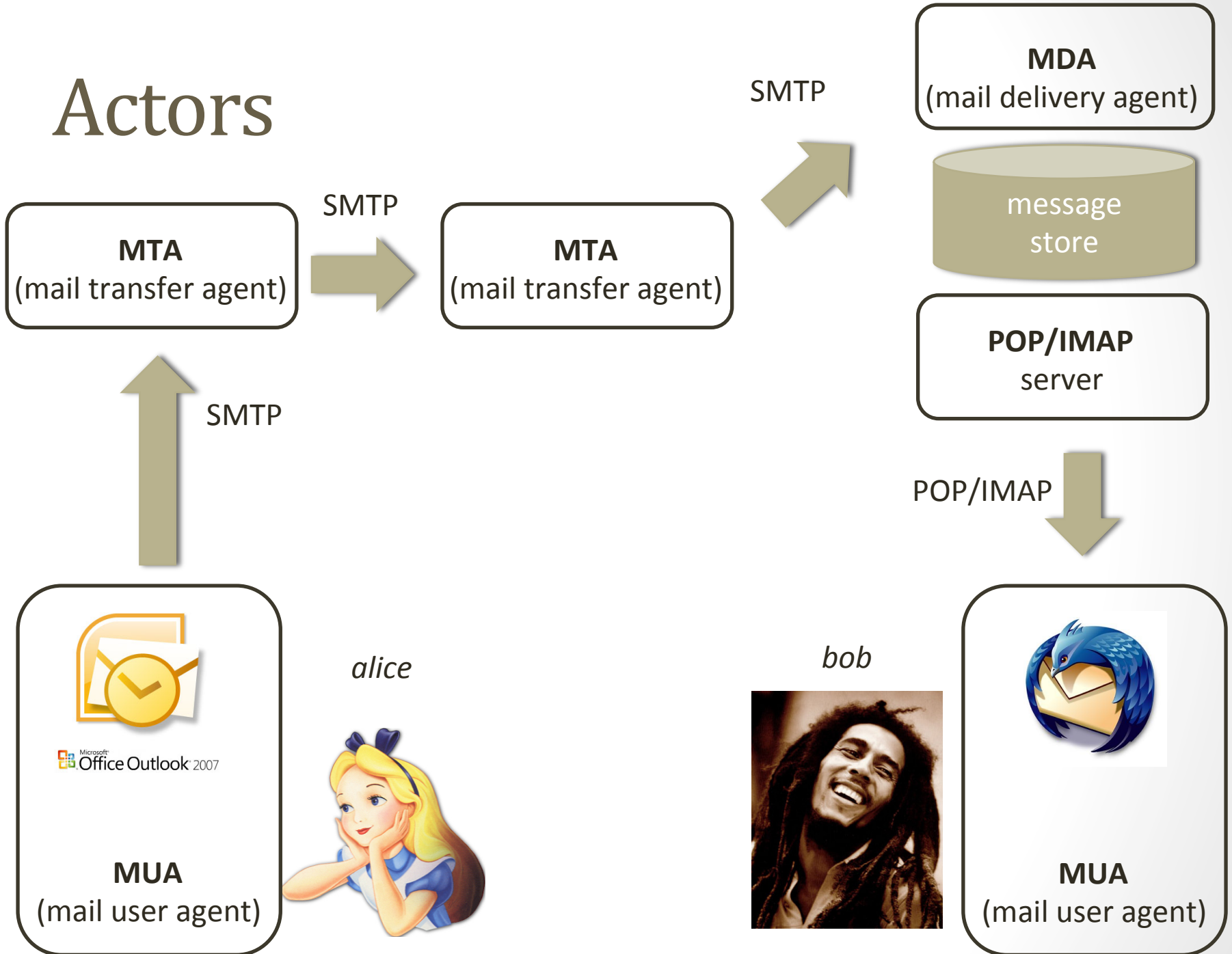


Email and Postfix

Lorenzo Bracciale

Marco Bonola

Actors



Postfix is a MTA

- other popular MTAs are:
 - sendmail: historical, hard to configure, several security flaws (
 - exim: popular
 - Postfix:
 - modular design
 - processes turned with minum priviledges and turned off when not used (e.g. MDA)
 - each process is chrooted and do not use fixed buffers (make buffer overflow unliked to happens)
 - keep DOS controlled (no more than X mem/storage used), rollback if problems

Where to study

- Postfix: the definitive guide (D. Dent - O' really)
- <http://www.postfix.org/documentation.html>
- RFCs

RCF 2822

- Newer respect to RFC 822
- Define the format for sending email

```
guest (ttya) freebie:~
i:Exit -:PrevPg SPC:NextPg v:Attach d:Del r:Reply j:Next ?:Help
From grog Sun Apr 12 14:31:02 1998
Date: Sun, 12 Apr 1998 14:31:02 +0930
From: Greg Lehey <grog@lemis.com>
To: Ang quest <quest@freebie.lemis.com>
Subject: Comparison
X-Mailer: Mutt 0.91i

FreeBSD is a direct descendent of the original UNIX, though it contains no residual AT&T code.

Linux is a clone and never contained any AT&T code

FreeBSD is a complete operating system, maintained by a central group of software developers. There is only one distribution of FreeBSD.

Linux is a kernel, personally maintained by a Linus Torvalds. The non-kernel programs supplied with Linux are part of a distribution, of which there are several.

FreeBSD aims to be a stable production environment.

Linux is still a ``bleeding edge`` development environment, though many distributions aim to make it more suitable for production use.

--- 1/1: Greg Lehey Comparison -- (72%)
```

header

body

SMTP

- Defined in RFC 2821
- commands and replies
- Extended with RFC 1869 to ESMTP (client → EHLO and server return list of extension supported)

\$ telnet mail.example.com 25

Trying 10.232.45.151 Connected to mail.example.com. Escape character is '^']'.

220 mail.example.com ESMTP Postfix

HELO mail.oreilly.com

250 mail.oreilly.com

MAIL FROM:<info@oreilly.com>

250 Ok

RCPT TO:<kdent@example.com>

250 Ok

DATA

354 End data with <CR><LF>.<CR><LF>

Date: Mon, 8 Apr 2003 15:38:21 -0500 From: Customer Service <info@oreilly.com> To:

<kdent@example.com> Reply-To: <service@oreilly.com> Message-ID:

<01a4e2238200842@mail.oreilly.com> Subject: Have you read RFC 2822?

This is the start of the body of the message. It could continue for many lines, but it doesn't.

.

250 Ok: queued as 5FA26B3DFE

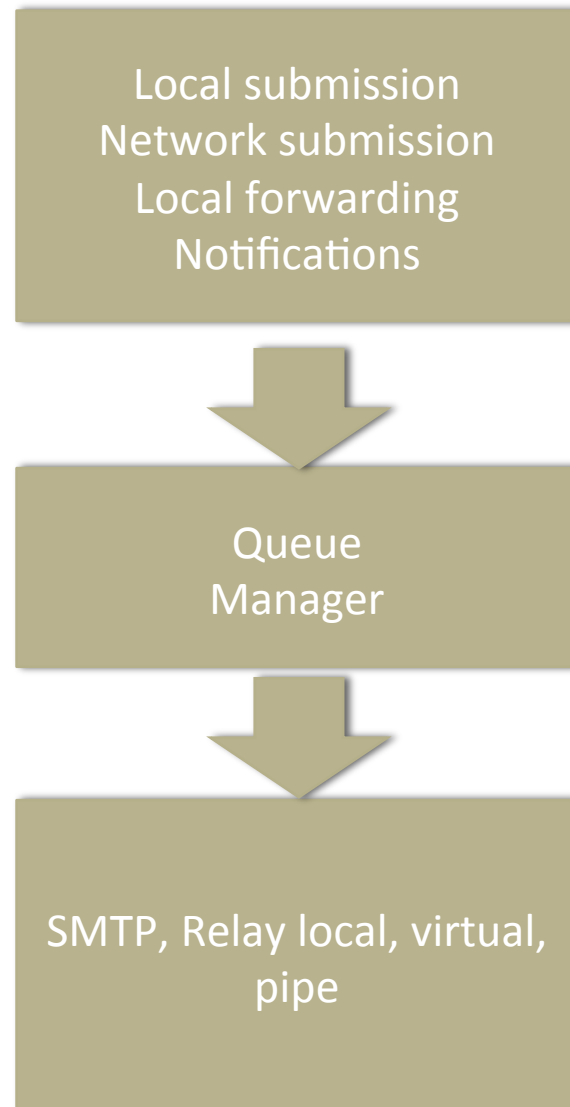
quit

221 Bye Connection closed by foreign host.

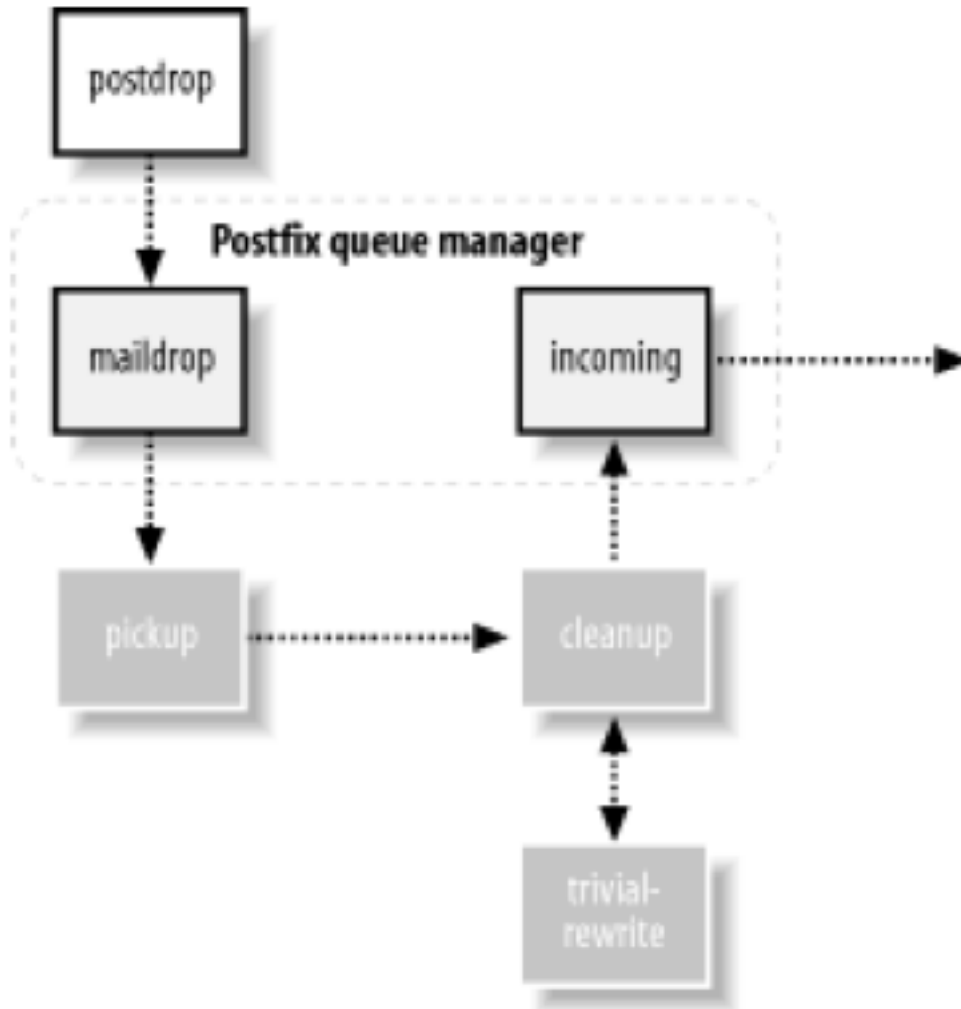
SMTP Response code

Code level	Status
2xx	The requested action was successful. The client may continue to the next step.
3xx	Command was accepted, but the server expects additional information. The client should send another command with the additional information.
4xx	The command was not successful, but the problem is temporary. The client should retry the action at a later time.
5xx	The command was not successful, and the problem is considered permanent. The client should not retry the action.

Postfix architecture



Local email submission



Postfix notifications

- When a user message is deferred or can't be delivered, Postfix uses the defer or bounce daemons to create a new error message.
- The error message is handed off to the cleanup daemon. It performs its normal checks before depositing the error message into the incoming queue, where it is picked up by the queue manager.
- Email administrator: Postmaster (RFC 2142)
 - In `/etc/alias` you should find an alias to root

Queue manager

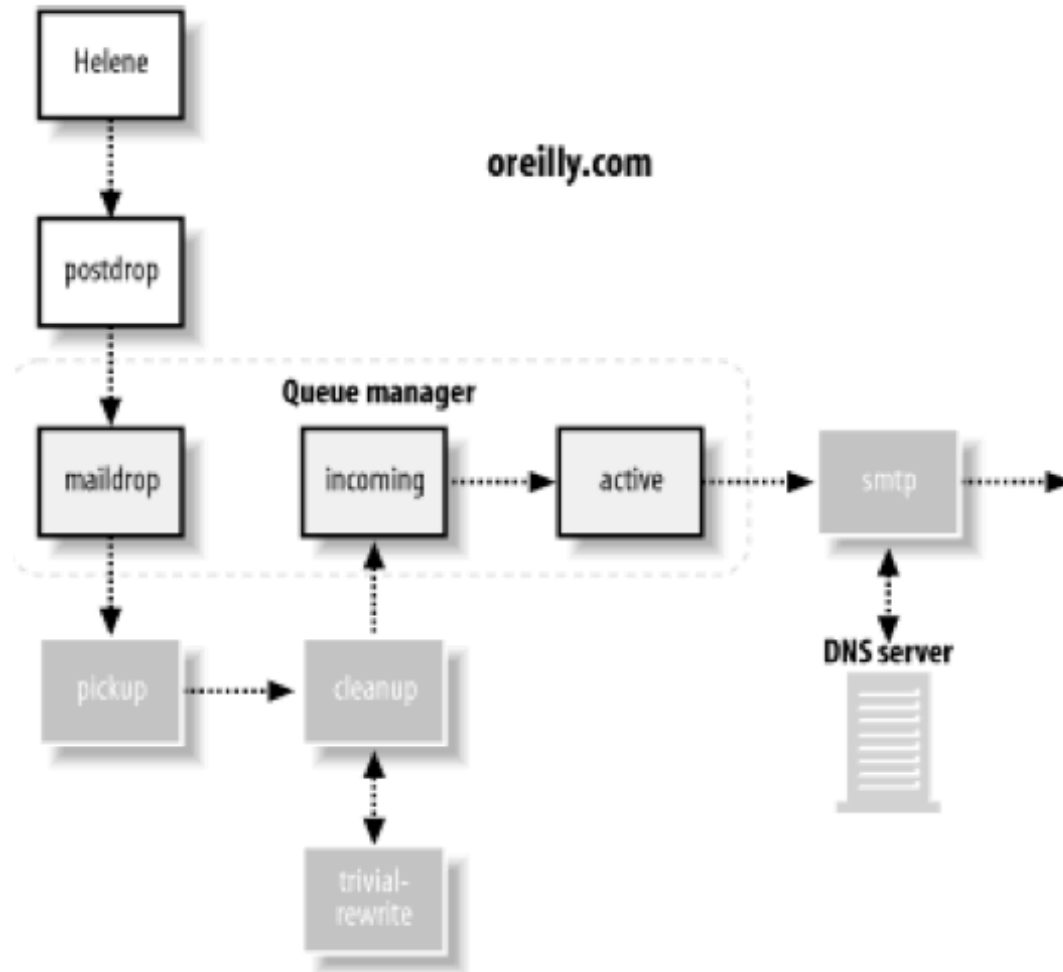
- 4 queue:
- incoming, active, deferred, and corrupt.

Mail delivery - classes

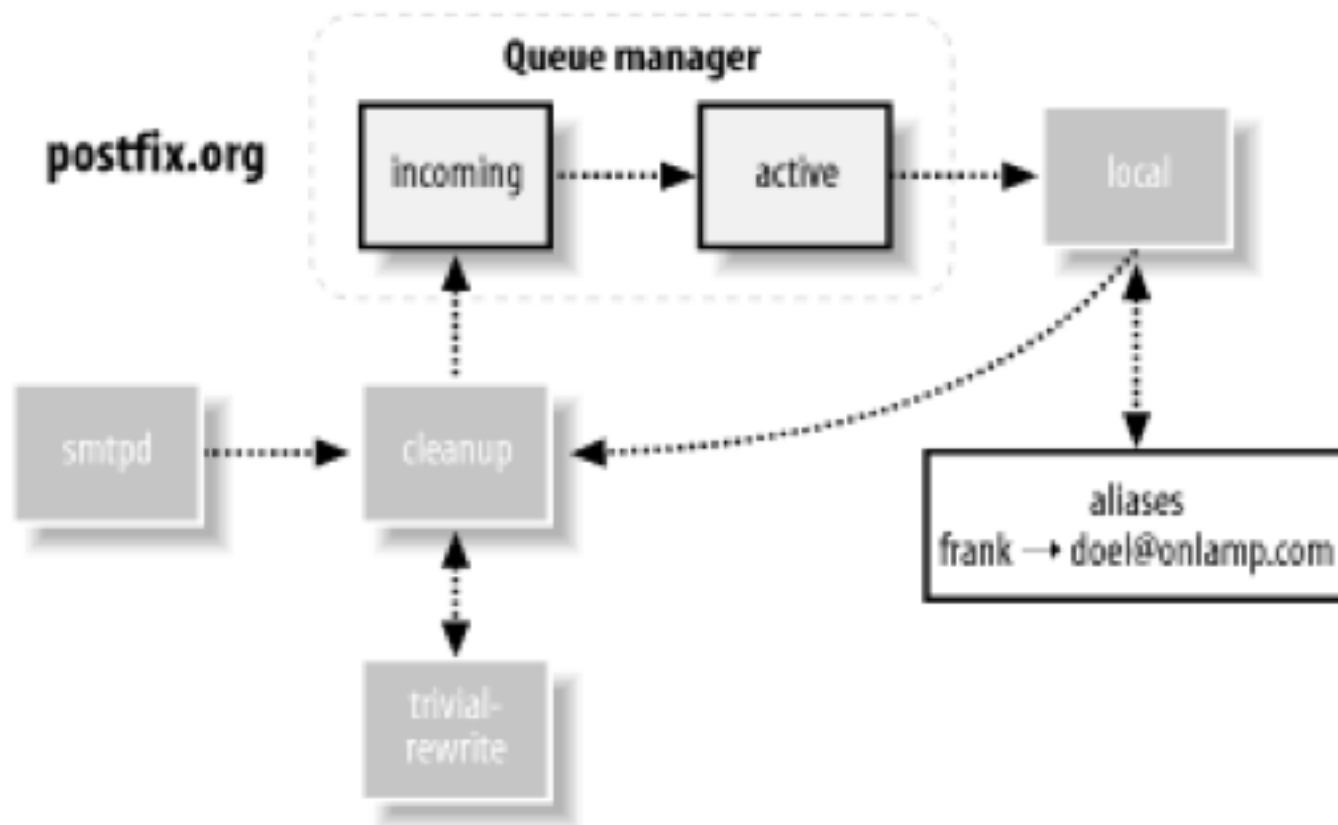
Depending from the “classes”, postfix choose the right delivery agent...

- local: users that got shell accounts on that machine
(**mydestination** contains domain names) local delivery agent
- virtual alias: changed to real address (according to a table) and forwarded (resubmitted) (**virtual_alias_domains**, **virtual_alias_maps**) local delivery agent
- virtual mailbox: delivered in mailboxes not associated with users' accounts (**virtual_mailbox_domains**, **virtual_mailbox_maps**) virtual delivery agent
- relay: e.g. internal network (**relay_domains**) SMTP delivery agent
- lmtpl delivery agent: similar to smtp but is for use in the same network / server (e.g. postfix and POP3/imap communication)
- pipe: pass messages to external program (e.g. fax)

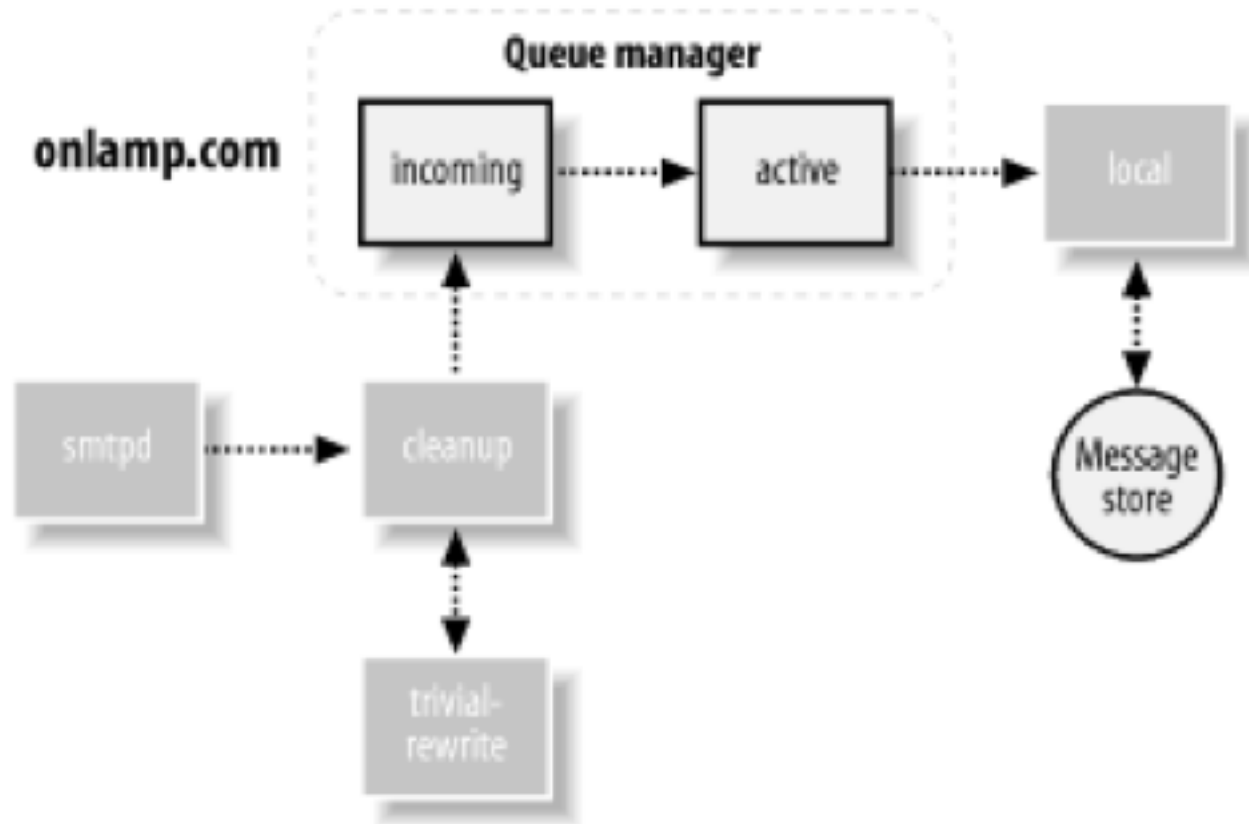
Postfix flow (1/3)



Postfix flow (2/3)



Postfix flow (3/3)



Postfix directories

directory	contains
<i>/etc/postfix</i>	Configuration files and lookup tables
<i>/usr/libexec/postfix</i>	Postfix daemons
<i>/var/spool/postfix</i>	Queue files
<i>/usr/sbin</i>	Postfix commands

Postfix quickstart

- configure your hostname
 - *# postconf -e myhostname=mail.example.com*
- construct your aliases database
 - *newaliases*
- start postfix
 - *postfix start #(or reload, stop etc)*
- *That's it!*

Send/Rcv email from script

- Using the “mail” command:
 - mail -s “Hello world” you@youremailid.com
 - # echo “This will go into the body of the mail.” | mail -s “Hello world” you@youremailid.com
- For the attachments:
 - # echo “Sending an attachment.” | mutt -a backup.zip -s “attachment” calvin@cnh.com

- View the email:

```
pippo@server1:/root$ mail
Mail version 8.1.2 01/15/2001.  Type ? for help.
"/var/mail/pippo": 1 message 1 new
>N 1 root@cgrl.edu      Thu May 24 20:56  15/411  prova1
& p
Message 1:
From root@cgrl.edu  Thu May 24 20:56:13 2012
X-Original-To: pippo@cgrl.edu
To: pippo@cgrl.edu
Subject: prova1
Date: Thu, 24 May 2012 20:56:13 +0000 (UTC)
From: root@cgrl.edu (root)

ciao
ciao
```

Message store format: mbox

- historical in UNIX
 - just one file: /home/pippo/mbox
 - postfix use locking to avoid to read/write while pop/imap do (postconf -l)

```
From: root@cgrl.edu Thu May 24 20:56:13 2012
Return-Path: <root@cgrl.edu>
X-Original-To: pippo@cgrl.edu
Delivered-To: pippo@cgrl.edu
Received: by mail.cgrl.edu (Postfix, from userid 0)
        id 1CC951144D; Thu, 24 May 2012 20:56:13 +0000 (UTC)
To: pippo@cgrl.edu
Subject: prova1
Message-Id: <20120524205613.1CC951144D@mail.cgrl.edu>
Date: Thu, 24 May 2012 20:56:13 +0000 (UTC)
From: root@cgrl.edu (root)
Status: RQ

ciao
ciao
```

- maildir format exists as well (solve some problems when system crash)
- mail_spool_directory = /var/spool/mail/
- home_mailbox = mbox OR maildir/

Procmail

- procmail is a mail delivery agent (MDA) capable of sorting incoming mail into various directories and filtering out spam messages.
- Procmail is widely used on Unix-based systems and stable, but no longer maintained;
- maildrop is maintained instead

POP vs IMAP

- **POP**: download all whole messages (good for intermittently connected devices). Options to delete messages on server
- **IMAP**: possibility to download whole messages, just the header, delete selectively messages (work remotely on the server)



LMTP

- Problem: what if POP/IMAP server got their own message store format?
 - Different programs need a standard way to communicate...
 - LMTP: simplified version of SMTP for LAN, cluster and intra machine communication
 - basically just OK or KO (no responsibility!)
- mailbox_transport: see aliases and entries and pass to LMTP client
- local_transport: just pass to LMTP client
- fallback_transport: if not local, then pass to LMTP client

.forward

- file in user directory (create by user)
- name is defined in forward_path directive
- in the simplest case a /home/pippo/.forward with
 - pippo2@cgrl.edu
- will be forwarder to that user

main.cf

- postfix main configuration file
 - 300 directives!
 - you can edit using postconf
 - ...or editing directly /etc/postfix/main.cf
- variable = value
 - if a line starts with whitespace (space or tab) is a continuation of a previous line
 - \$variable means “the value of variable”
 - multiple values are separated by commas or whitespace
 - lists and table have as value a file (containing the list or lookup table)
- postconf
 - to see all the configuration

main.cf main directives

- myhostname : *hostname*
- mydomain : *domain name*
- myorigin : *domain to be appended to email without domain*
- mydestination = \$myhostname, localhost.\$mydomain,
\$mydomain : *specify to which domains whose email should be accepted*

- mynetworks: *IPs that postfix accepts to serve as a relay*

lookup tables

canonical mappings

#

kdent@example.com kyle.dent@example.com

postmap /etc/postfix/canonical

postmap -q kdent@example.com /etc/postfix/canonical

canonical_maps = hash:/etc/postfix/canonical

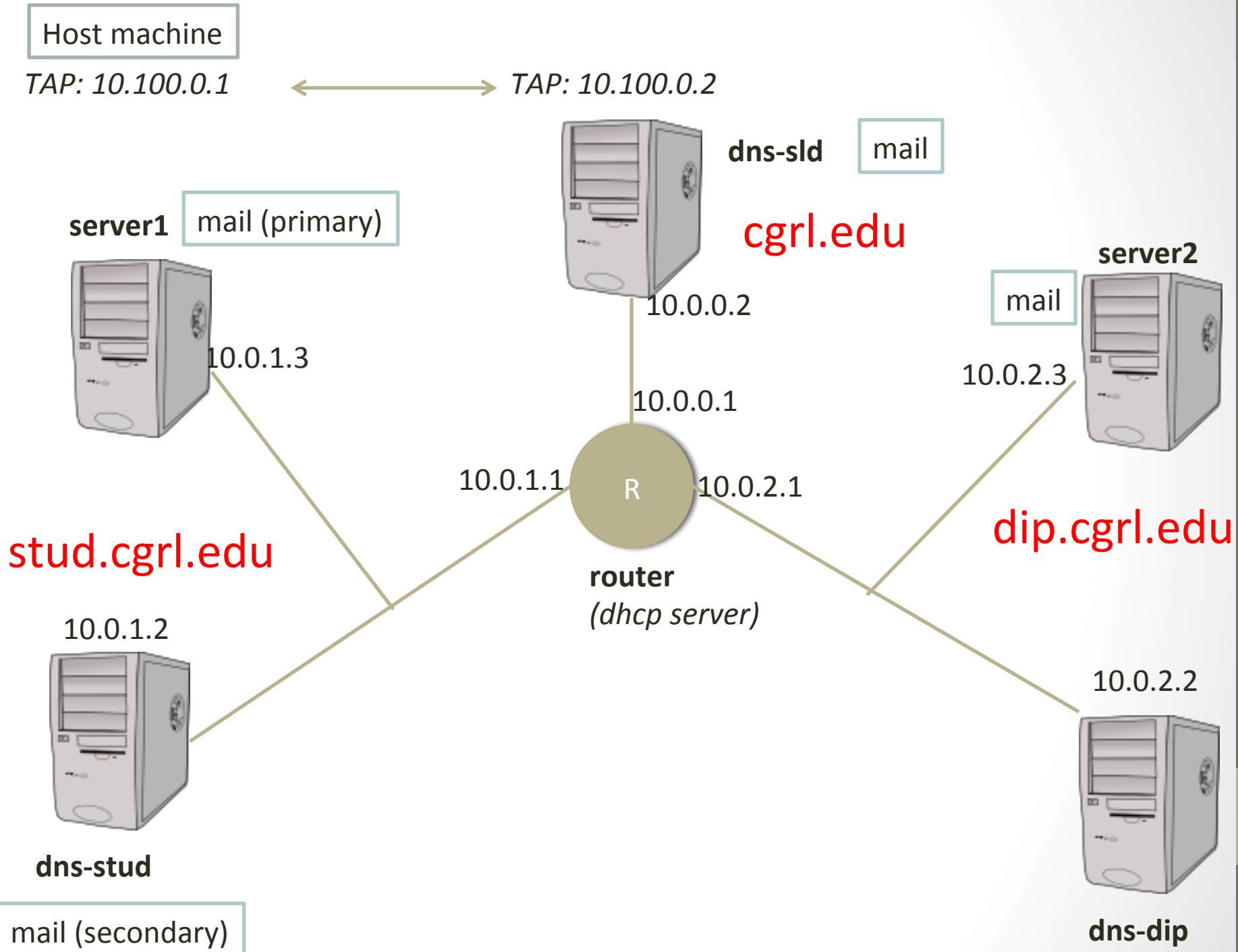
create a simple file

create the lookup table

query the lookup table

put in the conf file

*standard unix DB file format (supported list obtained by `postconf -m`,
used by `postconf default_database_type`)*



Example Configuration

- server1.stud.cgri.edu is also mail.stud.cgri.edu (@stud.cgri.edu)
 - dns-stud.stud.cgri.edu is the backup MX
- server2.dip.cgri.edu is also mail.dip.cgri.edu (@dip.cgri.edu)
- dns-sld.cgri.edu handles mail for @cgri.edu
- there are users on each machine:
 - user1sld , user1stud, user1dip
 - ...and user2dip but doesn't respond to email ;-)
- dns-sld uses a tap and has a pop

Aliases

```
# /etc/aliases
mailer-daemon: postmaster
postmaster: root
nobody: root
hostmaster: root
usenet: root
news: root
webmaster: root
www: root
ftp: root
abuse: root
noc: root
security: root
all: user1sld, user1dip@dip.cgri.edu, user1stud@stud.cgri.edu
```

- different type respect to lookup table (sendmail compatible), so different map:
 - alias_maps: files with aliases
 - alias_database : here aliases updated with newaliases

```
#simple alias
```

```
kyle.dent: kdent, kdent@oreilly.com
```

```
#filename
```

```
info: /usr/local/mail/info_box
```

```
#use an external command
```

```
info: "|/usr/local/bin/autoreply"
```

```
#include
```

```
info: :include:/usr/local/mail/info_list
```

To create tables: postalias /etc/aliases or newaliases

On dns-sld...

root@dip.cgri.edu send an email message to all@cgri.edu

1	0.000000	0a:ab:64:91:09:80	Broadcast	ARP	42:Who has 10.0.0.2? Tell 10.0.0.1
2	0.000075	fe:c3:61:e6:b5:57	0a:ab:64:91:09:80	ARP	42:10.0.0.2 is at fe:c3:61:e6:b5:57
3	0.000191	10.0.2.2	10.0.0.2	DNS	79:Standard query MX cgri.edu
4	0.000192	10.0.2.2	10.0.0.2	DNS	70:Standard query NS <Root>
5	0.000874	10.0.0.2	10.0.2.2	DNS	154:Standard query response MX 10 mail.cgri.edu
6	0.000967	10.0.0.2	10.0.2.2	DNS	110:Standard query response NS ROOT-SERVER
7	0.010499	10.0.2.2	10.0.0.2	DNS	87:Standard query A dns-sld.cgri.edu
8	0.010617	10.0.0.2	10.0.2.2	DNS	117:Standard query response A 10.0.0.2
9	0.010965	10.0.2.2	10.0.0.2	DNS	87:Standard query AAAA dns-sld.cgri.edu
10	0.011059	10.0.0.2	10.0.2.2	DNS	134:Standard query response
11	0.012129	10.0.2.2	10.0.0.2	DNS	84:Standard query A mail.cgri.edu
12	0.012220	10.0.0.2	10.0.2.2	DNS	138:Standard query response A 10.0.0.2
13	0.013259	10.0.2.2	10.0.0.2	DNS	84:Standard query AAAA mail.cgri.edu
14	0.013343	10.0.0.2	10.0.2.2	DNS	139:Standard query response
15	0.019176	10.0.2.3	10.0.0.2	TCP	74:57985 > smtp [SYN] Seq=0 Win=5840 Len=0 MSS=1460 SACK_PERM=1 TSval=4294950663 TSecr=0
16	0.019222	10.0.0.2	10.0.2.3	TCP	74:smtp > 57985 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK_PERM=1 TSval=42949494
17	0.019935	10.0.2.3	10.0.0.2	TCP	66:57985 > smtp [ACK] Seq=1 Ack=1 Win=5840 Len=0 TSval=4294950664 TSecr=4294949412

- SEE trace: mx.pcap

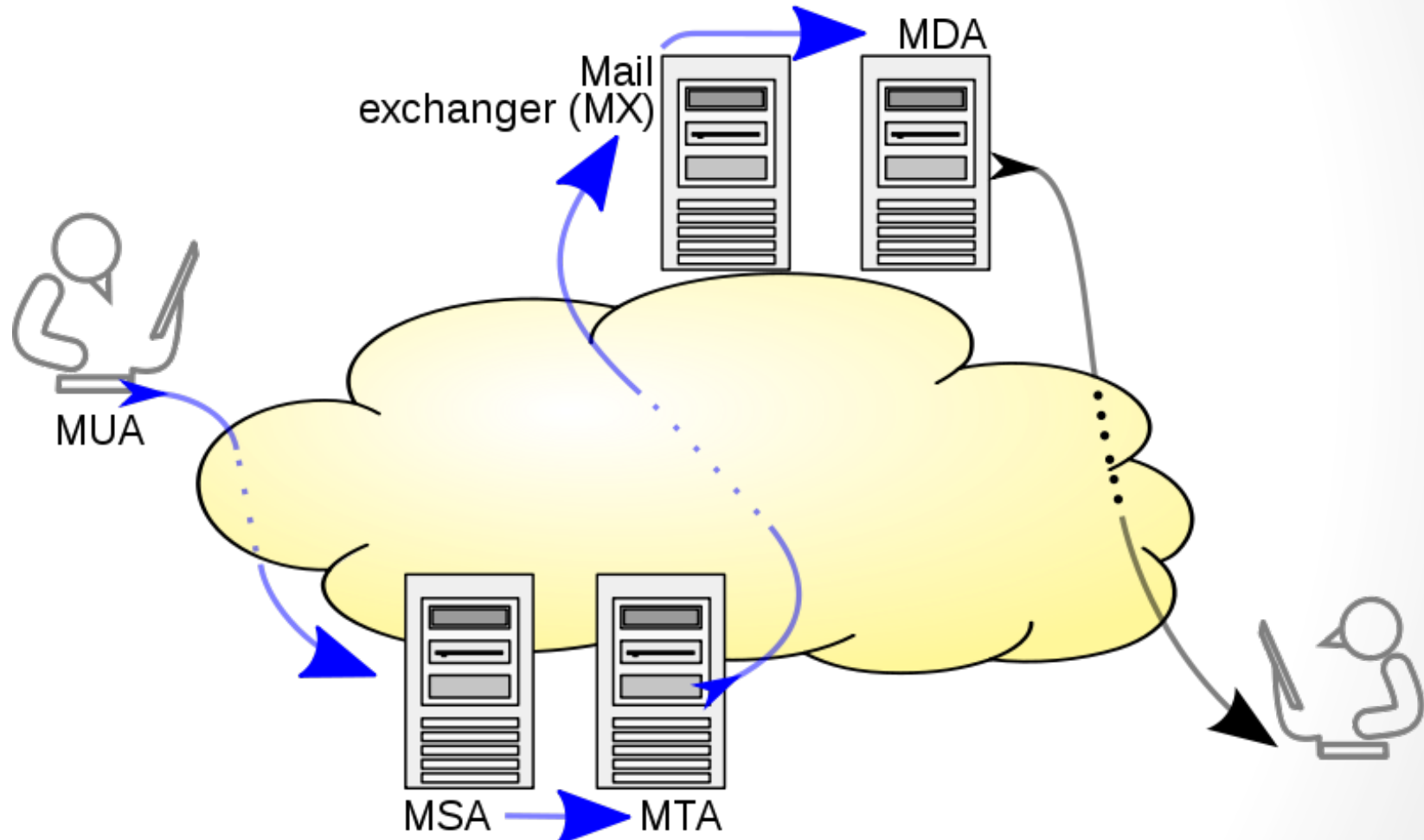
SMTP conversation

```
220 mail.dip.cgrl.edu ESMTP Postfix (Debian/GNU)
EHLO mail.cgrl.edu
250-mail.dip.cgrl.edu
250-PIPELINING
250-SIZE 10240000
250-VERFY
250-ETRN
250-STARTTLS
250-ENHANCEDSTATUSCODES
250-8BITMIME
250 DSN
MAIL FROM:<root@dip.cgrl.edu> SIZE=593
RCPT TO:<useridip@dip.cgrl.edu> ORCPT=rfc822;all@cgrl.edu
DATA
250 2.1.5 Ok
354 End data with <CR><LF>.<CR><LF>
Received: by mail.cgrl.edu (Postfix)
.id 9A96F11572; Mon, 28 May 2012 10:38:08 +0000 (UTC)
Delivered-To: all@cgrl.edu
Received: from mail.dip.cgrl.edu (unknown [10.0.2.3])
.by mail.cgrl.edu (Postfix) with ESMTP id 7D97011571
.for <all@cgrl.edu>; Mon, 28 May 2012 10:38:07 +0000 (UTC)
Received: by mail.dip.cgrl.edu (Postfix, from userid 0)
.id C5F8211570; Mon, 28 May 2012 10:38:07 +0000 (UTC)
To: all@cgrl.edu
Subject: mail x tutti
Message-Id: <20120528103807.C5F8211570@mail.dip.cgrl.edu>
Date: Mon, 28 May 2012 10:38:07 +0000 (UTC)
From: root@dip.cgrl.edu (root)

Adunata!

.
QUIT
250 2.0.0 Ok: queued as 0A6CA11572
221 2.0.0 Bye
```

Mail Submission Agent



Mail Submission Agent

BENEFITS:

- can correct minor errors in a message's format (e.g. missing Date, Message-ID, To fields, or an address with a missing domain name)
- immediately report an error to the author so that it can be corrected before it is sent to any of the recipients
- dedicated port number: 587
 - easier for an MTA to deny relaying
- MSAs and MTAs can have different policies for filtering of spam.

Spool directories

- inbox folder.
 - /var/spool/mail/
 - Once read with “mail” (or imap) are moved to mbox / maildir / custom storage location
- Queue manager spool dirs:
 - /var/spool/postfix/active : in processing
 - /var/spool/postfix/bounce : rejected or permanent error
 - /var/spool/postfix/corrupt : damaged and unreadable messages
 - /var/spool/postfix/deferred : when encounter temporary problem
 - /var/spool/postfix/hold : message YOU want to hold

Queue tools

- `postqueue -p`
 - or “`mailq`”
 - view message in queues
- `postsuper -d DBA3F1A9`
 - delete one specific message (-d ALL to delete all)
- `postcat -q DBA3F1A9`
 - print the content of a message
- `postqueue -s stud.cgri.edu`
 - flush (i.e. try to deliver all message, now) the message for that domain
- `postsuper -h DBA3F1A9`
 - put to hold
- `postsuper -H DBA3F1A9`
 - remove from holding queue

Relay Domain & backup MX

- Example: dns-stud.stud.cgri.edu backup mail.stud.cgri.edu
- In the backup mail server
 - relay_domains = stud.cgri.edu
 - DO NOT put in mydestination the domain!
- could be usefull to configure relay_recipient_maps
 - otherwise when primary will connect, you must bounce all the invalid email
- Empty the queue manually
 - postqueue -s stud.cgri.edu

LDAP

- ldap (par 15)

appunti

- vedersi pop e smtp
- autenticazione
- ldap

Canonical addresses and other useful rewriting procedures

- Substitute addresses with “canonical” ones:
 - affects all of the addresses, including envelope and message headers
- `canonical_maps = hash:/etc/postfix/canonical`

```
# /etc/postfix/canonical
#
pabelard@example.com abelard@oreilly.com
hfulbert@example.com heloise@oreilly.com
```

- in order: `sender_canonical_maps` ,
`recipient_canonical_maps`, `canonical_maps`
- Other useful stuff:
 - `masquerade_domains`: the gw appear as the sender
 - `relocated_maps`: send back a msg with the new addr

Notify classes

- Postmaster account usually used for notifying messages
 - usually aliased by root
 - but postfix does not forward to root (security reason)
 - “If you use procmail (or some other command) for local mail delivery, Postfix will not deliver mail as root. Instead, Postfix runs procmail (or whatever) as nobody. Perhaps some day Wietse (postfix creator n.d.L.) will trust Postfix enough to run external commands as root.”
 - by default, you can find postmaster email in the nobody inbox (!!!)
- notify_classes = resource, software
 - for classes see next slide

bounce	Inform the postmaster of undeliverable mail. Either send the postmaster a copy of undeliverable mail that is returned to the sender, or send a transcript of the SMTP session when Postfix rejected mail. For privacy reasons, the postmaster copy of undeliverable mail is truncated after the original message headers. This implies "2bounce" (see below). See also the user_relay feature . The notification is sent to the address specified with the bounce_notice_recipient configuration parameter (default: postmaster).
2bounce	When Postfix is unable to return undeliverable mail to the sender, send it to the postmaster instead (without truncating the message after the primary headers). The notification is sent to the address specified with the 2bounce_notice_recipient configuration parameter (default: postmaster).
delay	Inform the postmaster of client requests that were rejected because of (UCE) policy restrictions. The postmaster receives a transcript of the SMTP session. The notification is sent to the address specified with the error_notice_recipient configuration parameter (default: postmaster).
protocol	Inform the postmaster of protocol errors (client or server side) or attempts by a client to execute unimplemented commands. The postmaster receives a transcript of the SMTP session. The notification is sent to the address specified with the error_notice_recipient configuration parameter (default: postmaster).
resource	Inform the postmaster of mail not delivered due to resource problems (for example, queue file write errors). The notification is sent to the address specified with the error_notice_recipient configuration parameter (default: postmaster).
software	Inform the postmaster of mail not delivered due to software problems. The notification is sent to the address specified with the error_notice_recipient configuration parameter (default: postmaster).

Multiple domains (system accounts)

- **Shared domains:** xxx.com and yyy.com share the same mailboxes
- **Separate domains:** otherwise

- **Shared:**

```
mydomain = xxx.com
```

```
mydestination = $myhostname, $mydomain, yyy.com, zzz.com
```

- **Separate:**

- do not list in mydestination all the domains

```
virtual_alias_domains = yyy.com, zzz.com
```

```
virtual_alias_maps = hash:/etc/postfix/virtual_alias
```

- you may want to set up *canonical maps*

```
info@yyy.com helene@localhost  
webmaster@zzz.com george@localhost
```

virtual_alias conf file

Multiple domains (virtual accounts)

- Separate:

- do not list in mydestination all the domains

```
virtual_mailbox_base = /usr/local/vmail
```

*deliver email
in virtual mailboxes*

```
virtual_mailbox_maps = hash:/etc/postfix/virtual_mailbox
```

```
#or
```

```
virtual_transport = lmtp:unix:/var/imap/socket/imap
```

*pass to imap server
via lmtp*

- We can handle exception (e.g. local account delivery in a virtual domain) using virtual_maps.
 - parsed regardless of the classe

```
info@ora.com          ora.com/info
info@oreilly.com      oreilly.com/info
```

virtual_mailbox conf file

Transport

- transport maps override default transport types for delivery of messages.
 - regardless of DNS MX!
 - used to connect a domain to a postfix handler
- `transport_maps = hash:/etc/postfix/transport`

```
example.com smtp:[192.168.23.56]:20025
oreilly.com relay:[gateway.oreilly.com]
oreillynet.com smtp
ora.com maildrop
kdent@ora.com error:no mail accepted for kdent
```

```
XXX    TRANSPORT:NEXT_HOP
```



specified in master.cf

master.cf

- The Postfix master daemon launches all of the other Postfix services as they are needed
- The various services, and how they are run, are specified in the master.cf file

inet
unix
fifo

only
postfix?

need
root?

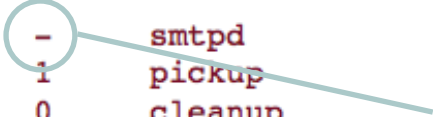
polling
time

max proc.
simultaneously

```

#= = = = =
# service type private unpriv chroot wakeup maxproc command + args
# name (yes) (yes) (yes) (never) (100)
#= = = = =
smtp inet n - y - - smtpd
pickup fifo n - n 60 1 pickup
cleanup unix n - n - 0 cleanup
qmgr fifo n - n 300 1 qmgr
rewrite unix - - n - - trivial-rewrite
bounce unix - - n - 0 bounce
defer unix - - n - 0 bounce
flush unix n - n 1000? 0 flush
proxymap unix - - n - - proxymap
smtp unix - - y - - smtp
relay unix - - y - - smtp
    -o smtp_helo_timeout=5 -o smtp_connect_timeout=5
showq unix n - n - - showq
error unix - - n - - error
local unix - n n - - local
virtual unix - n n - - virtual
lmtp unix - - n - - lmtp
maildrop unix - n n - - pipe
    flags=DRhu user=vmail argv=/usr/local/bin/maildrop -d ${recipient}
cyrus unix - n n - - pipe
    user=cyrus argv=/cyrus/bin/deliver -e -r ${sender}
    -m ${extension} ${user}
uucp unix - n n - - pipe
    flags=Fqhu user=uucp argv=uux -r -n -z -a$sender -
    $nexthop!rmail ($recipient)

```



default
value

Configuring an autoresponder

1. create a **virtual** file like:

```
user2dip@dip.cgri.edu user2dip@dip.cgri.edu ,_user2dip@autoreply.dip.cgri.edu  
and postmap that file
```

2. in the **transport** define a new transport (postfix process) for autoreply
autoreply.dip.cgri.edu autoreply:

3. in master.cf add a new process:

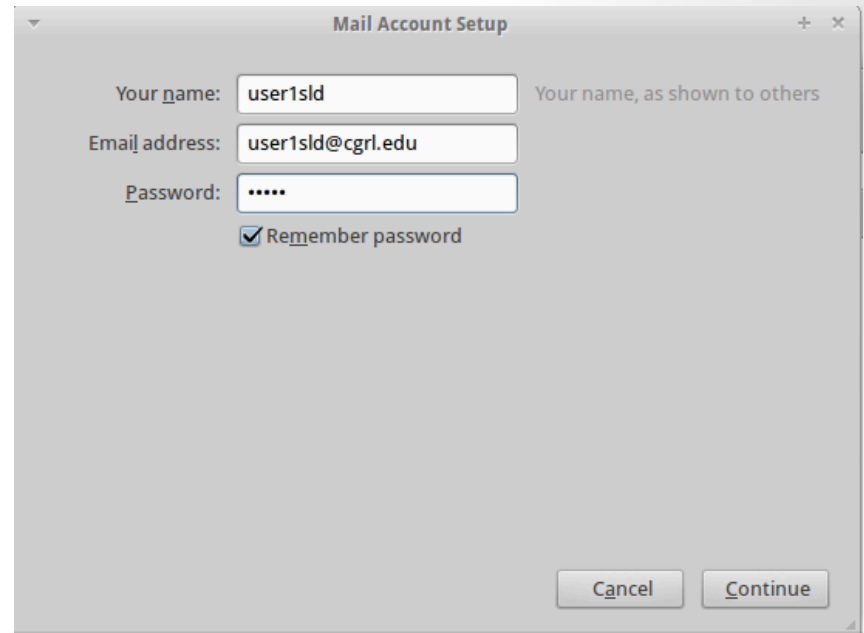
```
autoreply      unix      -      n      n      -      -      pipe  
      flags= user=nobody argv=/opt/etc/postfix/autoreply.sh ${sender} ${mailbox}
```

Try it: send an email to user2dip@dip.cgri.edu

Autoreply.sh

- It's just a small shellscript which expects the entire content of the mail (all headers included) on **stdin**. Furthermore the script wants to know the sender (which will be the receiver of the autoreply) and the original receiver (which will be the sender of autoreply)
- The script performs some basic checks on the mails. For example if the mail comes from a mailing list or from a bulk mailer (like newsletter). In such cases no autoreply will be generated (would be a mess otherwise). With the conditions of those checkings I based on the conditions used in dovecot-sieve vacation:
 - Auto-Submitted: header exists with any value except „no“
 - Precedence: header exists with value „junk“, „bulk“ or „list“
 - The envelope sender
 - begins with „MAILER-DAEMON“ (case-insensitive)
 - begins with „LISTSERV“ (case-insensitive)
 - begins with „majordomo“ (case-insensitive)
 - begins with „owner-“ (case-sensitive)
 - contains the string “-request” anywhere within it (case-sensitive)
 - The envelope sender and envelope recipient are the same
 - The envelope recipient is not found in the message To:, Cc: or Bcc: fields.

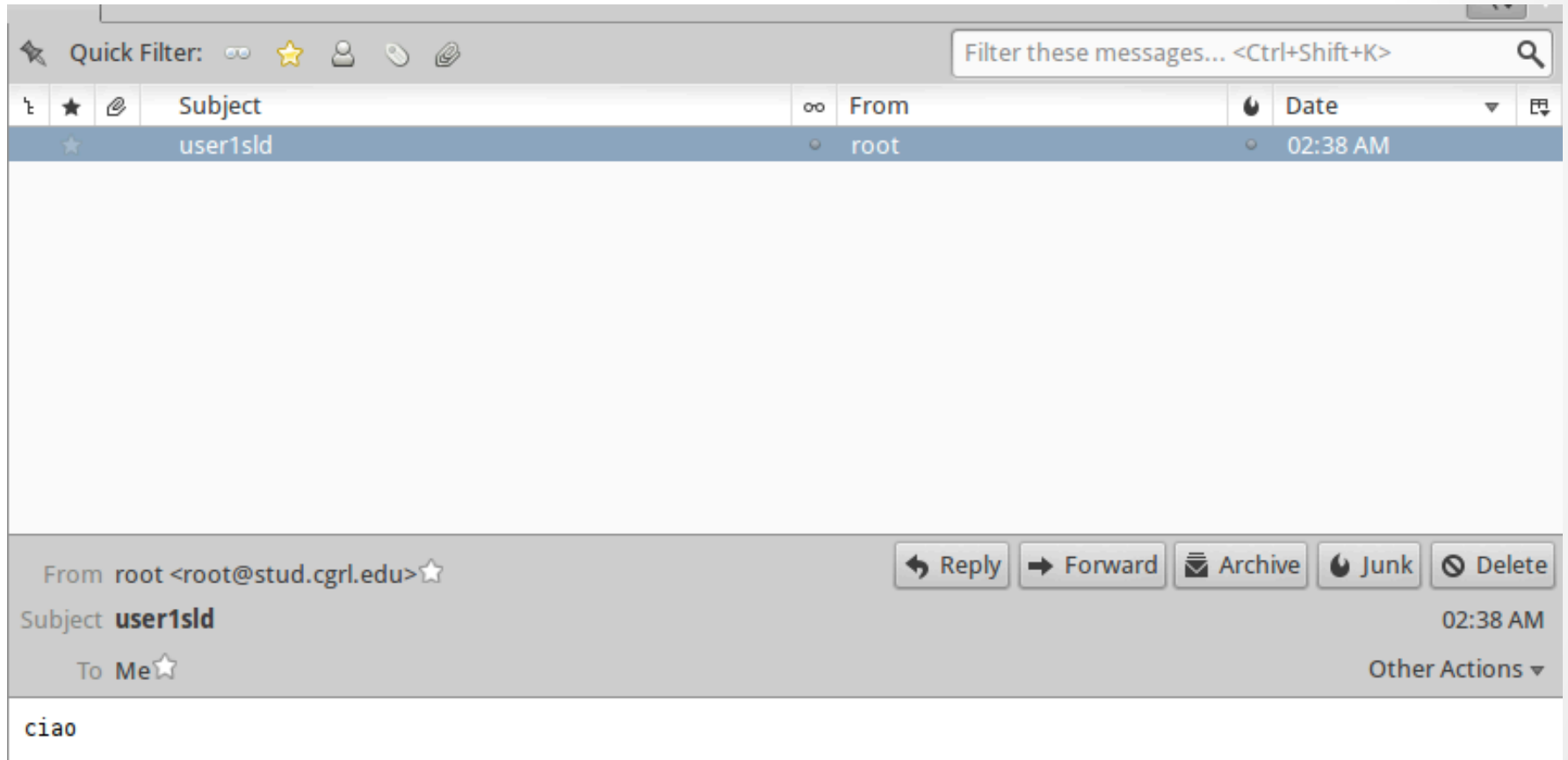
Configuring POP



- we got a tap on dns-sld!
 - wow! let's configure thunderbird!
- IP addresses: 10.100.0.1 (host) – 10.100.0.2 (guest)
- 1: set the right dns (/etc/resolv.conf → nameserver 10.100.0.2)
 - beware at dhclient!! *chattr +i /etc/resolv.conf* or something better [1]
- 2: configure dovecot (plaintext auth, mail location)
- 3: make an account on Thunderbird

[1] <http://www.cyberciti.biz/faq/dhclient-etcresolvconf-hooks/>

Incoming mail (pop3)



trace: pop1.pcap

Post Office Protocol (basic)

- In the very first version, only retrieve ALL or retrieve and delete all
 - several amendments comes later on
 - Version 3 is what we currently use (RFC 1725)
- To see a list of your emails awaiting collection use the **LIST** command, this will also show you the id number of your messages (e.g. 1 or 2 etc.) with the size
- To view the contents of an email type **RETR** + the id number of the message (e.g RETR 1).
- To delete a message use **DELE** + the id number of the message (e.g DELE 1).
- To leave your mailbox and close the connection use **QUIT**

POP3 minimal commands

Minimal POP3 Commands:

USER name	valid in the AUTHORIZATION state
PASS string	
QUIT	

STAT	valid in the TRANSACTION state
LIST [msg]	
RETR msg	
DELE msg	
NOOP	
RSET	

QUIT	valid in the UPDATE state
------	---------------------------

Optional POP3 Commands:

APOP name digest	valid in the AUTHORIZATION state
------------------	----------------------------------

TOP msg n	valid in the TRANSACTION state
UIDL [msg]	

POP3 Replies:

+OK
-ERR

```
+OK Dovecot ready.
AUTH
+OK
PLAIN
.
CAPA
+OK
CAPA
TOP
UIDL
RESP-CODES
PIPELINING
STLS
USER
SASL PLAIN
.
AUTH PLAIN
+
AHVzZXIxc2xkAHBpcHBv
+OK Logged in.
STAT
+OK 3 1779
LIST
+OK 3 messages:
1 580
2 570
3 629
.
UIDL
+OK
1 000000014fc34a91
2 000000024fc34a91
3 000000034fc34a91
.
RETR 2
```

```
Received: from mail.stud.cgri.edu (unknown [10.0.1.3])
.by mail.cgri.edu (Postfix) with ESMTP id 325C811571
.for <user1sld@cgri.edu>; Mon, 28 May 2012 09:54:31 +0000 (UTC)
Received: by mail.stud.cgri.edu (Postfix, from userid 0)
.id C9DC611570; Mon, 28 May 2012 09:54:30 +0000 (UTC)
To: user1sld@cgri.edu
Subject: user1sld
Message-Id: <20120528095430.C9DC611570@mail.stud.cgri.edu>
Date: Mon, 28 May 2012 09:54:30 +0000 (UTC)
From: root@stud.cgri.edu (root)
.
RETR 3
+OK 629 octets
Return-Path: <root@stud.cgri.edu>
X-Original-To: user1sld@cgri.edu
Delivered-To: user1sld@cgri.edu
Received: from mail.stud.cgri.edu (unknown [10.0.1.3])
.by mail.cgri.edu (Postfix) with ESMTP id 80B2311571
.for <user1sld@cgri.edu>; Mon, 28 May 2012 09:54:58 +0000 (UTC)
Received: by mail.stud.cgri.edu (Postfix, from userid 0)
.id 4655C11570; Mon, 28 May 2012 09:54:58 +0000 (UTC)
To: user1sld@cgri.edu
Subject: email di user1stud
Message-Id: <20120528095458.4655C11570@mail.stud.cgri.edu>
Date: Mon, 28 May 2012 09:54:58 +0000 (UTC)
From: root@stud.cgri.edu (root)

tanti cari saluti da user1stud

User1Stud
.
QUIT
+OK Logging out.
```

The POP conversation

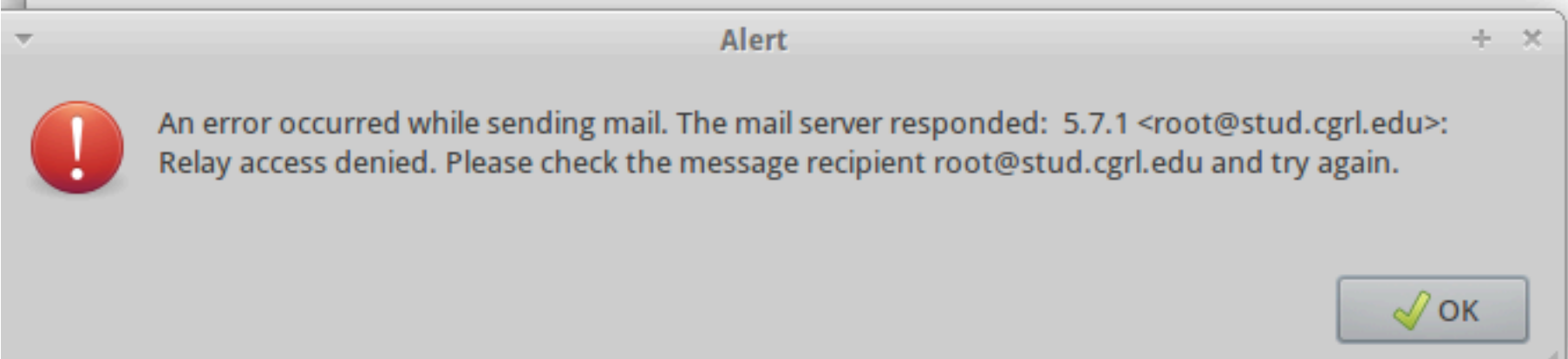
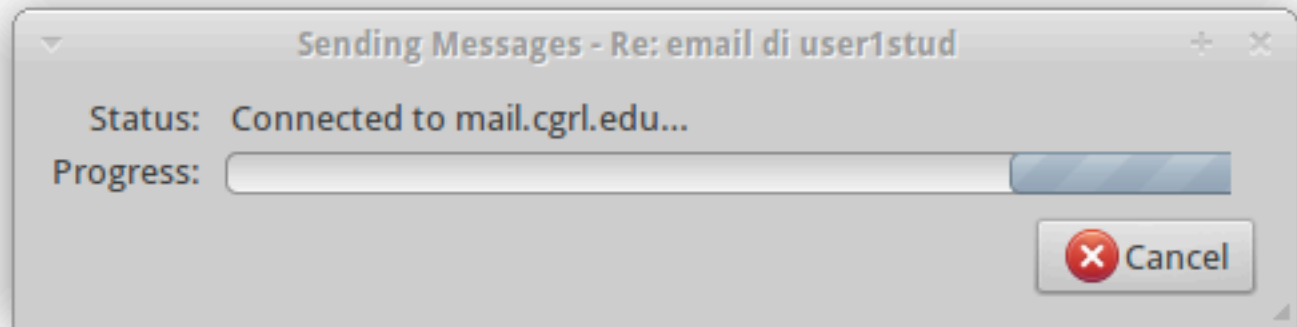
Outgoing mail

On 05/28/2012 02:54 AM, root wrote:

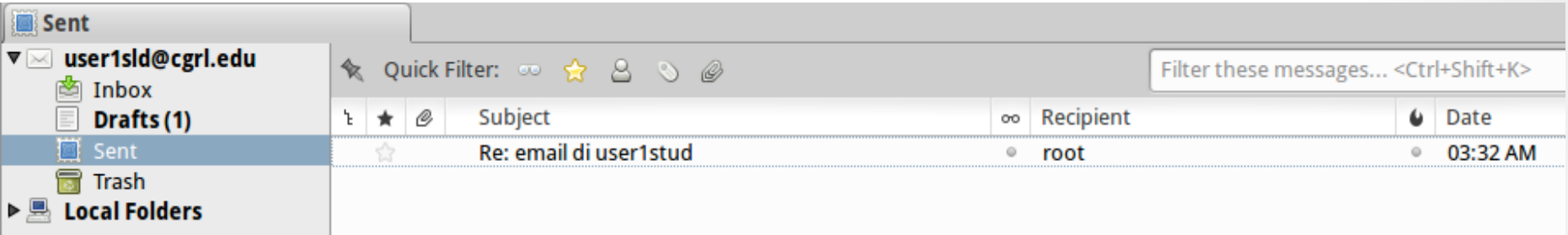
tanti cari saluti da user1stud

User1Stud

Ciao Amico!



Enabling relaying on postfix



- change mynetworks:
 - `mynetworks = 10.0.0.0/8` (append)
 - more complex configurations are possible (e.g. authentication)

220 mail.stud.cgri.edu ESMTP Postfix (Debian/GNU)

EHLO mail.cgri.edu

250-mail.stud.cgri.edu

250-PIPELINING

250-SIZE 10240000

250-VRFY

250-ETRN

250-STARTTLS

250-ENHANCEDSTATUSCODES

250-8BITMIME

250 DSN

MAIL FROM:<user1sld@cgri.edu> SIZE=743

RCPT TO:<root@stud.cgri.edu> ORCPT=rfc822;root@stud.cgri.edu

DATA

250 2.1.0 Ok

250 2.1.5 Ok

354 End data with <CR><LF>.<CR><LF>

Received: from [10.100.0.1] (unknown [10.100.0.1])

.by mail.cgri.edu (Postfix) with ESMTP id 874CE11571

.for <root@stud.cgri.edu>; Mon, 28 May 2012 16:49:04 +0000 (UTC)

Message-ID: <4FC3AC80.8030704@cgri.edu>

Date: Mon, 28 May 2012 09:49:04 -0700

From: user1sld <user1sld@cgri.edu>

User-Agent: Mozilla/5.0 (X11; Linux i686; rv:10.0.2) Gecko/20120216 Thunderbird/10.0.2

MIME-Version: 1.0

To: root <root@stud.cgri.edu>

Subject: Re: user1sld

References: <20120528093834.A239811570@mail.stud.cgri.edu>

In-Reply-To: <20120528093834.A239811570@mail.stud.cgri.edu>

Content-Type: text/plain; charset=ISO-8859-1; format=flowed

Content-Transfer-Encoding: 7bit

On 05/28/2012 02:38 AM, root wrote:

> ciao

>

Ciao anche da me

me.

.

QUIT

250 2.0.0 Ok: queued as 62AA011571

221 2.0.0 Bye

Exercises

1. **BASIC:** Add your postfix server in YOURNAME.stud.cgri.edu (using laboratory you created for the DNS exercise)
2. **ADVANCED:** create virtual mailboxes , send and receive emails (on server 1)
3. **EXTREME:** configure a pop server (dovecot) and hand off email to it via lmtpl