (or Relay) SMTP servers are outward facing. They receive AND send messages to the bad Internet. They are the entry point of all incoming messages and the exit point of all outgoing messages. They also are the first line of defense of the mail system against any problems or malicious activity.

Functions:

- receive mail from outside CS and relay it to the back-end servers for final delivery and storage for CS users
- receive mail from CS users for delivery to other CS users or to be forwarded to users outside of CS
- implement a variety of protection mechanisms, validity checks and filters
  - reject email from non-privileged networks (see $mynetworks, that are trusted and can relay messages through the system). See below the trusted networks.
  - check the validity of a receiving user by requesting a confirmation from the back-end servers
  - check the ability to deliver messages to users of incoming messages (ex. overquota)
  - use amavisd to do virus and spam filtering with spamassassin and clamav

Open TCP/UDP ports:

- 25 (tcp) from all
- 587 (tcp) from all
- 10001 for SASL (from back-end servers)

Set-up:

1. install amavisd/clamd (see below)
2. edit main.cf
3. edit master.cf
4. edit transport
5. virtual users (???)
6. The function of /usr/local/etc/postfix/access in protecting the system

Trusted Networks

Trusted networks can relay messages through Postfix. These will eventually be severely limited so that clients cannot relay without authorization on port 25.
Current configuration:

```
mynetworks  =   194.42.16.0/24,
                194.42.17.0/24,
                194.42.18.0/24,
                194.42.27.0/24,
                !10.16.3.0/24,
                !10.16.5.0/24,
                !10.16.6.0/24,
                !10.16.7.0/24,
                !10.16.8.0/24,
                !10.16.9.0/24,
                !10.16.10.0/24,
                !10.16.20.0/24,
                !10.16.21.0/24,
                10.16.0.0/16,
                194.42.0.0/24,
                194.42.2.0/24,
                194.42.34.0/24
```

SASL configuration

See also: Postfix SASL Howto: Dovecot SASL

SASL (Simple Authentication and Security Layer) is an SMTP extension to enable authentication of a client to the SMTP server. This authentication is necessary to allow a client (user or software client) to be recognized as a valid user and be able to relay messages through the mail system to remote users. It should be noted that such relaying is not permitted without this authentication since the server will accept messages only for local users in its normal operation.

We use the Dovecot SASL implementation over a TCP connection to back-end servers that hold the user data. See also the back-end server Dovecot configuration for this.

```
########################################################################
# SASL configuration
########################################################################
smtpd_sasl_auth_enable = yes
smtpd_sasl_type = dovecot
smtpd_sasl_path = inet:gorgo.in.cs.ucy.ac.cy:12345
smtpd_sasl_security_options = noanonymous
```

SSL/TLS configuration

See also: 1) Postfix TLS Support, 2) CentOS HowTo on Postfix/Dovecot TLS/SSL

```
##########################################################################
# TLS configuration
##########################################################################
smtpd_tls_security_level = may
smtpd_tls_key_file = /etc/pki/tls/private/mail.cs.ucy.ac.cy.key
smtpd_tls_cert_file = /etc/pki/tls/certs/mail.cs.ucy.ac.cy.cert
smtpd_tls_loglevel = 1
smtpd_tls_session_cache_timeout = 3600s
smtpd_tls_session_cache_database = btree:/var/lib/postfix/smtpd_tls_cache
tls_random_source = dev:/dev/urandom
smtpd_tls_auth_only = yes
```

Back-End (gorgo, mirto)

Back-end (or Storage) SMTP servers are inside the CS network. They do not interact with outside servers or services. They receive messages from front-end SMTP servers for delivery to user mailboxes. To deliver messages they use a Local Delivery Agent (Dovecot LDA).

Functions:

- keep records and have knowledge of all valid users through LDAP
- keep records of banned, non delivery users (ex. Over quota)
- use above records to answer ability to deliver requests from front-end servers before deliver is made to avoid backscatter
- receive mail from front-end SMTP servers (as a destination of a relay action)
- use an LDA to deliver messages to user mailboxes

Software Setup

- General access control (`/etc/postfix/access`)
- *Authentication is via LDAP*
- Virtual users are enabled (`/etc/postfix/virtual_users`)
- Virtual users control is enabled (via `/etc/postfix/virtual_users_access`)
- Over quota users are denied access (`/etc/postfix/overquota_users`)
- Internal mailing lists and aliases are enabled with (`/etc/aliases`). This can also be done with virtual users. (Note: there is room of improvement here in order to properly set up

aliases: per person, groups, small mail lists that are now created with system accounts via LDAP.

Open ports:

- 25 (tcp) from front-end servers

Set-up:

1. edit main.cf
2. edit master.cf
3. edit transport
4. virtual users (???)

LDAP Authentication and Configuration
(todo)

Virtual Domains
We usually are asked to host domains on our servers. These domains are usually related to research projects that are a collaboration effort among various entities that need a common interface.
Virtual domains are handled by the virtual domain support in Postfix. For a virtual domain to function properly for email:

- a proper domain registration is required
- an MX DNS record is required on the domain. Currently all virtual domain records point to mail2.cs.ucy.ac.cy and all such domains are therefore hosted on mail2.cs.ucy.ac.cy (elysso) for mail purposes
- On elysso:
    - the virtual domain MUST be added in /usr/local/etc/postfix/main.cf. Ex. Virtual domain rise.org.cy

```
### Additional Domains for which we receive messages ####################
## These are usually research related domains that may or may not expire #
## We use UNIX users to receive messages fo rthese domains. The valid    #
## users for each domain are specified in virtual-domain-users specified #
## by virtual_alias_maps below. See the admin manual.

virtual_alias_domains = rise.org.cy
```

    - for a user to be enabled to receive on the virtual domain it must be added in /usr/local/etc/postfix/virtual-domain-users. ONLY valid users for CS dept. can be enabled. Ex. Virtual domain rise.org.cy

```
## rise.org.cy ##
postmaster@rise.org.cy  postmaster
ank@rise.org.cy         ank
andrim@rise.org.cy      andrim
```

- Mailing Lists for Virtual domains:

Setting up Dovecot

1. To compile and install Dovecot and Pigeonhole Sieve. See Appendix A.
2. Enable logging as soon as installation is successful (10-logging.conf). Watch your logs.

See the Administration section.

The Dovecot (IMAP, POP3, Sieve, ManageSieve) servers are divided into two groups: front-end (directors), back-end (storage).

Front End (IMAP PROXY or Dovecot Director) Configuration (theano, elysso)

Proxy: <auth-config> - for static proxying

```
10-auth.conf
        !include auth-static.ext.conf
```

Back-end Configuration (gorgo, mirto)

TLS/SSL configuration

In 10-ssl.conf

```
ssl = yes
ssl_cert = </etc/pki/tls/certs/mail.cs.ucy.ac.cy.cert.pem
ssl_key = </etc/pki/tls/private/mail.cs.ucy.ac.cy.key.pem
```

Summary table

Service	**Front End** **(theano, elysso)**	**Back end** **(gorgo, mirto)**
IMAP	IMAP	
POP3		
Managesieve	Managesieve	
Sieve		
Director		

Table 5: Dovecot Services Setup

TCP port	**Front End** **(theano, elysso)**	**Back end** **(gorgo, mirto)**
110 (tcp, udp) from all		
143 (tcp, udp) from all		
4190 (tcp) from all		
9090 (director communication)		
10001 SASL authentication		Mirto only
12345 SASL authentication		Gorgo only
12340 quota status service		Mirto, gorgo

Table 6: Dovecot TCP ports usage

Dovecot Storage

Mail storage comes from /Mail.

INDEX and CONTROL files go in /sys-data/mail/dovecot/{index, control} where these files are not subject to quota controls. /sys-data/mail is an NFS mounted system from csfs11 (orfeas) and exists ONLY on back-end systems.

Quota

Quota is implemented with the Dovecot Quota plug-in. See file 90-quota.conf

Sieve Filtering and ManageSieve

Dovecot's Pigeonhole extension implements the Sieve and Managesieve protocols.
Sieve filtering is installed on the back-end IMAP machines to do the filtering before the Dovecot LDA/LMTP delivers each message to the user mailbox.

The Managesieve protocol is enabled on both the proxy servers and the back-end servers. Proxies simply work as font-end machines that proxy users to the back end services. Very much like IMAP proxying.

Sieve is part of Dovecot. The scripts are called by the Dovecot LDA during its message delivery process. Therefore it runs ONLY on the back end systems (gorgo, mirto) where delivery is happening.

Compile and install dovecot-pigeonhole extension. See Appendix A.

Default script run for all users: /usr/local/var/lib/dovecot/default.sieve.

```
[root@gorgo dovecot]# more default.sieve
require ["fileinto", "envelope", "editheader"];
if header :contains "subject" ["[SPAM]"] {
  fileinto "SPAM";
}
if header :contains "subject" ["[.SPAM.]"] {
  fileinto "SPAM";
}
```

```
  if header :contains "subject" ["[..SPAM..]"] {
    fileinto "SPAM";
  }
  addheader "X-CS@UCY-Information" "Please contact support@cs.ucy.ac.cy for help.";
  addheader "X-CS@UCY-Information" "Report abuse to abuse@cs.ucy.ac.cy.";
```

```
Compile manually at set up and when changing
  > sievec default.sieve
to avoid giving permissions to users on the directory. Otherwise users will not be able
to compile at run time
```

Sieve directory enabled: sieve_dir = ~/.sieve

Default user script: $HOME/.dovecot.sieve.
This can be a link to the directory $HOME/.sieve where multiple scripts can be saved.

mail_max_userip_connections
Since we are using a IMAP proxy/directors system all IMAP connections on th eback-ends (gorgo/mirto) appear to come from the directors (theano/elysso). If we have many people connecting to a common account or users with many devices this parameter will be overrrun. Changed to 15.

The Dovecot Configuration (dovecot -n)

```
  [root@gorgo log]# dovecot -n
  # 2.2.4: /usr/local/etc/dovecot/dovecot.conf
  # OS: Linux 2.6.32-358.14.1.el6.x86_64 x86_64 CentOS release 6.4 (Final) nfs
  mail_location = maildir:/newmail/%u:INDEX=/sys-data/dovecot/indexes/%u:CONTROL=/sys-
data/dovecot/control/%u
  namespace inbox {
    inbox = yes
    location =
    mailbox Drafts {
      special_use = \Drafts
    }
    mailbox Junk {
      special_use = \Junk
    }
    mailbox Sent {
      special_use = \Sent
    }
    mailbox "Sent Messages" {
      special_use = \Sent
    }
    mailbox Trash {
      special_use = \Trash
    }
    prefix =
  }
  passdb {
    driver = pam
  }
  ssl_cert = </etc/pki/dovecot/certs/dovecot.pem
  ssl_key = </etc/pki/dovecot/private/dovecot.pem
  syslog_facility = local0
  userdb {
    driver = passwd
  }

  [root@iolaos logrotate.d]# more dovecot
  /var/log/dovecot.log {
    missingok
    notifempty
    delaycompress
    sharedscripts
    postrotate
      /bin/kill -USR1 `cat /var/run/dovecot/master.pid 2>/dev/null` 2> /dev/null || true
    endscript
  }

  [root@gorgo pam.d]# more dovecot
  #%PAM-1.0
  auth       required     pam_nologin.so
  auth       include      password-auth
  account    include      password-auth
  session    include      password-auth

  [root@gorgo logrotate.d]# more dovecot
  # dovecot SIGUSR1: Re-opens the log files.
  /var/log/dovecot.log
  /var/log/dovecot-info.log
  {
    missingok
    notifempty
    delaycompress
    sharedscripts
    size 20M
    postrotate
      /bin/kill -USR1 `cat /var/run/dovecot/master.pid 2>/dev/null` 2> /dev/null || true
    endscript
  }
```

Advanced Dovecot Features

- dsync

A general overview of the functionality of the system is presented in the figure below.

Installing the software

The method we use in setting up the software is the top down approach. This approach builds work its way from the top software (postfix) and builds around it the functionality of the system required. Another approach might be the bottom up approach where we build the functionality required on top of a working operating system, testing the software at every step to verify its functionality. These methods are summarized in the table below.

The top down approach is described below.

Virus and SPAM Control Setup

Note: Needs redoing

Configuration Files
/usr/local/etc/postfix/master.cf
/usr/local/etc/postfix/main.cf
/etc/amavisd/amavisd.conf
/etc/clamd.conf
/etc/clamd.d/.conf*

For SpamAssassin
The SpamAssassin rule base, text templates, and rule description text are loaded from configuration files.
Default configuration data is loaded from the first existing directory in:

> ***/var/lib/spamassassin/3.003001***
> */usr/share/spamassassin*
> */usr/share/spamassassin*
> */usr/local/share/spamassassin*
> */usr/share/spamassassin*

Site-specific configuration data is used to override any values which had already been set. This is loaded from the first existing directory in:

> ***/etc/mail/spamassassin***
> */usr/etc/mail/spamassassin*
> */usr/etc/spamassassin*
> */usr/local/etc/spamassassin*
> */usr/pkg/etc/spamassassin*
> */usr/etc/spamassassin*
> */etc/mail/spamassassin*
> */etc/spamassassin*

From those three directories, SpamAssassin will first read files ending in ".pre" in lexical order and then it will read files ending in ".cf" in lexical order (most files begin with two numbers to make the sorting order obvious).

In other words, it will read init.pre first, then 10_default_prefs.cf before 50_scores.cf and 20_body_tests.cf before 20_head_tests.cf.

Options in later files will override earlier files.

Individual user preferences are loaded from the location specified on the "spamassassin", "sa-learn", or "spamd" command line (see respective manual page for details). If the location is not specified, ~/.spamassassin/user_prefs is used if it exists. SpamAssassin will create that file if it does not already exist, using user_prefs.template as a template. That file will be looked for in:

/etc/mail/spamassassin
/usr/etc/mail/spamassassin
/usr/share/spamassassin
/etc/spamassassin
/etc/mail/spamassassin
/usr/local/share/spamassassin
/usr/share/spamassassin

Malicious Content Protection Strategy

1. Before queue protection (Postfix checks)
    1. see reject_rbl_client zen.spamhaus.org
2. Amavisd with Spamassassin and Clamav (after queue)

AMAVISD

AMAVISD-NEW is used as the front end for VIRUS and SPAM control (http://www.ijs.si/software/amavisd/).

Amavisd can use a variety of software and facilities to operate. We use amavisd with

- spamassassin (http://spamassassin.apache.org/)
- clamav (www.clamav.net)

The strategy below is designed to guard against false SPAM positives, giving the chance to the user to scan special folders in case such a positive occurs. This has been found beneficial in the past especially in the case of SPAM since determination of whether a message is SPAM or not is statistical.

Strategy

Overall Description

- Every incoming and every outgoing message is scanned for viruses, spam and banned content
- Scanning is done on the entry point servers (SMTP relays: theano, elysso). Note that these servers are entry points for both incoming mail from *outside* sources and outgoing mail from *inside* sources. Inside, here, means our users whether on the local network or not.
- Messages found to contain viruses are **immediately quarantined and NOT forwarded to the user**. The user is notified and can request a release from the quarantine.
- Messages found to be SPAM with a very high degree of certainty (**score of >20 from Spamassassin**) are immediately quarantined and NOT forwarded to the user. The user is notified and can request a release from the quarantine.
- Messages found to be SPAM below the score of 20 are NOT discarded but are marked as such with special Subject: header additions, [.SPAM.] or [..SPAM..], and are then forwarded for delivery to the user.
- Messages found to have banned content (ex. executable files) are immediately

quarantined. The user is notified and can request a release from the quarantine.

- The delivery software (Dovecot LDA/LMTP) with the help of the Sieve language plug-in scans the subject by default and delivers SPAM messages (marked with [.SPAM.] and [..SPAM..] subject headers) into .SPAM special IMAP user folder.
- .SPAM folders are automatically cleaned every night with aging criteria as follows
  - messages are allowed to remain in the .SPAM folder for 14 days
  - csfaculty members are excluded from the cleaning
- Users can enforce their own filtering rules if they want to using the Sieve language as explained in the User manual.   (how??)(todo)

A list of systems and procedures used

- SPF DNS records are both checked and advertised
- DKIM signing is both enforced and checked by Spamassassin
- DNSRBL

AMAVISD

Amavid is used as a “manage” for SPAM, anti-virus, and malicious ocntent services. It calls various services to do its job. Works on fornt end servers (thano, elysso).

The overall SPAM software structure and interrelationships are presented in the figure below.

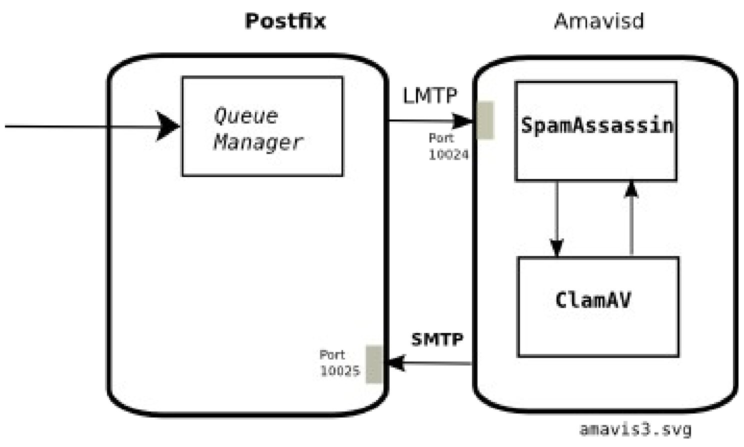


Fig. 4: Conceptual software interconnection in receive mode

Install and configure

Amavisd-new is in the EPEL directory and should be installed from there (note that the software required is in the CENTOS-CSEXTRAS repo so a simple `yum install amavisd-new` should be enough) . The configuration here describes the customization of the system over the CentOS default installation

- start amavisd service
  - `chkconfig amavisd on`
  - configure in /etc/amavisd/amavisd.conf
- clamav configuration
  - use clamd.amavisd service which start with user amavis (instead of clamd)
  - `chkconfig clamd.amavisd on`

- There is no need to configure Spamassassin in amavisd since it makes use of it by default via library calls. See below for Spamassassin configuration.

Postfix Integration

- Edit master.cf see the config examples

```
  The number of sessions used by Postfix to feed a content filter is governed by the lower of the
following limits:

  - maxproc field in the master.cf line describing the service
    feeding mail to amavisd, e.g.:  smtp-amavis unix - - n - 15 smtp

  - smtp-amavis_destination_concurrency_limit setting, or in the
    absence of it, a default_destination_concurrency_limit

  Mark
```

- increased the number of amavisd channels to 5 by using max-servers =5
- Note that the **default_destination_concurrency_limit=20**

```
  /usr/local/etc/postfix/master.cf
  # ======================================================
  # AMAVISD settings
  #
  amavisfeed      unix    -       -       n       -       5       lmtp
          -o lmtp_data_done_timeout=1200
          -o lmtp_send_xforward_command=yes
          -o lmtp_tls_note_starttls=no
          -o disable_dns_lookups=yes
          -o max_use=20

  127.0.0.1:10025 inet n    -       n       -       -     smtpd
       -o content_filter=
       -o smtpd_delay_reject=no
       -o smtpd_client_restrictions=permit_mynetworks,reject
       -o smtpd_helo_restrictions=
       -o smtpd_sender_restrictions=
       -o smtpd_recipient_restrictions=permit_mynetworks,reject
       -o smtpd_data_restrictions=reject_unauth_pipelining
       -o smtpd_end_of_data_restrictions=
       -o smtpd_restriction_classes=
       -o mynetworks=127.0.0.0/8
       -o smtpd_error_sleep_time=0
       -o smtpd_soft_error_limit=1001
       -o smtpd_hard_error_limit=1000
       -o smtpd_client_connection_count_limit=0
       -o smtpd_client_connection_rate_limit=0
       -o receive_override_options=no_header_body_checks,no_unknown_recipient_checks,no_milters
       -o local_header_rewrite_clients=
       -o smtpd_milters=
       -o local_recipient_maps=
       -o relay_recipient_maps=
```

SpamAssassin

Spamassassin is installed as an amavisd prerequisite. There is no need to start spamassassin as a service since AMAVIS uses it by direct library calls to access its functionality.

Here we describe any customization placed after the installation and explanations where things are not obvious

- subject tags [.SPAM.], [..SPAM..]
- How to train spamassassin (see spamc -L and spamd) (sa-learn??)
    - sa-learn -D when spam check is on different machine than where db is going to be used

ClamAV

Clamav is installed as an amavisd prerequisite

Here we describe any customization placed after the installation and explanations where things are not obvious

Note: clamav-update check

Message Quarantine

Every time the system detects a message that contains objectionable content (Spam, Virus, Bad content or messages that do not confrom to standards) it ssends a message to the administrator. The administrator in our case is supporthelp@cs.ucy.ac.cy.

All quarantined notifications are stored in the `Quarantine` folder of user supporthelp.

Releasing Messages

- `Check the notification of a line like:`
  - `The message has been quarantined as: spam-MGRkEnTKdz4w.gz`
  - `The message has been quarantined as: banned-2IvQO4s5M0Lq`
- `On the machine reporting the quarantine do (for example theano)`
  - `amavisd-release spam-MGRkEnTKdz4w.gz`

Managing/cleaning the quarantine folder

On theano/elysso

- cron.daily/amavisd
- tmpwatch 24 /var/spool/amavisd/tmp
- tmpwatch 720 /var/spool/amavisd/quarantine

Security

Outside facing systems (front-ends)
Inside systems (back-ends)

Server OS security

- Harden the OS
- Protect at the border (FW2)
- / (root) protection
- /var protection
- sudo
- ssh permissions
- fail2ban – local Intrusion Detection software
  - enables the ssh-iptables jail
  - custom jail postfix-dns
    - bans SMTP port for clients that have no reverse resolution IP and repeatedly try to send messages – possibly DOS, or mis-configured SPAM servers
- OS files (all files except mounted file systems) clamav scanning

Network Protection

The network is protected from the mail servers by having them in the DMZ. Only absolutely necessary and very directed permissions are given from the DMZ to the internal network (violation!!)

Server protection

Fail2ban
SSH jail
SMTP jail
Dovecort jail (IMAP, POP3)

Session security

Security MUST be looked at every process:

1. IMAP access
2. POP3 access
3. SMTP access
4. HTTP for WebMail

IMAP4	User-to-server	SSL protected session
POP3	user-to-server	SSL protected session
SMTP	user-to-server(submissions	SSL protected session
SMTP	smtp-to-smtp	SSL protected session
WebMail	user-to-webmail	HTTPS
Webmail	webmai-client-to-smtp	SSL
webmail	webmail-to-IMAP	SSL

Setting up HTTPS for encryption of web mail sessions. SASL for authentication with the SMTP AUTH method

Port list that need to be blocked/opened and are required by the software:

Port	Action	Mask	Description
25	enabled	(tcp,udp)	SMTP
109 for POP2	blocked	(tcp,udp)	POP2 not supported
110 for POP3	enabled	(tcp, udp)	Theano,
143 for IMAP	enabled	(tcp, udp)	
587	enabled		Postfix Relays SMTP submission
4190	enabled		From Dovecot front end to Dovecot back end -- Managesieve protocol
1234			SASL authentication from Postfix relays to

			back-end Dovecot
9090	enabled	tcp theano, elysso	Dovecot Director communications
5666	enabled	(tcp, udp) - ALL	NRPE

Mail server protection

- Back Scatter E-Mail
- How to protect the mail system when OUR user passwords are compromised:
  - (proposal) 1) prohibit unknown clients even when authorized??
  - (proposal) 2) monitor sending patterns and either grey list suspicious users or entirely prohibit them until investigated??

Mail System Clients

Some machines which provide mail services are actually clients to the mail system and not part of it. We currently have three client email services: Pine (system ada), Webmail and Mailman hosted on thalia.

Basically the mail system supports all clients that are IMAP, POP3 or SMTP compliant. Even some departure from the standards can be tolerated.

The configuration has been tested to work with;

- Thunderbird
- Microsoft Outlook
- Other IMAP and POP3 clients mainly from mobile devices
- Pine
- Webmail clients – Horde, Roundcube
- Mailman
- A large array of other SMTP/IMAP clients and custom programming

Pine

- Pine is available from system ada.
- Pine uses IMAP and SMTP (like every other client) to communicate with the email system.

WebMail Servers

There are two software suites providing webmail services: Horde and Roundcube. Both are installedn on theano.cs.ucy.ac.cy

Web mail client and server configuration

- Incoming Server configuration
  - Horde – current setup

            - mailer-type = 'sendmail'
            - sendmail_path = '/usr/lib/sendmail'
            - sednmail_args = '-ci'
        - imp
            - imap – mail.cs.ucy.ac.cy
- Outgoing server configuration (SMTP) – for both Horde, RoundCube
    - to local server first
    - relayed to mail.cs.ucy.ac.cy

Thalia uses a local SMTP server to communicate with the mail system (relay).

Mailing List Server

See also: Authentication, Names, Aliases, Groups, Lists

Mailman is on system thalia (194.42.17.136).
See mailman web site and documentation for details on Mailman.

Other clients

- How to set-up internal SMTP clients ex. Moodle, joomla, to make use of the Mail System
- custom program interfaces to access Mail System
- change Postfix to a lighter application for send only systems (ex. sending to supporthelp for administration messages)

Administration

Administration guidelines and procedures.

General

Be very careful with what you are changing. It is possible to break the system entirely including loosing mail messages if you break things. Follow the instruction carefully below.

See Table 2: Server services summary and Table 2: Server services summary for the functionality and configuration of each server and server group.

While Postfix is a critical part of the entire mail system most of the time troubleshooting concentrates on the Dovecot part is is directly accessed by the users.

Critical OS checks

A) Make sure that all software and services needed are installed and configured as explained in the previous chapters. If in doubt follow the relevant chapter.

B) Make sure all services will be restarted upon reboot (chkconfig –list). The following list relates to email only but the usual OS service should be started (ex. NTP). There are differences between back-end and front-end servers.

    - Postfix

- Dovecot
- amavisd
- clamd
- clamd.amavisd
- Spamassassin

C) Other software that need to be configured
- ldap (back-end only)
- fail2ban
- firewall (iptables/firewalld)

D) Make sure that your /etc/fstab will mount all the required directories for the mail system to function. This is highly dependent on the configuration (ex. /Mail repository, /sys-data/mail or other temporary file systems set up).

OS upgrades

- stop postfix
- stop dovecot
- upgrade
  - *check your yum repos if using a custom set-up*
- reboot

`Postfix`

Before making any serious configuration changes that may impact the delivery of messages on any Postfix system first do:

```
soft_bounce = yes
```

in the configuration. This will prevent the loss of messages due to possible configuration errors. Messages that are likely to bounce because of mis-configuration will be retried.

Some useful commands:

- display the queue
  - mailq
  - postqueue -p
- view messages in the queue
  - postcat -q <queue id>
- process the queue
  - postqueue -f (re-queues all entries)
  - postfix flush
- delete messages from queue
  - delete all
    - postsuper -d ALL
- delete all from queue `deferred`
  - postsuper -d ALL deferred
- examine the look-up tables ie the mapping of users/aliases
  - `postmap -q <user> <map_type>:<map file name>`

- check if a user exists – this is slightly different from the above since it will do a test delivery to determine if the user is actually there or not. This can be used for any address and the answer is mailed to <root>
    - `sendmail -bv <user address>`

Dovecot

Back-end system maintenance.

To move all user sessions to a different back-end. From the front-end Director server:

1. Disable any system that will undo changes you make to back-end server weights, such as poolmon or any crons that make such changes.
2. Set the weight of the back-end server to be worked on to 0:
    - `doveadm director add <backend server ip> 0`
3. Flush current assignments to disable new connections to this server:
    - `doveadm director flush <backend server ip> (???)`
4. **From the backend server** close all open sessions:
    - `doveadm kick 0.0.0.0/0`

Performance

Fault tolerance

Backup

- backup (how an to do an archive for permanent storage?? For how long to expire?)

Monitoring the Mail system

There are several ways to monitor the activity of both the OS and the E-Mail system:

- log files with syslog or direct
- mail messages generated by the OS and the different modules
- nagios
- supporthelp account. All messages to postmaster end up in this account.

Nagios is an active method of monitoring while the rest are passive. Generated log messages are generally affected by various configuration parameters on each system. Statistics can also provide valuable information on how the system is functioning.

Logging with syslog and files

Log files are an invaluable resource when things do not work as expected. See the logging section for each application setup to understand in more detail the way logs are kept.

In summary hte email application use the following:

• Dovecot	Syslog Facility: local0	->	/var/log/dovecot.log
	LDA delivery	->	/var/log/dovecot-lda.log
	Information Log	->	/var/log/dovecot-info.log*
	Debug	->	/var/log/dovecot-debug.log*

- * these are not always enabled. Enable only when debugging or need to obtain extra information. See */usr/local/etc/dovecot/conf.d/10-logging.conf* file to determine if these are enabled on not.

        - The verbosity of logging is kept at minimum in regular operational mode. See 10-logging.conf

- Postfix   Syslog Facility: mail   ->   /var/log/maillog
    - See the notify_classes parameter to increase reporting capability
- Amavisd
    - Spamassassin   ->   /var/log/spamd.log
    - ClamAV   ->   /var/log/clamav/clamav.log or clamd.log or freshclam.log

Log rotation

***<u>Rotating the logs and determining that this works well is a MUST operation</u>*. If not done properly, log files will overrun the file system, log file will overflow with the result of OS crash and loss of information. Some applications (ex. dovecot) do not automatically provide logrotate scripts during install to facilitate log rotations and must be created manually. Example below:

General logrotate set up:

- daily
- compress
- rotate 21
    - 3 weeks of log files for all system logs
- size 1M
    - this establishes a default that can be overridden if required

Example logrotate configuration for Dovecot (on all systems):

/etc/logrotate.d/dovecot

```
/var/log/dovecot.log
/var/log/dovecot-info.log
/var/log/dovecot-lda.log
{
  missingok
  notifempty
  delaycompress
  sharedscripts
  size 20M
  postrotate
    /bin/kill -USR1 `cat /var/run/dovecot/master.pid 2>/dev/null` 2> /dev/null || true
  endscript
}
```

Mail messages

The operating system and many applications have the ability to send email messages (usually to system user root) when predetermined events are encountered (ex. non delivery of messages will generate a report to the `postmaster`). These messages should go to the special user supporthelp for CS. Make sure that in the system /etc/aliases:

```
##### support:  postmaster
root:         supporthelp@cs.ucy.ac.cy
```

Nagios Monitoring (for all servers)

These are basic instructions to Nagios monitoring.

On all servers

- `Modify rsyslog.conf`

    - `Add local1.*          /var/log/nagios.log`
- `yum install nrpe`
- `yum install nagios-plugins`
- `yum install nagios-plugins-load`
- `yum install nagios-plugins-procs`
- `yum install nagios-plugins-disk`
- custom Nagios plug-in's go into /usr/lib64/nagios/cs-plugins
    - *mkdir /usr/lib64/nagios/cs-plugins*
    - *create the check_postfix_queue*
- *edit /etc/nagios.nrpe.conf*
    - *log-facility = local1*
    - *add check_load*
    - *add check-postfix-queue*
- *chkconfig nrpe on*
- *service nrpe start*
- *Port 5666 needs to open for the Nagios server NRPE service (10.16.0.1).*
- *Get check_postfix_queue from http://exchange.nagios.org/directory/Plugins/Email-and-Groupware/Postfix/ and install in cs_plugins*

Table 7 gives a summary of Nagios monitoring for the mail server components.

Entity	**Nagios plug-in**	**Type**	**Notes**

CPU load	check_load	Local/nrpe	`gorgo/mirto: -w 50,40,30 -c 70,60,50`
			`theano/elysso: -w 25,40,15 -c 50,80,30`

Check /var	check_disk	Local/nrpe	`-w 20% -c 10%`
Postfix (SMTP)	check_smtp	Remote/triton	
Dovecot (IMAP)	check_imap	Remote/triton	
Postfix queue	check_postfix_queue	Local/nrpe	the script was changed so that it responds to 8 characters of queue_id instead of 10. See the script at /usr/lib64/nagios/cs-plugins • Checking the queues: • on internal systems (gorgo, mirto) keep values small (-w 100 -c 500) since thse systems should deliver messages immediately • on relays (theano, elysso) (-w 300 -c 1000) *Note: the best approach would be to do a time based check ie. Check the queue record values and check a fixed amount of time later several times, if queues exceed a value, remain or keep increasing issue a warning. Do the same for critical value. This will require change of the check script. Consider using:* *1. check queue; record value* *2. check queue again. Compare and remember if value goes up* *3. do above for 30 min. If number keeps increasing then report WARNING* *4. do this for 1 hour report CRITICAL*
amavisd process (only on relays)	check_amavisd	Local/nrpe	
clamd.amavisd (only on relays)	check_clamd.amavisd	Local/nrpe	
Fail2ban-server (on relays)	check_fail2ban	Local/nrpe	

Table 7: Summary of Nagios monitoring for Mail Servers

Statistics

Message cleanup

Clean up scripts are used to clean messages that end in the .SPAM, .VIRUS and .TRASH folders. The idea behind this is that users rarely care about these folders, some even do not see them since they are not subscribed to them. Instead of allowing the user to go over quota the clean-up script cleans up these folders with predetermined criteria.

The clean-up scripts currently run on system **hermes** since this machine is one hosting the mail storage file system that needs to be cleaned. The scripts are run daily with related cron jobs.

- hermes:/mail/common/Mail/scripts/cleanup-Mail cleans up mailboxes of old messages in SPAM and VIRUS folders.

- hermes:/mail/common/Mail/scripts/cleanup-Mail-Trash cleans the TRASH folders except for faculty members. *(run manually on proteas due to a buggy find command)*
- hermes:/mail/common/Mail/scripts/cleanup-Mail-Trash-faculty cleans TRASH folders for some faculty members (see the script). *(run manually on proteas due to a buggy find command)*

The scripts use the following criteria to decide if a message is to be cleaned or not:

- OLDSPAM = 15 days from .SPAM folders
- OLDVIRUS = 7 days from .Virus folders
- OLDTRASH = 20 days from .Trash folders (60 for faculty)

See Appendix D for a listing of these scripts.

Synchronizing a Dual server configuration

In a dual server configuration, many options must be synchronized. The synchronization of many aspects of both the relay and back-end systems is necessary in order to achieve a consistent operation for the systems.

Some preliminary things to synchronize:

1 main.cf – must have some same options like restrictions (the two main.cf files are not the same).

2 access file on relay systems

i. protect internal mailing lists, either LDAP or manual

3 /etc/aliases

4 SpamAssassin

5 ClamAV

6

7 Crontab entries

8 LDAP options and configuration

9 Nagios monitor configuration (nrpe.conf)

Upgrades

- When scheduled for upgrades or down times note that queues will remain the machine.

Troubleshooting

Testing SMTP

- If upon
  - telnet <smtpserver> 25 or
  - telnet <smtpserver> 587

  we get nothing then it means the server did not start correctly. Look in /var/log/maillog for errors in the the config file (ex. main.cf)

```
[root@mirto ]# telnet elysso 587
Trying 194.42.17.141...
Connected to elysso.
Escape character is '^]'.
220 elysso.cs.ucy.ac.cy ESMTP Postfix
```

```
EHLO mirto
250-elysso.cs.ucy.ac.cy
250-PIPELINING
250-SIZE 25600000
250-VRFY
250-ETRN
250-STARTTLS
250-ENHANCEDSTATUSCODES
250-8BITMIME
250 DSN
```

Problems with authentication:

- check if ESMTP is spoken between client and server
  - telnet <server> 25 EHLO <client>
- Should receive a reply similar to above.
  - If not then ESMTP is blocked by firewall then. Fixup protocol SMTP On CISCO PIX

Testing IMAP

```
 telnet: > telnet imap.example.com imap
telnet: Trying 192.0.2.2...
telnet: Connected to imap.example.com.
telnet: Escape character is '^]'.
server: * OK Dovecot ready.
client: a1 LOGIN MyUsername MyPassword
server: a1 OK Logged in.
client: a2 LIST "" "*"
server: * LIST (\HasNoChildren) "." "INBOX"
server: a2 OK List completed.
client: a3 EXAMINE INBOX
server: * FLAGS (\Answered \Flagged \Deleted \Seen \Draft)
server: * OK [PERMANENTFLAGS ()] Read-only mailbox.
server: * 1 EXISTS
server: * 1 RECENT
server: * OK [UNSEEN 1] First unseen.
server: * OK [UIDVALIDITY 1257842737] UIDs valid
server: * OK [UIDNEXT 2] Predicted next UID
server: a3 OK [READ-ONLY] Select completed.
client: a4 FETCH 1 BODY[]
server: * 1 FETCH (BODY[] {405}
server: Return-Path: sender@example.com
server: Received: from client.example.com ([192.0.2.1])
server:         by mx1.example.com with ESMTP
server:         id <20040120203404.CCCC18555.mx1.example.com@client.example.com>
server:         for <recipient@example.com>; Tue, 20 Jan 2004 22:34:24 +0200
server: From: sender@example.com
server: Subject: Test message
server: To: recipient@example.com
server: Message-Id: <20040120203404.CCCC18555.mx1.example.com@client.example.com>
server:
server: This is a test message.
server: )
server: a4 OK Fetch completed.
client: a5 LOGOUT
server: * BYE Logging out
server: a5 OK Logout completed.
```

Testing POP3

```
telnet: > telnet pop.example.com pop3
telnet: Trying 192.0.2.2...
telnet: Connected to pop.example.com.
telnet: Escape character is '^]'.
server: +OK InterMail POP3 server ready.
client: USER MyUsername
```

```
server: +OK please send PASS command
client: PASS MyPassword
server: +OK MyUsername is welcome here
client: LIST
server: +OK 1 messages
server: 1 1801
server: .
client: RETR 1
server: +OK 1801 octets
server: Return-Path: sender@example.com
server: Received: from client.example.com ([192.0.2.1])
server: by mx1.example.com with ESMTP
server: id <20040120203404.CCCC18555.mx1.example.com@client.example.com>
server: for <recipient@example.com>; Tue, 20 Jan 2004 22:34:24 +0200
server: From: sender@example.com
server: Subject: Test message
server: To: recipient@example.com
server: Message-Id: <20040120203404.CCCC18555.mx1.example.com@client.example.com>
server:
server: This is a test message.
server: .
client: DELE 1
server: +OK
client: quit
server: +OK MyUsername InterMail POP3 server signing off.
```

Appendix A: Compiling and Installing from Sources

Compiling all used packages from sources is chosen to, mainly, take advantage of the new features that appear but also to act quickly on possible bugs or security problems. CentOS usually lags behind these features and past experience has shown that there is clear advantage of compiling from sources.

Compilation and installation strategy is:

1. Compilation and most importantly installation is done in a way such that it is compatible with the stock RPM installs. Where necessary (ex. creation of users and groups, start-up scripts etc) the installation follows the original CentOS conventions. This helps in case we later decide to convert to the original RPMs int he OS.

   We can do a preliminary install of Dovecot/Postfix to get all the defaults in place. These will need to be revised when the custom compilation is complete and of course the RPMs removed to avoid confusion.

2. Configuration/compilation is done on each machine independently in the /root home directory
3. All new files (including configuration files) are installed in /usr/local to make them independent of RPM files/packages
4. run time files are kept in their default place (ex. queues, lock files etc). These files are described for each application separately since they are application dependent.
5. Installation of the relevant RPMs is disabled in /etc/yum.conf to avoid confusion

This strategy helps in case we decide, for whatever reason, to revert back to the original CentOS packages but also to make each machine independent.

Prerequisites

- Install gcc

Postfix – Compile and Install

NOTE: Compilation of front-end and back-end systems is slightly different.

Instructions based on version 2.10.x.

- install necessary software: db4-devel, openldap-devel (only on back-end systems)
- cd /root; download source (see www.postfix.org); unpack.
- In /root there is a postfix-make-<host>.sh where host is the host being used to build Postfix. Each host has been optimized with its own build. Copy it to the new source directory.
- cd the new source directory
- Run postfix-make-<host>.sh
  - this file customizes the compilation/installation for our purposes.
  - *(To start from scratch do a **make clean**)*

- Create user accounts and related groups (if not available already). These user setting are the same with CentOS default UID/GID.

```
/etc/passwd:
    postfix:x:89:89::/var/spool/postfix:/sbin/nologin

/etc/group:
    postfix:x:89:
```

- Create a group "postdrop"

```
/etc/group:
    postdrop:x:90:
```

- Install new postfix
  - make install
    - you should take the defaults on the options given since the compilation has already determined the place of install..
  - OR make upgrade if installing an upgrade
- Prevent installation of Postfix RPM in the future. In /etc/yum.conf do
  - **exclude = postfix***
- chown postfix.root /usr/local/var/lib/postfix/
- chmod 700 /usr/local/var/lib/postfix/

Add Postfix to the reboot start-up procedures

Centos 6: Use the chkconfig system

- cp -p /root/postfix.init.d to /etc/init.d/postfix
- chkconfig –add postfix
- chkconfig postfix on
- chkconfig –list ; check it

Centos 7: Use the systemd system

- cp -p /root/systemd.postfix.* to /etc/systemd/system
- ....
-
-

The procedures above, when successful, allow us to stop and start Postfix with the familiar

- service postfix start (syste   for Centos 7)
- service postfix stop
- etc

- we need to disable sendmail and switch to the new Postfix software
  - USE THE alternatives system – the following command to switch to the new Postfix related software (there is no need to do this during upgrade)

```
/usr/sbin/alternatives --install /usr/sbin/sendmail mta /usr/local/sbin/sendmail 25 \
--slave /usr/bin/mailq mta-mailq /usr/local/bin/mailq \
  --slave /usr/bin/newaliases mta-newaliases /usr/local/bin/newaliases
  --slave /usr/share/man/man1/mailq.1.gz mta-mailqman /usr/local/share/man/man1/mailq.1 \
  --slave /usr/share/man/man1/newaliases.1.gz mta-newaliasesman
/usr/local/share/man/man1/newaliases.1 \
  --slave /usr/share/man/man8/sendmail.8.gz mta-sendmailman /usr/local/share/man/man1/sendmail.1 \
  --slave /usr/share/man/man5/aliases.5.gz mta-aliasesman /usr/local/share/man/man5/aliases.5 \
  --initscript postfix
```

[this does not work on theano – set manual links??]

Remove sendmail and Postfix RPMs
We need to remove the Postfix RPMs to avoid confusion as to which software is runninf.
Postfix has several packages dependancies (cronie etc). To remove do
See what is installed

    rpm -qa | grep sendmail
    rpm -qa | grep postfix

Then Remove without touching the dependencies

    rpm -e –nodeps sendmail
    rpm -e –nodeps postfix

Go to the Postfix configuration. Without proper configuration Postfix will usually not start successfully.

Dovecot – Compile, Install

Prerequisites

Install:

- zlib-devel
- openssl-devel
- pam-devel
- quota-devel, quota
- tcp_wrappers-devel
- openldap-devel

Download sources:

- expand into its directory (ex. tar -zxvf dovecot-2.2.4.tar.gz)
- cd into directory
- **./configure --with-pam --with-ldap --with-ssl=openssl --with-zlib –with-libwrap --with-mysql**
  - Install prefix . : /usr/local
  - File offsets ... : 64bit
  - I/O polling .... : epoll
  - I/O notifys .... : inotify
  - SSL .... : yes (OpenSSL)
  - GSSAPI .... : no
  - passdbs .... : static passwd passwd-file shadow pam checkpassword ldap sql
  -                  : -bsdauth -sia -sql -vpopmail
  - userdbs .... : static prefetch passwd passwd-file checkpassword ldap sql nss
  -                  : -sql -vpopmail
  - SQL drivers .... :
  -                  : -mysql -pgsql -sqlite
  - Full text search : squat
  -                  : -lucene -solr

- **make**
- **make install** (into /usr/local/ by default)
- Create necessary users if required
  - dovecot
    - dovecot:x:97:97:Dovecot Local IMAP server:/usr/local/libexec/dovecot:/sbin/nologin
    - dovenull:x:498:498:Dovecot's unauthorized user:/usr/libexec/dovecot:/sbin/nologin
      - `groupadd -g 97 dovecot`
      - `groupadd -g 496 dovenull`
      - `useradd -g 97 -u 97 -c Dovecot Local IMAP server -d /usr/local/libexec/dovecot -M -N -s /sbin/nologin dovecot`
      - `useradd -g 496 -u 496 -c Dovecot Local unauthorized user -d /usr/local/libexec/dovecot -M -N -s /sbin/nologin dovenull`
    - *default uid and gid change from time to time but are not critical*
- to uninstall: **make uninstall**
- Disable install from CentOS repositories so that we do not end up with two different installs. In /etc/yum.conf
  - **exclude = dovecot***
- Transfer the example configuration to /usr/local/etc/dovecot from /usr/local/share/doc/dovecot/example-configs

Add Dovecot to the boot start-up procedures

Centos 6

- there is a /root/dovecot.init.d
  - cp -p dovecot.init.d /etc/init.d/dovecot
  - chkconfig –add dovecot
  - chkconfig on dovecot
  - chkconfig –list dovecot

Centos 7

- cp -p /root/systemd.dovecot.* to /etc/systemd/system
  - /usr/lib/systemd/system/dovecot.service
  - /usr/lib/systemd/system/dovecot.socket
- ......

Start/Restart procedures

- go to Dovecot configuration
- service dovecot start

Pigeonhole Compile and Install

ucompress

```
./configure --with-dovecot=/usr/local/lib/dovecot
make
make test
make install
```

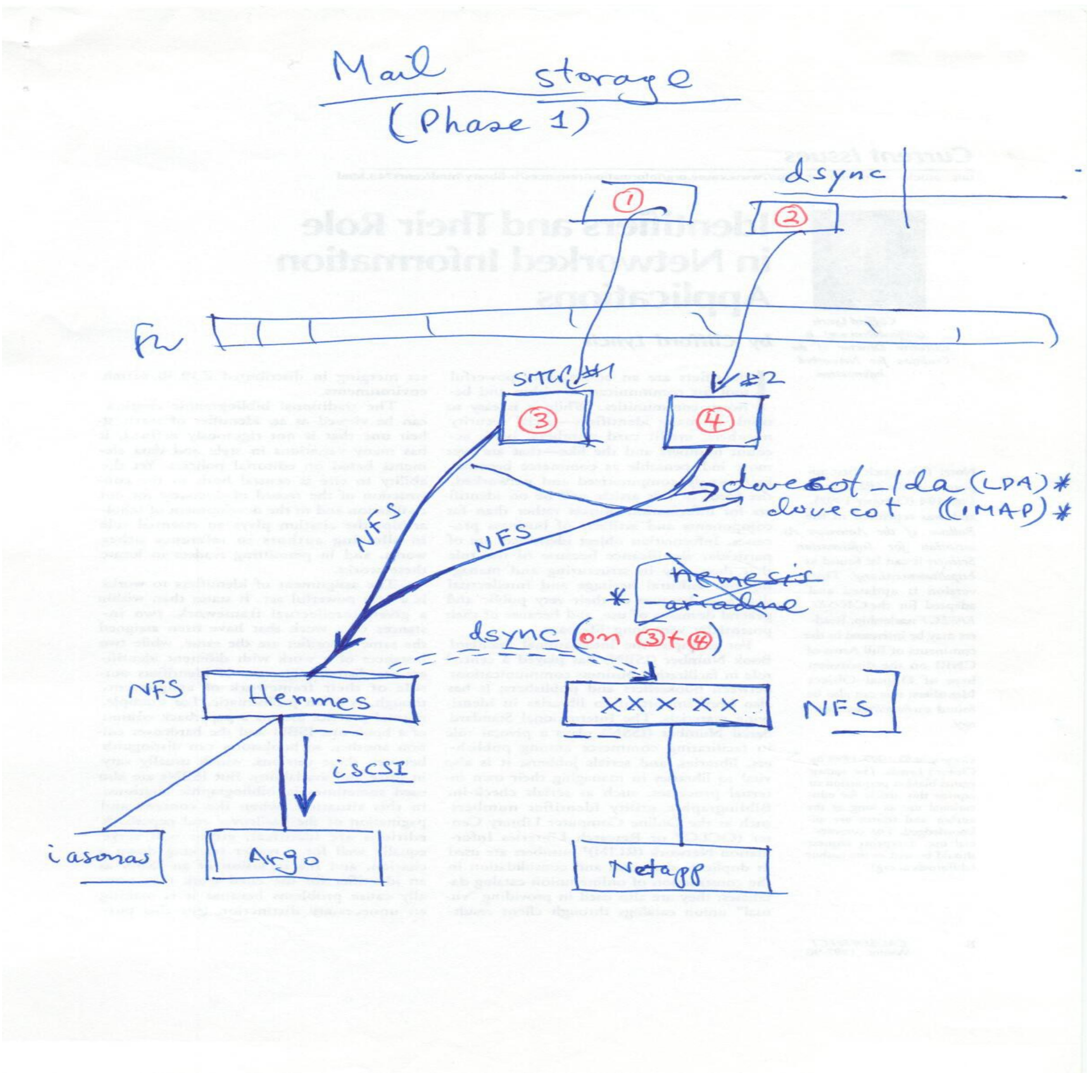
Copy sieve.conf, sieve-extprogs.conf, managesieve.conf from

/usr/local/share/docs/dovecot/example-config/conf.d/ /usr/local/etc/Dovecot/conf.d

Use these files to configure Pigeonhole (managesieve and sieve)

Appendix B: Future Work

Future Storage



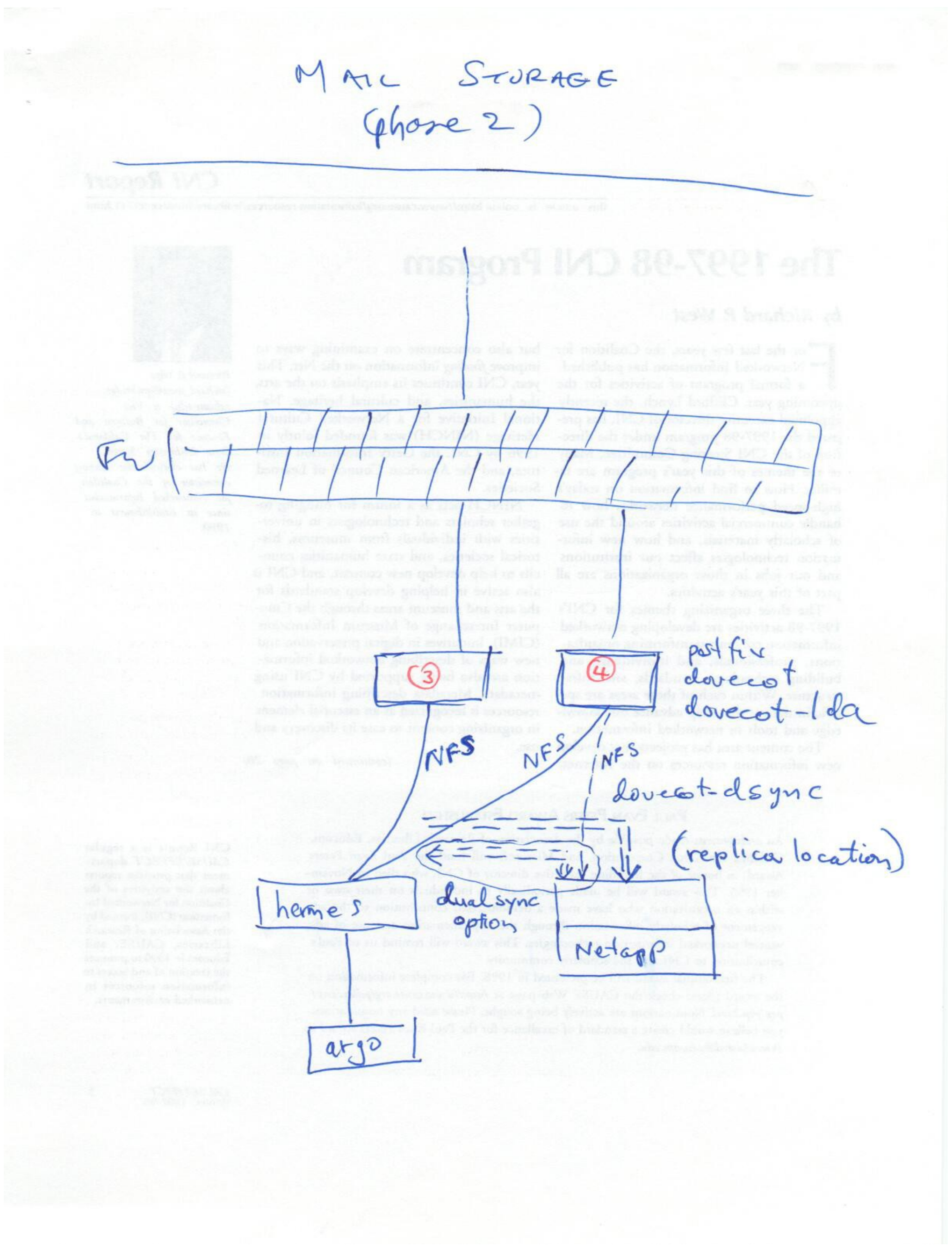


Illustration 5: Mail Storage Phase 2

Appendix C: Notes and Pending Issues

1. Also solve the issue of failed mounts (check Dovecots alternative location feature)

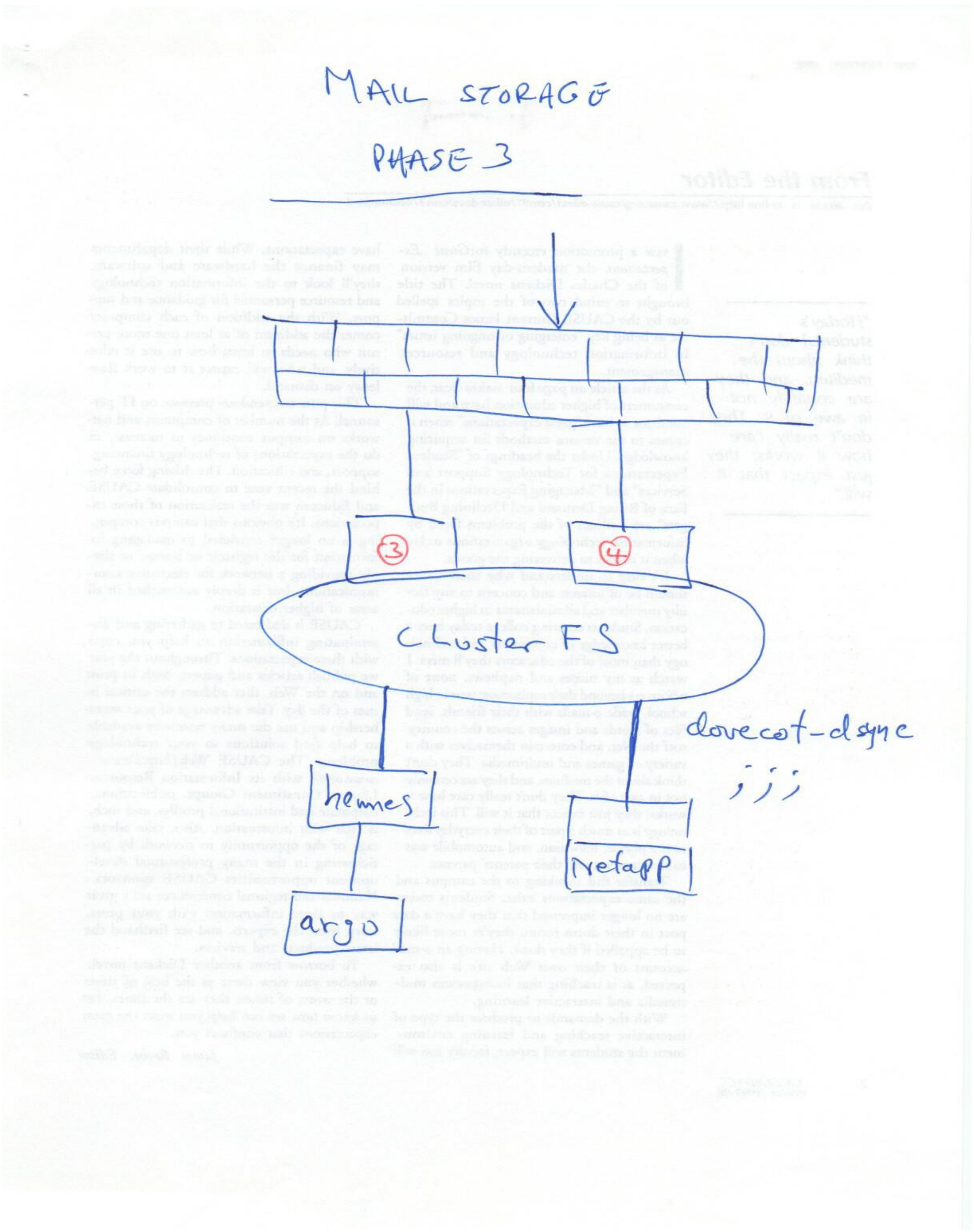


Illustration 6: Storage Phase 3

2. How to solve the problem of giving access to the external relay to the users DB (internal
    1. check the verify (8) Postfix facility

2. The scenario is a classic one:
    1. one or more relay SMTP servers in DMZ
    2. one or more backend SMTP servers on the inside network
    3. There may or may not be separate incoming or outgoing designated SMTP servers.

```
 Now the desired functionality is (of course):
 1. relay machines receive messages from outside AND inside
 2. relays check for all the bad things (spam, viruses etc).
 3. for incoming messages relays check for valid local users and reject messages for invalid
users Such scenario allows all checks to be done at the entry point allowing back-ends to function
with the real nice messages and at a much reduced load. But there is a problem. If you are a DMZ
admin (or a security hawk) #3 functionality above is not possible without violating the DMZ
policy, especially if you are dealing with internal LDAP and DB servers which essentially house
personal information.

 Have a look at verify(8) and the address_verify_* variables in main.cf

 With this you can dynamically verify recipients on your backend SMTP
 servers.
```

Appendix D: Helper Scripts

These may change. Look at the locations indicated below for exact configuration.

Temporary user management scripts

- **See crontab -l on theano, elysso**
    - [root@theano postfix]# crontab -l
    - 15 * * * * cp /tmp/overquota.users /usr/local/etc/postfix/overquota.users
    - 17 * * * * cp /tmp/virtual-users /usr/local/etc/postfix/virtual-users
    - ### 18 * * * * cp /tmp/virtual-users-cs /usr/local/etc/postfix/virtual-user-cs
    - 19 * * * * cp /tmp/CS-virtual-alias /usr/local/etc/postfix/CS-virtual-alias
    - 19 * * * * cp /tmp/UCY-virtual-alias /usr/local/etc/postfix/UCY-virtual-alias
    - 20 * * * * cd /usr/local/etc/postfix/; /usr/local/sbin/postmap overquota.users
    - 21 * * * * cd /usr/local/etc/postfix/; /usr/local/sbin/postmap virtual-users
    - ### 22 * * * * cd /usr/local/etc/postfix/; /usr/local/sbin/postmap virtual-users-cs
    - 23 * * * * cd /usr/local/etc/postfix/; /usr/local/sbin/postmap CS-virtual-alias
    - 23 * * * * cd /usr/local/etc/postfix/; /usr/local/sbin/postmap UCY-virtual-alias

- **See crontab -l on nireas**
    - # Backup Directory Server every day at 2am
    - 0 2 * * * /etc/cron.d/backupdirsrv
    -
    - # Send files to theano, elysso
    - 0 */1 * * * /root/sendfile
    -
    - # Send /etc/mailalaises to gorgo, mirto
    - 05 */6 * * * /root/sendmailaliases

Mail clean up script

Currently on hermes:/mail/common/Mail/scripts/cleanup-Mail

```
#!/bin/bash
# The purpose of this file is to maintain the e-mail system and its associated
# storage filesystem. This includes automatic spam learning and the
# clean up of all the .VIRUS and .SPAM and .Trash user folders
# in user directories. It must be run from the /Mail directory to have
# practical effect.
# The clean up happens on messages that are older than 15 days for SPAM
# 7 days for VIRUS and 20 days for Trash. These can be adjusted using the OLDSPAM and OLDVIRUS
# and OLDTRASH variables.
#
#
# This is run daily via cron on the entire /Mail storage area.
###########
LOGFILE=/var/log/mailcleanup.log
LEARNFROM="./ank-test/.SPAM/cur ./antonis/.SPAM/cur ./george/.SPAM/cur ./yanos/.SPAM/cur ./skevos/.SPAM/cur
./savvasn/.SPAM/cur ./kekkos/.SPAM/cur ./ank-test/.SPAM/new ./antonis/.SPAM/new ./george/.SPAM/new ./yanos/.SPAM/new
./skevos/.SPAM/new ./savvasn/.SPAM/new ./kekkos/.SPAM/new"

###OLDSPAM=5
```

```
##OLDSPAM=20
OLDSPAM=10
OLDVIRUS=7
OLDTRASH=10

cd /mail
echo "============================================================" >> $LOGFILE
echo "This log is produced by /Mail/common/scripts/cleanup-Mail. See this file for details" >> $LOGFILE
echo `date` >> $LOGFILE
#
#echo "Starting Spamassassin learning ....." >> $LOGFILE
#for i in $LEARNFROM; do
#echo "Learning from $i" >> $LOGFILE
#/usr/bin/sa-learn --spam --showdots $i >>$LOGFILE 2>&1
#sleep 3
#done;
#
#
#
echo "____________________________________________________________" >> $LOGFILE
echo "Starting cleanup of .SPAM and .VIRUS folders ...." >> $LOGFILE
echo "I am deleting the following files..." >> $LOGFILE
for i in *; do find $i/.SPAM/cur -type f -mtime +$OLDSPAM -print -exec rm {} \; >>$LOGFILE 2>&1; done;
for i in *; do find $i/.SPAM/new -type f -mtime +$OLDSPAM -print -exec rm {} \; >>$LOGFILE 2>&1; done;
###
for i in *; do find $i/.VIRUS/cur -type f -mtime +$OLDVIRUS -print -exec rm {} \; >>$LOGFILE 2>&1; done;
for i in *; do find $i/.VIRUS/new -type f -mtime +$OLDVIRUS -print -exec rm {} \; >>$LOGFILE 2>&1; done;
###
echo "Starting cleanup of .Trash folders ....." >> $LOGFILE
for i in *; do find $i/.Trash/cur -type f -mtime +$OLDTRASH -print -exec rm {} \; >>$LOGFILE 2>&1; done;        disabled 9/1/2015
###
###echo "Starting cleanup of /Mail/tmp folders ....." >> $LOGFILE
###/usr/sbin/tmpwatch --verbose 72 /Mail/tmp /tmp >>$LOGFILE 2>&1
```

Mail clean up .Trash script

On platon

```
#!/bin/bash
# List of Groups to clean .Trash folders
GRP="support csstaff cs96 cs97 cs98 cs99 cs00 cs01 cs02 cs03 cs04 cs05 cs06 cs07 cs08 cs09 cs10 cs11 cs12 cs13 cs14
csalumni courses cspg09 cspg10 cspg11 cspg12 cspg13 cspg14 cspg15 research "

LOGFILE=trash.clean.log
OLDTRASH=15
ENABLE=0

echo `/usr/bin/date +%d%m%Y` > $LOGFILE 2>&1
echo "Starting cleanup of .Trash folders ....." >> $LOGFILE
for grp in $GRP; do
MEMBERS=`/usr/bin/getent group  $grp | cut -d":" -f4 | /bin/sed 's/\,/ /g' -`
```

```
echo $grp >> $LOGFILE
echo $MEMBERS >> $LOGFILE
echo "=============" >>$LOGFILE 2>&1
        for i in $MEMBERS; do
        echo "Starting cleanup of .Trash folder for user $i ....." >> $LOGFILE
##      if $ENABLE; then
                find /Mail/$i/.Trash/cur -type f -mtime +$OLDTRASH -print -exec rm {} \; >>$LOGFILE 2>&1;
##      else
##              find /Mail/$i/.Trash/cur -type f -mtime +$OLDTRASH -print  >>$LOGFILE 2>&1;
##      fi
        echo "=============" >>$LOGFILE 2>&1
        done
done
echo "======== DONE ======" >>$LOGFILE 2>&1
exit 0
```

Appendix E: Configuration Listings

A complete listing of the systems configuration will eventually be found on platon.

Custom differences only:

Fail2ban

Filter dovecot-pop3imap.conf

[Definition]
failregex = (?: pop3-login|imap-login): (?:Authentication failure|Aborted login \(auth failed|Aborted login \(tried to use disabled|Disconnected \(proxy dest auth failed).*rip=(?P<host>\S*),.*
ignoreregex =

SSHD (/etc/sshd_config)

```
##############################
PermitRootLogin no
#############################
# Live for 6 hours
ClientAliveInterval 21600
ClientAliveCountMax 5
#############################
```

Appendix F: References

www.redhat.com
www.centos.org
www.postfix.org
www.dovecot.org
www.amavisd.org
www.clamav.net
www.spamassassin.apache.org
www.sieve.org
www.roundcube.org
www.horde.org

Relevant RFC reference

RFC #*	Subject
2822	SMTP
4954 (3463, 2554)	SASL authentication
5230	Sieve vacation extension

*obsolete in parentheses

Appendix G: Policies

A. Trash clean up policy

- SPAM folder = 15 days from .SPAM folders
- VIRUS folder = 7 days from .Virus folders
- TRASH folder = 30 days from .Trash folders
    - faculty TRASH folder 60 days

Appendix H: Random Notes

SSL certificates:
View: openssl x509 -in <certificate> -text -noout

To tail and highlight a selections do:

- tail -f /var/log/maillog | perl -pe 's/*keyword*/\e[1;31;43m$&\e[0m/g'
- or tail -h <file> <keyword> on any of the mail servers

Certificate Mgmt

- View
  - openssl x509 -in <cert> -noout -text

ChangeLog

0.6 - Original EmailNG administration manual – the start
0.7 - Changeover to the EmailNG project by the department. There is still much work to be done. 18/06/2014http://hcmportal.vi.ucy.ac.cy

Troubleshooting Errors

imap(ank): Debug: Namespace : /Mail/ank/.Trash.Parking doesn't exist yet, using default permissions
Thunderbird: [CANNOT] Renaming not supported across conflicting directory permissions.

This most probably is related to conflicting permissions like trying to move (or delete) a folder that has different permissions than its destination folder. Dovecot is picky about that even though such