Innopolis University

SYSTEM AND NETWORKING ENGINEERING

Classical Internet Applications

LABORATORY REPORT 6

Mail Transfer Agents (1)

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Introduction

Email is one of the most important services a System Engineer has to provide for the user base. If mail cannot be sent or received, users invariably cannot perform their duties. A working mail server is therefore of high importance.

A mail server is a computer that serves as an electronic post office for email. The Domain Name System (DNS) associates a mail server to a domain with an MX record containing the domain name of the host providing Mail Transfer Agent (MTA) services.

Mail Transfer Agent (MTA) is software that transfers electronic mail messages from one computer to another using a client–server application architecture. An MTA implements both the client (sending) and server (receiving) portions of the Simple Mail Transfer Protocol.

Initial Settings:

- MTA: **qmail**
- IP-address: **188.130.155.46**
- DNS implementation: **Unbound+NSD**
- FQDN: **st13.os3.su**
- Subdomain: **os3.su**
- Group members: Ilya Radostev (**Exim**, **st12.os3.su**), Bagdat Bimaganbetov (**Postfix**, **st3.os3.su**)

1 Mail Transfer Agents

1. As per usual, explain everything you have done in your log, and how.

   (a) First make sure that your system does not contain a pre-installed version of the MTA of your choice, if so, remove it before you continue.

Q1 part A missing. No output or command

```
$ dpkg -l qmail
dpkg-query: no packages found matching qmail
```

   (b) Make sure the source code is retrieved from a secure location. Use the official website for the MTA of your choice.

   Answer:

```
$ wget http://www.qmail.org/netqmail-1.06.tar.gz
$ wget http://cr.yp.to/ucspi-tcp/ucspi-tcp-0.88.tar.gz
$ wget http://cr.yp.to/daemontools/daemontools-0.76.tar.gz
```

   (c) Because it is important that an MTA be correct and secure it is often signed using a digital PGP signature. If your MTA is signed then make sure you have downloaded the correct sources by checking the validity of the key and the signature.

   Answer:

```
$ md5sum netqmail-1.06.tar.gz
c922f776140b2c83043a6195901c67d3  netqmail-1.06.tar.gz
$ cat qmail.md5
c922f776140b2c83043a6195901c67d3
```

   (d) There are a number of options that you will have to enter before compilation, so that the functionality can be compiled into the program. Make sure the basic install holds all the necessary functionality. Show the options you configured.

      i. Building the source

      - Verifying build environment (C compiler is required)

```
$ cc
cc: fatal error: no input files
compilation terminated.
```

      - Unpacking the distribution

```
$ su
Password:
# umask 022
# mkdir -p /usr/local/src/
# mv netqmail-1.06.tar.gz ucspi-tcp-0.88.tar.gz /usr/local/src/
# mkdir -p /package
# mv daemontools-0.76.tar.gz /package/
# chmod 1755 /package/
# cd /usr/local/src/
# tar xpf  netqmail-1.06.tar.gz
```

```
# tar xpf ucspi-tcp-0.88.tar.gz
# rm *.gz
# cd /package/
# tar xpf daemontools-0.76.tar.gz
# rm *gz
```

The directories */usr/local/src/netqmail-1.06*, */usr/local/src/ucspi-tcp-0.88*, and */package/admin/daemontools-0.76* were created.

- Creating the qmail "home" directories

```
# mkdir /var/qmail
```

- Creating users and groups

```
# cd /usr/local/src/netqmail-1.06/
# cp INSTALL.ids IDS
# vim IDS
groupadd nofiles
useradd -g nofiles -d /var/qmail/alias alias
useradd -g nofiles -d /var/qmail qmaild
useradd -g nofiles -d /var/qmail qmaill
useradd -g nofiles -d /var/qmail qmailp
groupadd qmail
useradd -g qmail -d /var/qmail qmailq
useradd -g qmail -d /var/qmail qmailr
useradd -g qmail -d /var/qmail qmails
# bash IDS
```

- Patching

```
# cd other-patches
# wget https://www.ckdhr.com/ckd/qmail-103.patch
# cd ..
# patch < other-patches/qmail-103.patch
patching file dns.c
Hunk #1 succeeded at 19 (offset -2 lines).
Hunk #2 succeeded at 45 (offset -2 lines).
Hunk #3 succeeded at 81 (offset -2 lines).
```

- Doing the build

```
# make setup check
# ./config
Your hostname is ns1.
hard error
Sorry, I couldn't find your host's canonical name in DNS.
You will have to set up control/me yourself.
# ./config-fast st13.os3.su
Your fully qualified host name is st13.os3.su.
Putting st13.os3.su into control/me...
Putting os3.su into control/defaultdomain...
Putting os3.su into control/plusdomain...
Putting st13.os3.su into control/locals...
Putting st13.os3.su into control/rcpthosts...
Now qmail will refuse to accept SMTP messages except to
 ↪  st13.os3.su.
```

```
Make sure to change rcpthosts if you add hosts to locals or
 ↪  virtualdomains!
```

ii. Installing *ucspi-tcp*

- Building the source
  - Patching

```
# cd /usr/local/src/ucspi-tcp-0.88/
# patch < /usr/local/src/netqmail-1.06/other-patches/ucspi-tcp-0.8
 ↪  8.errno.patch
```

  - Doing the build

```
# make
# make setup check
./install
./instcheck
```

iii. Installing *daemontools*

- Building the source
  - Patching

```
# cd /package/admin/daemontools-0.76/src
# patch < /usr/local/src/netqmail-1.06/other-patches/
 ↪  daemontools-0.76.errno.patch
```

  - Doing the build

```
# cd ..
# package/install
```

- Fix problems with running *svscan*

```
# vim /lib/systemd/system/daemontools.svscan.service

[Unit]
Description=Daemontools svscan
After=sysinit.target

[Service]
ExecStart=/command/svscanboot </dev/null >/var/log/svscan 2>&1
Restart=always

[Install]
WantedBy=multi-user.target

# ln -s /lib/systemd/system/daemontools.svscan.service /etc/systemd/
 ↪  system/multi-user.target.wants/daemontools.svscan.service
# ll /etc/systemd/system/multi-user.target.wants/daemontools.svscan.
 ↪  service
lrwxrwxrwx 1 root root 46 sep 16 13:03 /etc/systemd/system/multi-use
 ↪  r.target.wants/daemontools.svscan.service ->
 ↪  /lib/systemd/system/daemontools.svscan.service
# systemctl reboot
$ ps aux | grep svscan
root       752  0.0  0.0   4508   760 ?        Ss   10:17   0:00
 ↪  /bin/sh /command/svscanboot </dev/null >/var/log/svscan 2>&1
root       938  0.0  0.0   4408  1164 ?        S    10:17   0:00
 ↪  svscan /service
```

iv. Tunning *qmail*

- Creating script

```
# cd /var/qmail
# vim rc
```

```
#!/bin/sh

# Using stdout for logging
# Using control/defaultdelivery from qmail-local to deliver messages
 ↪  by default

exec env - PATH="/var/qmail/bin:$PATH" \
qmail-start "`cat /var/qmail/control/defaultdelivery`"
```

```
# chmod 755 rc
# mkdir /var/log/qmail
```

- Setting the default delivery mode for messages that aren't delivered by a *.qmail* file

```
# echo ./Mailbox > /var/qmail/control/defaultdelivery
```

- Creating a startup/shutdown script *qmailctl*

```
# cd /var/qmail/bin
# wget http://lifewithqmail.org/qmailctl-script-dt70
# mv qmailctl-script-dt70 qmailctl
# chmod 755 /var/qmail/bin/qmailctl
# ln -s /var/qmail/bin/qmailctl /usr/bin
```

- Creating the *supervise* scripts

```
# mkdir -p /var/qmail/supervise/qmail-send/log
# mkdir -p /var/qmail/supervise/qmail-smtpd/log
# vim /var/qmail/supervise/qmail-send/run
```

```
#!/bin/sh
exec /var/qmail/rc
```

```
# vim /var/qmail/supervise/qmail-send/log/run
```

```
#!/bin/sh
exec /usr/local/bin/setuidgid qmaill /usr/local/bin/multilog t
 ↪  /var/log/qmail
```

```
# vim /var/qmail/supervise/qmail-smtpd/run
```

```
#!/bin/sh

QMAILDUID=`id -u qmaild`
NOFILESGID=`id -g qmaild`
MAXSMTPD=`cat /var/qmail/control/concurrencyincoming`
LOCAL=`head -1 /var/qmail/control/me`

if [ -z "$QMAILDUID" -o -z "$NOFILESGID" -o -z "$MAXSMTPD" -o -z
 ↪  "$LOCAL" ]; then
    echo QMAILDUID, NOFILESGID, MAXSMTPD, or LOCAL is unset in
    echo /var/qmail/supervise/qmail-smtpd/run
    exit 1
fi

if [ ! -f /var/qmail/control/rcpthosts ]; then
    echo "No /var/qmail/control/rcpthosts!"
    echo "Refusing to start SMTP listener because it'll create an
     ↪  open relay"
```

```
    exit 1
fi

exec /usr/local/bin/softlimit -m 4000000 \
    /usr/local/bin/tcpserver -v -R -l "$LOCAL" -x /etc/tcp.smtp.cdb
     ↪  -c "$MAXSMTPD" \
        -u "$QMAILDUID" -g "$NOFILESGID" 0 smtp
         ↪  /var/qmail/bin/qmail-smtpd 2>&1
```

```
# vim /var/qmail/supervise/qmail-smtpd/log/run
```

```
#!/bin/sh
exec /usr/local/bin/setuidgid qmaill /usr/local/bin/multilog t
 ↪  /var/log/qmail/smtpd
```

```
# echo 20 > /var/qmail/control/concurrencyincoming
# chmod 644 /var/qmail/control/concurrencyincoming
# chmod 755 /var/qmail/supervise/qmail-send/run
# chmod 755 /var/qmail/supervise/qmail-send/log/run
# chmod 755 /var/qmail/supervise/qmail-smtpd/run
# chmod 755 /var/qmail/supervise/qmail-smtpd/log/run
# mkdir -p /var/log/qmail/smtpd
# chown qmaill /var/log/qmail /var/log/qmail/smtpd
# ln -s /var/qmail/supervise/qmail-send
 ↪  /var/qmail/supervise/qmail-smtpd /service
# qmailctl stop
Stopping qmail...
  qmail-smtpd
  qmail-send
Starting qmail
```

- Allowing the local host to inject mail via SMTP

```
# echo '127.:allow,RELAYCLIENT=""' >>/etc/tcp.smtp
# qmailctl cdb
Reloaded /etc/tcp.smtp.
```

v. Creating System Aliases

```
# echo sergey > /var/qmail/alias/.qmail-root
# echo sergey > /var/qmail/alias/.qmail-postmaster
# cd /var/qmail/alias/
# ln -s .qmail-postmaster /var/qmail/alias/.qmail-mailer-daemon
# ln -s .qmail-postmaster /var/qmail/alias/.qmail-abuse
# chmod 644 .qmail-root .qmail-postmaster
```

vi. Starting *qmail*

```
# qmailctl start
Starting qmail
```

vii. Testing the installation

```
# qmailctl stat
/service/qmail-send: up (pid 8745) 1086 seconds
/service/qmail-send/log: up (pid 8744) 1086 seconds
/service/qmail-smtpd: up (pid 14274) 1 seconds
/service/qmail-smtpd/log: up (pid 8749) 1086 seconds
messages in queue: 0
messages in queue but not yet preprocessed: 0
```

2. Most of the options for an MTA can be found in a configuration file that will be loaded when the MTA starts. It is recommended to start with an example configuration that looks a lot like what you need for now. Show how you adapt it to your needs.

Configuration files:

All of qmail's system configuration files, with the exception of the **.qmail** files in ∼alias, reside in **/var/qmail/control**.

```
# cd /var/qmail/control
# ls
concurrencyincoming  defaultdelivery  defaultdomain  locals  me  plusdomain
 ↪  rcpthosts
# cat *
20                  #concurrencyincoming
./Mailbox           #defaultdelivery
os3.su              #defaultdomain
st13.os3.su         #locals
st13.os3.su         #me
os3.su              #plusdomain
st13.os3.su         #rcpthosts
mail1.st13.os3.su   #rcpthosts
mail2.st13.os3.su   #rcpthosts
```

3. (a) Add a local account on your experimental machine and make sure that the MTA can deliver mail to it. Show the required configuration.

   Result:

   Adding a local account using aliases

```
# echo \&sergey > /var/qmail/alias/.qmail-gena
# exit
$ cd
$ vim file
```

```
To: gena@st13.os3.su
Subject: Checking

Hello! I'm you
```

```
$ qmail-inject < file
```

   (b) Add to your log an email received by this account. **Do not forget the full headers!**

   Result:

   Log file **/var/log/qmail**:

```
@4000000059be4dd105f7a044 new msg 8653768
@4000000059be4dd105f7a42c info msg 8653768: bytes 335 from
 ↪  <sergey@st13.os3.su> qp 6835 uid 1001
@4000000059be4dd10cf17424 starting delivery 22: msg 8653768 to
 ↪  local sergey@st13.os3.su
@4000000059be4dd10cf1780c status: local 2/10 remote 0/20
@4000000059be4dd10cf1780c delivery 21: success:
 ↪  did_0+1+0/qp_6835/
@4000000059be4dd10cf2338c status: local 1/10 remote 0/20
@4000000059be4dd10cf23774 end msg 8653735
@4000000059be4dd10f7636bc delivery 22: success: did_1+0+0/
@4000000059be4dd10f76d6e4 status: local 0/10 remote 0/20
@4000000059be4dd10f774444 end msg 8653768
```

Received email

```
$ less Mailbox
...
From sergey@st13.os3.su Sun Sep 17 10:26:15 2017
Return-Path: <sergey@st13.os3.su>
Delivered-To: sergey@st13.os3.su
Received: (qmail 6835 invoked by alias); 17 Sep 2017 10:26:14
 ↪  -0000
Delivered-To: gena@st13.os3.su
Received: (qmail 6832 invoked by uid 1000); 17 Sep 2017 10:26:14
 ↪  -0000
Date: 17 Sep 2017 10:26:14 -0000
Message-ID: <20170917102614.6831.qmail@st13.os3.su>
From: sergey@st13.os3.su
To: gena@st13.os3.su
Subject: Checking

Hello! I'm you
```

(c) Also make sure that any email intended for `postmaster@st<X>.os3.su` is delivered to this account. Show the full email as delivered to the new account and the required configuration.

Result:

Mail delivery to **postmaster@st13.os3.su**

```
# echo gena >> /var/qmail/alias/.qmail-postmaster
# vim /var/qmail/alias/.qmail-postmaster
```

```
sergey
gena
```

```
# exit
$ cd
$ vim file
```

```
To: postmaster@st13.os3.su
Subject: gena post master

blablabla
```

```
$ qmail-inject < file
$ less Mailbox
From sergey@st13.os3.su Sun Sep 17 10:53:22 2017
Return-Path: <sergey@st13.os3.su>
Delivered-To: sergey@st13.os3.su
Received: (qmail 7203 invoked by alias); 17 Sep 2017 10:53:21
 ↪  -0000
Delivered-To: gena@st13.os3.su
Received: (qmail 7198 invoked by alias); 17 Sep 2017 10:53:21
 ↪  -0000
Delivered-To: postmaster@st13.os3.su
```

```
Received: (qmail 7195 invoked by uid 1000); 17 Sep 2017 10:53:21
 ↪  -0000
Date: 17 Sep 2017 10:53:21 -0000
Message-ID: <20170917105321.7194.qmail@st13.os3.su>
From: sergey@st13.os3.su
To: postmaster@st13.os3.su
Subject: gena post master

blablabla
```

2 Mail Backup

You should now have a working MTA for your domain. If your server is not reachable for whatever reason, you would not want email sent to you to be returned to sender immediately. To remedy this we will configure backup MTAs on other servers. One of these backup MTAs will receive email intended for your domain when your own MTA is offline. Note that a backup MTA should not be confused with a server that makes backups of your mail, they have different functions.

Setting up two backup MTAs should be enough. Roughly follow the following steps to set up a backup MTA:

- Adapt the DNS information for your domain, so that the backup MTAs can be found.
- Configure the MTA on the backup mail server so that it accepts mail for relay for the domain it is backup for.

With a group of three and two backup MTAs, each server will be backup for the other two domains.

Question

4. First, describe you have done *on your own server* to create two backup MTAs for your domain. **Do not describe how you made your server fallback for the other domains at the same time, that is the next question.** This makes grading easier for your lab teacher.

   Result:

   Creating two backup MTAs for my domain

```
$ cd /usr/local/etc/nsd
$ systemctl stop nsd
$ sudo vim st13.os3.su.zone
```

```
    ...
        IN      MX      30      st12.os3.su.
        IN      MX      40      st3.os3.su.
    ...
```

```
$ sudo -u nsd ldns-signzone st13.os3.su.zone Kst13.os3.su.+008+15514
 ↪  Kst13.os3.su.+008+36381
$ sudo systemctl start nsd
```

5. Afterwards, describe what you have done on your own server to make it act as a backup for the two other domains.

   Result:

   Making my server act as a backup for the two other domains

```
$ su
Password:
# vim /var/qmail/control/rcpthosts
```

```
...
st12.os3.su
st3.os3.su
```

6. Shutdown your MTA, send a mail to your domain and show

   (a) The email is delivered to one of your colleagues.

   Result:

   - Shutdown MTA

```
# qmailctl stop
```

   - Send the message using innopolis mailbox

```
From: <s.grebennikov@innopolis.ru>
To: <sergey@st13.os3.su>
Subject: Test st13.os3.su

It's the test for st13.os3.su!!!!

Hello
```

   - My colleague Ilya Radostev (**exim**, **st12.os3.su**) turned off his MTA and my message was delivered to Bagdat Bimaganbetov. (**postfix**, **st3.os3.su**)

   Postfix log file

```
Sep 17 21:32:54 st3.os3.su postfix/smtpd[21315]: 8BED5C820A4: client=unknown[10.90.14.9]
Sep 17 21:32:54 st3.os3.su postfix/cleanup[21320]: 8BED5C820A4: message-id=<1505673170715.33134@innopolis.ru>
Sep 17 21:32:54 st3.os3.su postfix/qmgr[21269]: 8BED5C820A4: from=<s.grebennikov@innopolis.ru>, size=2688, nrcpt=1
 ↪    (queue active)
Sep 17 21:32:54 st3.os3.su postfix/smtpd[21315]: disconnect from unknown[10.90.14.9] ehlo=2 starttls=1 mail=1 rcpt=1
 ↪    data=1 quit=1 commands=7
Sep 17 21:32:54 st3.os3.su spamd[15895]: spamd: connection from localhost.localdomain [::1]:58246 to port 783, fd 5
Sep 17 21:32:54 st3.os3.su spamd[15895]: spamd: processing message <1505673170715.33134@innopolis.ru> for spamd:182
...
from=<s.grebennikov@innopolis.ru>
Sep 17 21:33:02 st3.os3.su postfix/pipe[21321]: 8BED5C820A4: to=<sergey@st13.os3.su>, relay=spamassasin, delay=8.2,
 ↪    delays=0.17/0/0/8.1, dsn=2.0.0, status=sent (delivered via spamassasin service)
Sep 17 21:33:02 st3.os3.su postfix/qmgr[21269]: 8BED5C820A4: removed
Sep 17 21:33:02 st3.os3.su postfix/cleanup[21320]: C01D5C820A6: message-id=<1505673170715.33134@innopolis.ru>
Sep 17 21:33:02 st3.os3.su postfix/qmgr[21269]: C01D5C820A6: from=<s.grebennikov@innopolis.ru>, size=3191, nrcpt=1
 ↪    (queue active)
Sep 17 21:33:03 st3.os3.su postfix/smtp[21325]: connect to mail1.st13.os3.su[188.130.155.46]:25: Connection refusedSep
 ↪    17 21:33:03 st3.os3.su postfix/smtp[21325]: connect to mail2.st13.os3.su[188.130.155.46]:25: Connection refused
Sep 17 21:33:03 st3.os3.su postfix/smtp[21325]: connect to st12.os3.su[188.130.155.45]:25: Connection refused
Sep 17 21:33:03 st3.os3.su postfix/smtp[21325]: C01D5C820A6: to=<sergey@st13.os3.su>, relay=none, delay=0.63,
 ↪    delays=0.15/0.01/0.47/0, dsn=4.4.1, status=deferred (connect to st12.os3.su[188.130.155.45]:25: Connection
 ↪    refused)
```

   (b) The email is delivered to your MTA when you turn it back on.

   Result:

   - Turn on my MTA

```
# qmailctl start
```

Postfix log file

```
Sep 17 21:33:37 st3.os3.su postfix/qmgr[21269]: C01D5C820A6: from=<s.grebennikov@innopolis.ru>, size=3191, nrcpt=1
  ↪    (queue active)
Sep 17 21:33:38 st3.os3.su postfix/smtp[21325]: C01D5C820A6: to=<sergey@st13.os3.su>,
  ↪    relay=mail1.st13.os3.su[188.130.155.46]:25, delay=36, delays=35/0/0.52/0.1, dsn=2.0.0, status=sent (250 ok
  ↪    1505673218 qp 5576)
Sep 17 21:33:38 st3.os3.su postfix/qmgr[21269]: C01D5C820A6: remove
```

qmail log file

```
@4000000059bebde613bff244 new msg 8653778
@4000000059bebde613bff62c info msg 8653778: bytes 3345 from <s.grebennikov@innopolis.ru> qp 5418 uid 1002
@4000000059bebde61ab8d00c starting delivery 1: msg 8653778 to local sergey@st13.OS3.su
@4000000059bebde61ab8d3f4 status: local 1/10 remote 0/20
@4000000059bebde620b6bba4 delivery 1: success: did_1+0+0/
@4000000059bebde620b6bf8c status: local 0/10 remote 0/20
@4000000059bebde620b6bf8c end msg 8653778
@4000000059bebf360cdcde9c status: exiting
@4000000059bebf6d3a8141bc status: local 0/10 remote 0/20
@4000000059bebff10664872c status: exiting
@4000000059bebff1067a93b4 status: local 0/10 remote 0/20
@4000000059bec00c1fc4222c new msg 8653778
@4000000059bec00c1fc458dc info msg 8653778: bytes 3272 from <s.grebennikov@innopolis.ru> qp 5576 uid 1002
@4000000059bec00c25cfe4bc starting delivery 1: msg 8653778 to local sergey@st13.os3.su
@4000000059bec00c25cfe8a4 status: local 1/10 remote 0/20
@4000000059bec00c29ce9d24 delivery 1: success: did_1+0+0/
@4000000059bec00c29cf50d4 status: local 0/10 remote 0/20
@4000000059bec00c29cf7bcc end msg 8653778
```

qmail Mailbox

```
From s.grebennikov@innopolis.ru Sun Sep 17 18:33:38 2017
Return-Path: <s.grebennikov@innopolis.ru>
Delivered-To: sergey@st13.os3.su
Received: (qmail 5576 invoked from network); 17 Sep 2017 18:33:38 -0000
Received: from mail.st3.os3.su (HELO st3.os3.su) (188.130.155.36)
  by st13.os3.su with SMTP; 17 Sep 2017 18:33:38 -0000
Received: by st3.os3.su (Postfix, from userid 182)
  id C01D5C820A6; Sun, 17 Sep 2017 21:33:02 +0300 (MSK)
Authentication-Results: st3.os3.su;
  dkim=pass (2048-bit key) header.d=innopolis.ru header.i=@innopolis.ru header.b=fEliQzPX
X-Spam-Checker-Version: SpamAssassin 3.4.1 (2015-04-28) on st3.os3.su
X-Spam-Level:
X-Spam-Status: No, score=-1.1 required=5.0 tests=ALL_TRUSTED,DKIM_SIGNED,
  DKIM_VALID,DKIM_VALID_AU,HTML_MESSAGE,URIBL_BLOCKED autolearn=ham
  autolearn_force=no version=3.4.1
Received: from st01-ex01.innopolis.ru (unknown [10.90.14.9])
  by st3.os3.su (Postfix) with ESMTPS id 8BED5C820A4
  for <sergey@st13.os3.su>; Sun, 17 Sep 2017 21:32:54 +0300 (MSK)
X-Assp-Version: 2.5.16302) on ASSPF01DCFBL.res.innopolis.ru
X-Assp-ID: ASSPF01DCFBL.res.innopolis.ru m1-73173-79060
X-Assp-Session: 7F91483A5508 (mail 1)
X-Assp-Envelope-From: s.grebennikov@innopolis.ru
X-Assp-Intended-For: sergey@st13.os3.su
X-Assp-Client-TLS: yes
X-Assp-Server-TLS: yes
Content-Language: ru-RU
Content-Type: multipart/alternative;
  boundary="_000_150567317071533134innopolisru_"
DKIM-Signature: v=1; a=rsa-sha256; d=innopolis.ru; s=unimail1;
  c=simple/simple; t=1505673173; h=from:subject:date:message-id;
  bh=o/+OeWoLFwpPzz5zjK20bB+4s7pJ/PWNkEC8nBZuZSI=;
  b=fEliQzPXlCBKysrcKXlipeV/a83gOKKzyfBVEQK+1zje32Akhsbu5KOqr9Il9+dEOPjI0OPD1EL
  997532khdwt9DVXpand6/BobTWmrcC91ecq8+1GEpWMz6kXMogaZIjicRKoJqnvvzs2Dr/VTihp3g
  nPLRDTsCBi/dCHOH5Pn/JmRGRyGhoxc22TWt/bPtw97mJT5vCidkfspVkhijLY+IjUECY5B53cMfm
  bkOzsQeSio9/uF0nXoP3UpSN/s8tkwFWI35ZNwHRLTwZixJwxK1BKNB1DmXo95wYyq4kWurhr9G85
  KagAbTIuqgUHRx43wi8MvXOhF67OdrSlgtGA==
From: Sergey Grebennikov <s.grebennikov@innopolis.ru>
To: "sergey@st13.os3.su" <sergey@st13.os3.su>
Subject: Test with st3.os3.su
Thread-Topic: Test with st3.os3.su
Thread-Index: AQHTL+MUiZD0aEvdyUiFW53eQ1O1wKK5ZuHi
Date: Sun, 17 Sep 2017 18:32:50 +0000
Message-ID: <1505673170715.33134@innopolis.ru>
References: <7ec2f0ef7fdc42b887835910c0c975af@EXMBO1.edu.innopolis.ru>
In-Reply-To: <7ec2f0ef7fdc42b887835910c0c975af@EXMBO1.edu.innopolis.ru>
Accept-Language: ru-RU, en-US
X-MS-Has-Attach:
X-MS-TNEF-Correlator:
x-ms-exchange-transport-fromentityheader: Hosted
MIME-Version: 1.0

|_000_150567317071533134innopolisru_
Content-Type: text/plain; charset="koi8-r"
Content-Transfer-Encoding: quoted-printable

?Test with st3.os3.su domain!!!?

...
```

3 Client Access and MTA Internals

7. Choose a console mail client that is available in the Ubuntu repositories, install it and configure it to read mail for the account added before.

Console Mail Client **mutt**

```
$ wget ftp://ftp.mutt.org/pub/mutt/mutt-1.9.0.tar.gz
$ tar xvf mutt-1.9.0.tar.gz
$ cd mutt-1.9.0/
$ ./configure
$ sudo make install
$ mutt -f Mailbox
```

(a) Where does the client store read emails?

Answer:

The mail client **mutt** stores read emails in the *Mailbox* file under the user's home directory, but this can be changed using the mutt configuration file **/etc/Muttrc**.

(b) In what format?

Answer:

The mail client **mutt** stores read emails in the **mbox** format that is a plain text file. Each message starts with a "From " line. Body-lines starting with "From" are usually escaped as ">From" if they occur in messages.

8. Briefly explain

(a) what mail queues your mail server uses?

Answer:

A mail server gets email into the on-disk queue using the **qmail-queue** program.

Rest ok, please concentrate more on Q 8

Qmail's queue consists of several directories. Some of them, which can be expected to hold many hundreds or thousands of files are split into numbered subdirectories. That is because in Unix, normally finding a file in a directory becomes slow if that directory contains many files. A message going through qmail will have related files in several places in that directory structure.

(b) what is their purpose?

Answer:

qmail-queue program takes an email (using **qmail-smptd** for outside messages or **qmail-inject** for local messages) and store it in the central queue directory (on-disk queue). The primary function of the on-disk queue is to serve as a reliable storage and signaling mechanism for the **qmail-send** program.

(c) where are they located on your machine?

Answer:

The queue is organized into several directories (**pid/**, **mess/**, **intd/**, **todo/**, **info/**, and **remote/**) under **/var/qmail/queue/** directory, each of which may contain files related to message. The directories:

```
mess - the message
todo - the envelope: where the message came from, where it's going
intd - the envelope, under construction by qmail-queue
```

```
info - the envelope sender address, after preprocessing
local - local envelope recipient addresses, after preprocessing
remote - remote envelope recipient addresses, after preprocessing
bounce - permanent delivery errors
```

(d) how can you interact with them?

Answer:

To display a list of all messages in the queue, enter the following command:

```
# /var/qmail/bin/qmail-qread
```

To display the number of messages in the queue, enter the following command:

```
# /var/qmail/bin/qmail-qstat
```

To display all the e-mail content in the queue, including the headers, enter the following command:

```
# find /var/qmail/queue -name NNNN| xargs cat | less
```

Where NNNN is the 8-digit identification number specified in the command **/var/qmail/bin/qmail-qread**.

4 Conclusion

qmail is a very separate program. Its broken down into multiple tiny programs that govern a very specific piece of the MTA process.

5 References

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[4] How Qmail Works [https://www.stephenrlang.com/2007/04/how-qmail-works/]

[5] qmail-queue [https://ru.godaddy.com/help/prosmotr-soobshenij-v-ocheredi-v-qmail-158