

Project EmailNG

Next Generation Email System

Project EmailNG is an upgrade project of our mail systems which were installed in 2004 in their current form. Along with upgrading the existing systems new functionality and options are implemented to reflect the technological advances of the last years. EmailNG depends entirely on FOSS and makes use of the CS Dept. virtualization and consolidated storage systems.

Apart from the infrastructure being used and the time spent on implementing the project there are no other costs. The system is custom built using entirely internal technological knowledge and dependent entirely on the CS support personnel for support and maintenance (and the FOSS community of course).

The “Email administrator manual” should be read along with this document to understand the installation details. Here we describe the project steps. Description of the system and installation details are provides in the Administrator manual.

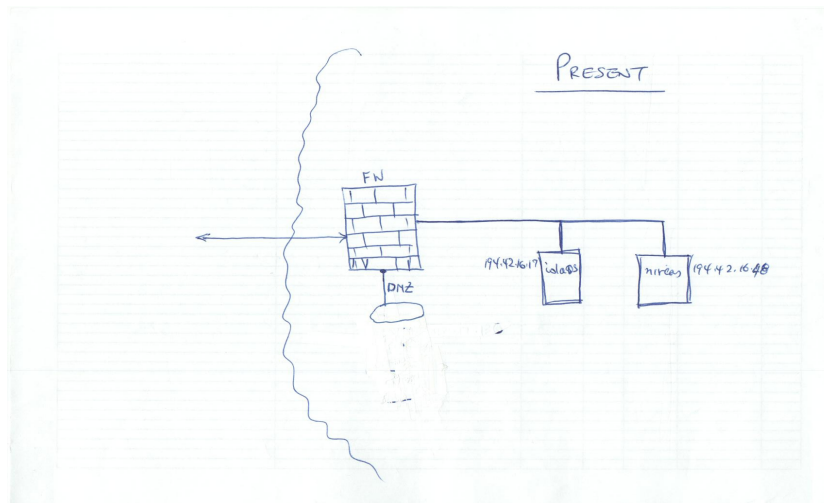
Features

- Advanced capabilities fit for a diverse community
- Expandability at all levels (Storage, IMAP, SMTP, SPAM and VIRUS control)
- Multilevel security (system, email, DMZ)
- E-Mail client independence supporting almost all IMAP, POP and Webmail clients
- Robustness, availability, fault tolerance built into the original design
- User control – users can customize their message delivery experience (filters, SPAM control etc)
- Support for advanced and entry level users
- Support for mobile devices and clients
- No down time maintenance operations
- Minimal cost with FOSS and off the shelf hardware. Uses widely available and tested FOSS software.
- Vendor independence. No vendor lock in. Built with local technology knowledge and experience.

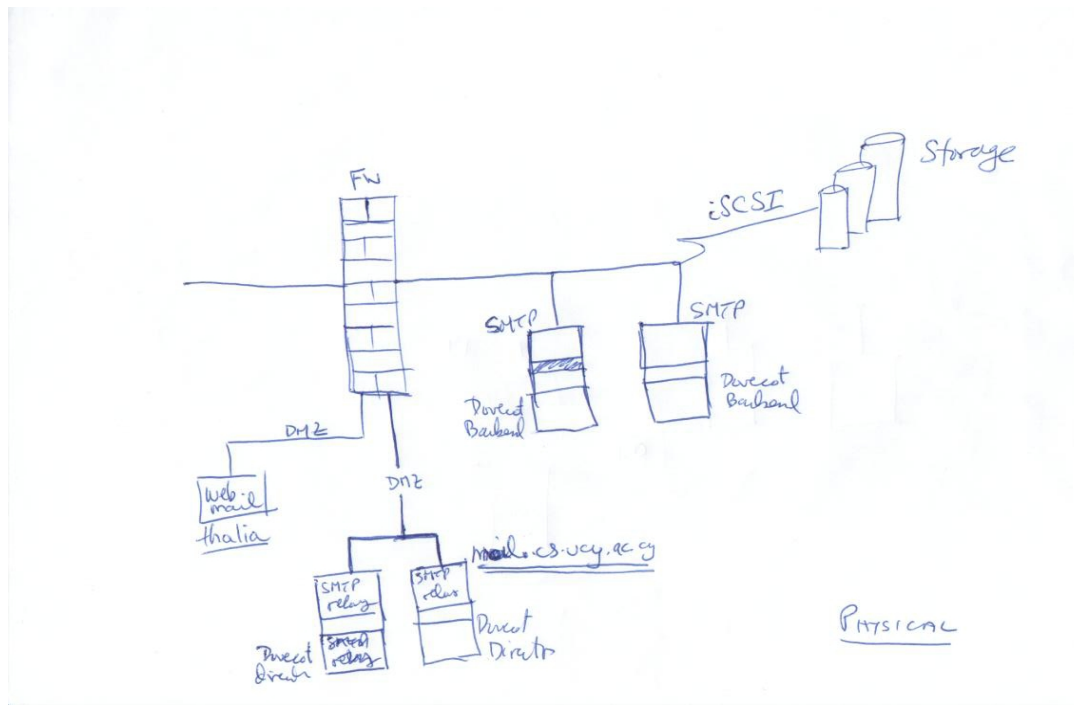
Why Change?

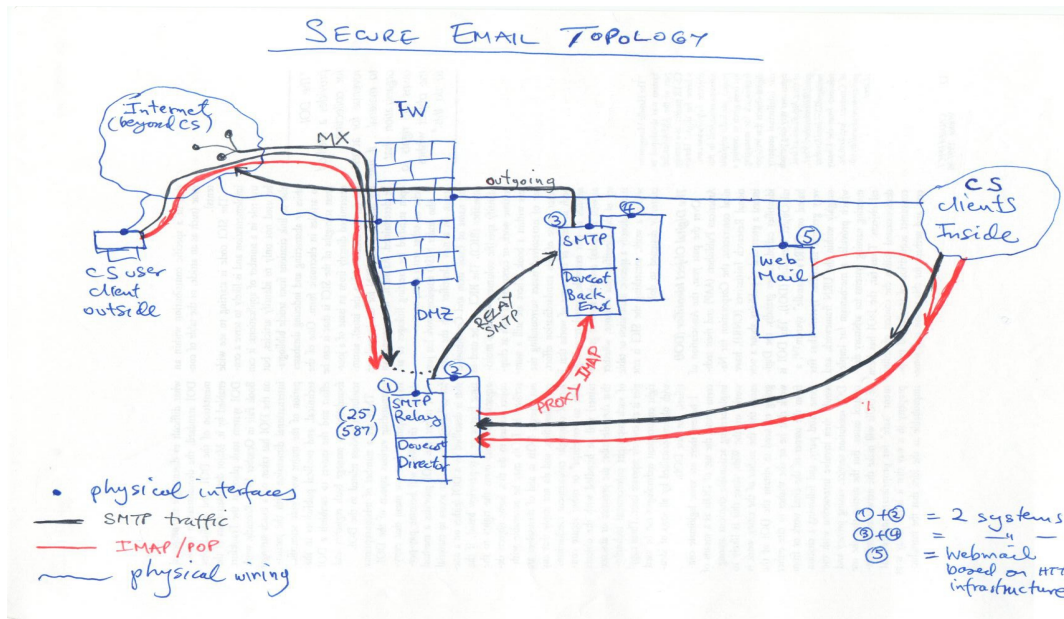
- There is a pressing need for a system upgrade of software and hardware
- security challenges have increased and the current status does not address even the basic threats that exist today
- provide better availability in line with dept. requirements both during normal operations but also during maintenance operations
- enhance the user functionality by allowing the user to better control his/her environment
- better mobile systems support

Current Status



Future Status





Objectives:

1. Create a robust, fault tolerant upgrade of the existing system
2. Upgrade of software and take advantage of new features in software
3. Change from the MailScanner software to the Amavisd-new system
4. Make use of our extensive virtual server platforms and our consolidated storage
5. Take advantage of our LDAP installation to centralize and streamline the email system authentication and user profiles
6. Improvements on
 - a) Security
 - b) Efficiency (storage, processing speed)
 - c) User capabilities and UI
7. The following areas will be affected:

Area	Short description
User Quota	<ul style="list-style-type: none"> • implement Dovecot based quota with the ability to enforce from LDAP settings rather than fs quota • over quota management • user monitoring
Message Storage	<ul style="list-style-type: none"> • Integration with consolidated storage systems at CS • Multiple location message storage • synchronization with dsync • migration to the more efficient mbox message storage format
Message format	<ul style="list-style-type: none"> • Change from maildir to Dovecot mbox
Better filtering	<ul style="list-style-type: none"> • Use a standards based filter engine (sieve) <ul style="list-style-type: none"> ◦ clients will be affected
Better user experience	<ul style="list-style-type: none"> • Message filter setup from within the clients • individual quota monitoring • over quota management
Fault tolerance, resilience	<ul style="list-style-type: none"> • Multiple message servers (virtual machines) • ability for the system to survive server failures • automatic redirection of mail traffic and users to surviving

	<ul style="list-style-type: none"> servers automatic storage synchronization on two servers
Performance	<ul style="list-style-type: none"> Separation of user activity from back end server activity
Better SPAM control	<ul style="list-style-type: none"> Use of amavisd Multilevel filtering Server side filters and options (before queue-after queue filtering)
User filters (spam and message mgmt)	<ul style="list-style-type: none"> Server side user filters with Sieve
User management	<ul style="list-style-type: none"> Integration with LDAP services
Security/SMTSPS	<ul style="list-style-type: none"> Greatly enhance security by designing the whole system around using the DMZ with inside and outside facing servers Login with encrypted channel to SMTP when submitting messages for delivery (SASL authentication)
Shared Mailboxes	<ul style="list-style-type: none"> Internal Lists or Announcements

Project Overall Flow

This is an overview and plan. Not a complete action list. See the section “Project Time Flow” below for a detailed action list and the Appendix for a detailed action account and notes.

How to install, configure the systems, enable and protect services is described in the “Email Administrator Manual”.

The project takes a phased approach where the general flow is:

1. PHASE I: Primary IMAP network (theano, gorgo)
 1. priority is give to the primary IMAP network setup (since this will provide substantial improvement in user experience right from the start)
 2. Experiment with new features (mail alt locations, dsync to mbox format)
 2. PHASE II: Primary SMTP services network (theano, gorgo)
 3. PHASE III: Secondary IMAP network
 4. PHASE IV: Aecondary SMTP services network
 5. PHASE V: Message storage format, security, tuning, final checks
 1. Message storage format change to mbox
 2. Security enhancements
 3. tuning
 6. PHASE VI: External systems integration
 1. Mailing list manager
 2. Pine on ADA
 3. caching DNS
- Primary and secondary IMAP/SMTP networks function simultaneously and do not have priority over each other. Here the terms are used for reference only.
 - **NO EMAIL SERVICE DISRUPTION IS EXPECTED**

Project Time Flow

PRE-REQUISITES:

1. Check and verify that at least one storage device to be used is ready to accept load
 1. hermes (nfs) -> argo -> /Mail (is already available)
 2. orpheas (nfs) -> argo -> /Mail (will be available soon as a final location)
 3. orpheas (nfs) -> NetApp -> /MailAlt (will be available soon)

PHASE I: PRIMARY IMAP SET-UP (Expected Duration: 20 days)

2. THEANO – IMAP proxy #1

1. Install and secure OS - CentOS
 - A) iptables, fail2ban, secure at the firewall, set up monitoring
2. Compile and/or Install basic IMAP software
 - A) Dovecot
 - B) Configure IMAP proxy (director #1) to proxy to either NIREAS/IMAP or IOLAOS/IMAP based on user and or user-group. This is an initial state to test the director service.

3. GORGO – IMAP back end #1

1. Install and secure OS - CentOS
 - A) iptables, fail2ban, secure at the firewall, set up monitoring
2. Compile and/or Install basic IMAP software – Dovecot (Ref.: Setting up Dovecot)
3. Configure to become a back end IMAP server
4. enable LDAP authentication.
5. LDAP schema for users directly accessed by IMAP.
 - A) Why not through PAM for password authentication
 - B) MUST be direct for extra fields (is this true? Must be verified)
6. Install the Sieve extension - filtering
7. Enable IMAP Quota

4. Expire NIREAS/IMAP only – keep NIREAS/SMTP for now

- A) Reconfigure THEANO to proxy to the new IMAP back end (GORGO)
- B) Disable IMAP on NIREAS
- C) mail.cs.ucy.ac.cy should point to theano.cs.ucy.ac.cy
- D) MX records should remain as is (iolaos, nireas)

5. GORGO – NewFiler/MailAlt – Optional Activity

1. Convert message store from maildir to mbox by using dsync
 - o This is sort of a backup process
 - o TO actually make use of the /MailAlt requires the ability to individually set the location of message repositories

MILESTONE #1:

Successful operation of Dovecot as an IMAP server, proxy/director on theano and back end on gorgo

means that PHASE I is finished and we have a complete usable IMAP mail environment based on the new objectives.

PHASE II: PRIMARY SMTP SET-UP (Expected Duration: 20 days)

6. THEANO – SMTP External Relay #1
 1. Enable SMTP services
 - A) (Compile), install and configure Postfix as a relay
 - B) Relay SMTP traffic to IOLAOS, NIREAS
 - C) *SPAM/VIRUS control – AMAVISD*
 - I. *AMAVISD*
 - II. *CLAMAV set up*
 - III. *SPAMASSASSIN set up*
7. GORGO - SMTP Internal Back End #1
 1. (Compile), install and configure Postfix as a back-end
 2. *Dovecot needs to be configured here to enable its LDA/LMTP to enable the LDA delivery and Postfix to make use of it*
 3. *Configure Sieve global filters to replace procmail*
 4. *Add new MX record with higher priority on GORGO*
 5. *Demote NIREAS MX record to a very low priority (MX priorities are now GORGO, IOLAOS, NIREAS)*
 6. *mail-out.cs.ucy.ac.cy (???)*
8. *THEANO – Reconfigure to Relay to: IOLAOS, GORGO now*

MILESTONE #2:

Proper operation of both SMTP relay #1 and SMTP back end #1 allows bringing the new systems on-line (with an additional MX record). It also allows, as second step, transfer of existing system (nireas, iolaos SMTP) functionality to the new systems. At this point NIREAS is free of mail services but kept as backup in case we discover problems.

PHASE III: SECONDARY GROUP IMAP SET-UP (Expected Duration: 15 days)

9. ELYSSO – IMAP proxy #2
 1. Install and secure the OS - CentOS
 - A) Iptables, fail2ban, secure at the firewall, set up monitoring
 2. Compile, install, configure basic IMAP software - Dovecot
 3. Enable IMAP proxy/director #2
 - A) Proxy to GORGO and IOLAOS for now
10. MIRTO – IMAP back end #2
 1. Install and secure OS - CentOS
 - A) iptables, fail2ban, secure at the firewall, set up monitoring
 2. Compile and/or Install basic IMAP software - Dovecot
 3. Configure to become a back end IMAP server #2

4. Install the Sieve extension – user filtering
5. enable LDAP authentication
11. Expire IOLAOS/IMAP only – keep IOLAOS/SMTP for now
 - A) Reconfigure THENO, ELYSSO to proxy to the new IMAP back ends #1, #2 (GORGO, MIRTO)
 - B) Disable IMAP on IOLAOS
 - C) mail.cs.ucy.ac.cy should now point to theano.cs.ucy.ac.cy and elysson.cs.ucy.ac.cy
 - D) MX records should remain as is (gorgo, iolaos, nireas)

PHASE IV: SECONDARY GROUP SMTP SET-UP (Expected Duration: 15 days)

12. ELYSSO – SMTP External Relay #2

1. Enable SMTP services
 - A) (Compile), install and configure Postfix as a relay
 - B) Relay SMTP traffic to GORGO, IOLAOS
 - C) SPAM/VIRUS control – AMAVISD
 - I. AMAVISD
 - II. CLAMAV set up
 - III. SPAMASSASSIN set up

13. MIRTO - SMTP Internal Back End #2

1. (Compile), install and configure Postfix as a back-end
2. Dovecot needs to be configured here to enable its LDA/LMTP to enable the LDA delivery and Postfix to make use of it
3. Configure Sieve global filters to replace procmail
4. SPAM/VIRUS control – AMAVISD
 - A) CLAMAV set up
 - B) SPAMASSASSIN set up
5. Add new MX record for MIRTO
 - A) MX records priority now GORGO, MIRTO, IOLAOS
 - B) Remove NIREAS MX record (NIREAS is now dead for email. Thank you – more than 10 years of service!!)
6. mail-out.cs.ucy.ac.cy (???)

14. THEANO – Reconfigure to SMTP relay to: GORGO and MIRTO now

PHASE V:

MDBOX MESSAGE STORE CONVERSION, TUNING, SECURITY ENHANCEMENTS, FINAL CHECKS (Expected Duration: 20 days)

15. Convert message store to mbox message format

1. DSYNC – Replicate message storage to a secondary storage area
2. Enable “alternative” location for Dovecot

16. Tuning of systems – Final Configurations – SMTP

1. Remove IOLAOS MX record (IOLAOS is now dead for email)

2. POLICYD (!!)

MILESTONE #3:

PHASE VI:

17. FURTHER ENHANCEMENTS

1. Mailing lists management

A) csall etc

B) project mailing lists

C) ad-hoc mailing lists – user defined – announce

Unresolved Issues

(not yet in the Project plan)

- *pine on ADA*
- *caching DNS (on outgoing SMTP)*

Appendix: Activity Schedule

d – working day (estimate)

Official Start: 09/12/2013

Time	System	What	Notes	Done
PHASE I: PRIMARY IMAP SET-UP (+20d total)				
+3d	THEANO	- Install and secure OS with all already standard methods (see Linux install and security in wiki)		11/12/2013
		- iptables, fail2ban, secure, firewall - check further the VLAN security	This should be revisited on the final check-out and in line with future DMZ mods.	11/12/2013
+7d	THEANO	- compile and install dovecot	Due to a problem with IOLAOS hanging at random:	12/12/2013
		- Dovecot configuration as a front-end proxy #1	* this was slightly modified to go directly to gorgo which was already a live IMAP server also (see below) removing load from nireas and bypassing the unstable iolaos. Proxying is currently static and should be modified when the secondary IMAP is available.	12/12/2013
		- configure IMAP proxy to NIREAS/IOLAOS based on user/group (50/50).	* also decided to redirect RC to theano to bypass the unstable iolaos as soon as the theano/gorgo IMAP couple are ready and as a testing ground.	12/12/2013
+10d	GORGO	- Install and secure OS with all already standard methods (see Linux install and security in wiki)		12/12/2013
		- iptables, fail2ban, secure, firewall - check further the VLAN security	This should be revisited on the final check-out and in line with future DMZ mods.	12/12/2013
+15d	GORGO	- compile and install Dovecot 2.2.x		12/12/2013
		- Dovecot configuration as a back end #1		12/12/2013
		- enable LDAP authentication	* authentication is via SSSD to LDAP	12/12/2013
		- install the Sieve extension	* managesieve installed BUT cannot be used since proxying of this protocol MUST be enabled on THEANO-proxy – postponed until after installation of GORGO	12/12/2013
		- install/enable IMAP quota		12/12/2013

		- Test for stand alone operation		12/12/2013
		-Test proper proxying from THEANO	** static proxying **	12/12/2013
Due to problems with IOLAOS being unstable decided to jump to PHASE II and postpone actions here until IOLAOS/SMTP is replaced. (12/12/2013)				
+18d	LDAP	- set up of LDAP mail schema (kekkos) - enable IMAP to receive user info from LDAP		
+20d	NIREAS	- reconfigure THEANO to proxy to the new GORGO/IMAP back end - expire NIREAS IMAP – keep NIREAS/SMTP - mail.cs.ucy.ac.cy should point to THEANO - MX remain as (iolaos, nireas)		12/12/2013
+22d	GORGO/ NewFiler	- convert message store from maildir to mbox by using dsync manually - this is actually a backup process on the message store level - NOTE: using the mail alt feature of Dovecot requires the ability to individually set the message location - This is experimental at this stage and meant to test the concept		
MAILSTONE 1				
TEST all above functionality for				
<ul style="list-style-type: none"> • dovecot proxying • dovecot operation • quota • sieve • LDAP schema 				
PHASE II: PRIMARY SMTP SET-UP (+20d total)				
+27d	THEANO	- Enable SMTP services - Compile, install, configure Postfix as a relay #1 - relay SMTP traffic to IOLAOS, NIREAS - install, configure AMAVISD to do CLAMAV, SPAMASSASSIN scans		
+32d	GORGO	- enable SMTP services - compile install, configure Postfix as SMTP Internal back end #1		

		<ul style="list-style-type: none"> - ** enable Dovecot LDA/LMTP (required for delivery to message store by Postfix) – change from PROCMAIL - add new MX record with higher priority than NIREAS 		
+34d	NIREAS	<ul style="list-style-type: none"> - Demote NIREAS MX record to a very low priority ** MX priorities are now GORGO, IOLAOS, NIREAS 		
+36d	DNS	Mail-out.cs.ucy.ac.cy (?????)		
+40d	THEANO	<ul style="list-style-type: none"> - reconfigure to relay to IOLAOS, GORGO 		
MILESTONE #2 Test all above - at this stage we have a complete system (IMAP/SMTP services) except the fault tolerant part - complete functionality testing is done here. <ul style="list-style-type: none"> - SMTP delivery - IMAP proxying - IMAP and SMTP back ends - LDAP schema working - auxiliary systems (quota, sieve) - begin writing the user manual				
PHASE III: SECONDARY IMAP SET-UP (+15d total)				
+43d	ELYSSO	<ul style="list-style-type: none"> - Install and secure OS with all already standard methods (Linux install and security in wiki - iptables, fail2ban, secure, firewall - check further the VLAN security 		
+45d	ELYSSO	<ul style="list-style-type: none"> - compile and install dovecot - configure IMAP proxy #2 to GORGO/IOLAOS based on user/group (50/50). 		
+50d	MIRTO	<ul style="list-style-type: none"> - Install and secure OS with all already standard methods (Linux install and security in wiki - iptables, fail2ban, secure, firewall - check further the VLAN security 		
+52+	MIRTO	<ul style="list-style-type: none"> - compile and install Dovecot 2.2.x - Dovecot configuration as back end #2 - enable LDAP authentication - install the Sieve extension - install/enable IMAP quota 		
+55d	IOLAOS	<ul style="list-style-type: none"> - expire IOLAOS/IMAP - reconfigure THEANO, ELYSSO to proxy to the new IMAP back ends #1 #2 (GORGO, MIRTO) - DISABLE IMAP on IOLAOS 		
+55d	DNS	<ul style="list-style-type: none"> - mail.cs.ucy.ac.cy should now point to theano.cs.ucy.ac.cy and elyso.cs.ucy.ac.cy - MX records should remain as is 		

		(GORG0, IOLAOS, NIREAS)		
PHASE IV: SECONDARY SMTP SET-UP (+15d total)				
+57d	ELYSSO	<ul style="list-style-type: none"> - SMTP External Relay #2 - Enable SMTP services - Compile, install, configure Postfix as a relay #1 - relay SMTP traffic to GORG0, IOLAOS - install, configure AMAVISD to do CLAMAV, SPAMASSASSIN scans 		
+60d	MIRTO	<ul style="list-style-type: none"> - Internal Back end #2 - enable SMTP services - compile install, configure Postfix as SMTP Internal back end #2 - ** enable Dovecot LDA/LMTP (required for delivery to message store by Postfix) – change from PROCMail 		
+65d	DNS	<ul style="list-style-type: none"> - add new MX record for MIRTO - MX records now: GORG0, MIRTO, IOLAOS - remove NIREAS MX record (NIREAS now dead!!) - mail-out.cs.ucy.ac.cy (???) 		
+70d	THEANO	<ul style="list-style-type: none"> - reconfigure to SMTP relay to GORG0, MIRTO 		
PHASE V: NewFiler and MDBOX change (+10d)				
+75d	GORG0 MIRTO	<ul style="list-style-type: none"> - Dovecot dynamic synchronization (DSYNC) - test manual synchronization for proper operation (from - set up DSYNC for on line synchronization (
+78d	GORG0 MIRTO	<ul style="list-style-type: none"> - make use of newfiler instead of hermes NFS 		
+80d	DNS	<ul style="list-style-type: none"> - remove MX record for IOLAOS (ioloas now dead for email) 		
PHASE VI: Additional Work – Tuning (+10d)				
+83d		Postfix Policyd		
+85d		Mailing list management		
+88d		Dovecot mail alt feature		
+90d		SPAM config with outside SPAM DBs		