E-Mail

Mail User Agent:
edit messages
when you send it hands them to the MSA
the MSA then hands it to the MTA for transmission

read messages
they must be in your mail spool file
(placed there by the MTA)

Mail Submission Agent
Receive mail from the MUA, hand it to the MTA.

Mail Transport Agent

Gets mail from a MSA or MTA and:
1) places it in a local file (users mail spool)
2) forwards it to another MTA (forwarded mail)
(watch out for SPAM)

Simple Mail Transport Protocol (SMTP)–
The protocol that defines how MTAs exchange mail
You don't to be the same MTA, but both MTAs must use SMTP Some MSA/MTA transfers are proprietary, but most use SMTP.

SMTP example

Sending mail from `p.edu` to `q.edu`
(`s:`, `r:` added to id sender, receiver)
Sender uses commands
Receiver uses digital replys with comments

```
r: 220 q.edu
s: EHLO p.edu
r: 250 Hello p.edu
s: MAIL FROM:<bob@p.edu>
r: 250 Ok
s: RCPT TO:<sue@q.edu>
r: 250 OK
s: DATA
r: 354 end message with .
s: From:"My Bob" <bob@p.edu>
s: To:"Your Sue" <sue@q.edu>
s: ....
s: .
r: 250 OK
s: QUIT
r: 221 Bye bye
```

No particular correspondence between
"`To:`" and "`RCPT TO:`"

Standart Mail Message Format

`From:` – newer MUAs, the sender

`To:` the recipients. A comma separated list.

`cc:` more recipients

`Date:` Original posting date

`Received:` added by MTAs as they receive and forward messages (useful in back tracing problem messages)

The message body may be restricted to a maximum of 80 characters per line for backward compatibility with old systems.

Other than appending to the "`Received:`" the MTA's often do not modify the message format.
However, they may be specifically instructed to rewrite things like the from and to addresses.

Mail Storage Format

mbox format:

All incoming mail for a user is placed in a single file.
If using folders, each folder is an mbox format file. Each message starts with a special from line (no colon) so the MUAs can find the different messages.

maildir format:

There is a mail directory.
Each message is stored in a separate file.
Subdirectories are usually `new`, `cur`, `tmp`

Several MUAs exist:
elm, pine, mail, Thunderbird, Eudora...

Several MTAs exits:
sendmail, smail, mmdf, Microsoft Exchange

Mail exchangers:
A machine that receives mail for a set of machines, usually an entire Internet domain
All mail coming into `cecs.csulb.edu` goes to `charlotte.cecs.csulb.edu`

That machine forwards it to others on campus.

DNS has an MX record that gives the mail exchanger

Side effect of using exchangers: if that machine is down, all mail halts.
Solution: priority list of mail servers.
Each MX record has a priority number attached

Aliases:
`cecs-faculty`: an alias for about 30 names.
`/etc/mail/aliases`
`/etc/mail/aliases.db`

Configuring Sendmail

`sendmail` is a smtp delivery program

Its behavior is governed by `/etc/mail/sendmail.cf`

This file contains regular expressions and replacement rules.

Rule lines begin with `R`

```
R$* % $*      $1 @ $2
```

`$*` match any thing
% match a percent sign
`$*` match any thing

`$1` what ever is matched by the first the first `$*`

`$2` what ever is matched by the second the first `$*`

`joe%cheetah` is matched and
rewritten as: `joe@cheetah`

Some of those rules refer to databases (`.db` format)
aliases – mail aliases
domaintable – old domain name, new domain name
mailertable – overrides routing for particular domains
virtusertable – address, real address
access – can refuse mail from specific domains

Rules are gathered into rule sets

```
S97
R$*                     $: $>3 $1
R$*                     $ $>0 $1
```

These may be used as subroutines

`$>3` invokes ruleset 3 (`S3`) and uses the result.

macros replacements may be defined

`DS yei.csulb.edu`

The smart host macro `$S` is set to `yei`

`D{Hi} MulticharacterMacro`

A macro with a multi-character name

Groups (classes) may be defined

`CLroot volper sam`

The `$=L` group has three members

These are locally delivered even if all mail is forwarded to another machine.

Options may be listed

`Odbackground`

The delivery option is background

Various mailer programs may be used

`Msmtp P=[IPC]...`

The program `P` is invoked, the one here is a special indicator meaning make an IP Connection to another sendmail

`R<@> $#local $: <>`

send using the local mailer (defined by an `M` entry). Use the address found in the <>

Administration

A: Use and adjust the databases. (Forwards, blocks)

B: Use m4 macros (IDA) to generate a `sendmail.cf`.
Administer by adjusting (and re-compiling) the macros (`.mc` files).
`/usr/share/sendmail/cf` (Ubuntu)
`/usr/share/sendmail/cf/cf` (Slackware)

C: Adjust the macros in `sendmail.cf`
Most configuration adjustments can be made one of the `D` or `C` entries.

D: Edit the rule sets. If you are trying to do something unusual you may end up here.

E: Rewrite the `sendmail` source code.

Address test mode:
You can test a config without actually using it,
but it takes a little effort
`sendmail -bt -Cmyfile.cf`
`-bt` — address test mode
`-Cmyfile.cf` — config file to be tested

Usually start with ruleset 3,0, but to test other things (like reply address rewrites) you may want to start with another ruleset.

Daemon mode: `-bd`
Start the mail transport server
and it is to run forever.

Services, inetd entry:

The services entry is there,
Port 25 is the mail port (standard)

the inetd entry is commented out
When another machine connects to port 25, start a mail server
(only if the mail server is not running daemon mode)

Mail trick: configure sendmail to send only;
only configure the mail exchanger to receive mail.

Local Mail Handling

sendmail (and smail) hands local mail to a local mailer program (whose name is specified in the cf file). This local program (probably) places the mail in the spool.

`procmail`—a very flexible local mail program

Normal operation: drop the mail into the spool.

vacation/.forward–reads the .forward file, runs a program that sends a message and logs the name of the user to whom it was sent and saves the mail in the spool. A user will only be sent the message once.

`.procmailrc`–full rules file for disposition.

Can: leave in spool, forward to an address, place in folders.

File format:
`:0` *[flags] [:[locallockfile]]* beginning of a recipe
Regular expression to be match conditions (1 per line), these lines start with a *
dispositions/actions (if matched)

```
:0
* ^From.*volper
$HOME/mymaildir/ccs
```

Any thing with a "From ... volper" automatically goes to the file `ccs`, does not show up in my inbox.

```
:0:
* ^Subject.*homework
homeworkmail
```

Subject of homework goes to the file `homeworkmail`, that file is also used as a lockfile.

```
:0:otherlock
*
! newaddress@newplace.com
```

All (`*`) mail is Forwarded (`!`) to newaddress. The file `otherlock` is used as a lock file

```
:0
*
| $HOME/bin/mymailparseprogram
```

All (*) mail is sent (piped) (|) to a program

Flags:
B apply the condition to the body
H apply the condition to the header (default)

```
:0 B:
* BUY NOW
/dev/null
```

Any mail whose body contains the phrase BUY NOW is discarded.

Beware: mail loops are easy to create.

Pop and Imap

Support for remote MUAs.

Example: Windows/Thunderbird access to Unix mail.

Post Office Protocol

`popd` — running on Unix server
Connect to `popd`
User name and password are required
`popd` provides access to Unix mail spool.
Used by Eudora, Thunderbird, Outlook

Sending mail: connect to `sendmail` on server (using SMTP).

IMAP: access remote mail with
Internet Message Access Protocol
newer than pop, does basically the same thing
adds the ability to send mail

Enabling pop or imap on Slackware:
uncomment the correct line(s) in `inetd.conf`

Ubuntu: these are bundled in the `dovecot` package

Mail Filters

Several mail filters are available for sendmail and may be installed.

spamassassin: A Baysian filter. Teach the filter using examples of spam and ham. You can configure it to label spam or drop spam.

mimedefang: a wrapper for antivirus filtering. Various antivirus filters can be attached. Can be set to quarantine, delete infected portions, or drop infected messages.

clamav: an antivirus filter. Make sure you keep the virus patterns up-to-date.

Configuring sendmail using mc

Ubuntu:

`Makefile`: causes the make command to rebuild the `.cf` files from the `.mc` configurations.

1) Edit `sendmail.mc` and/or `submit.mc`.

2) `make; make install-cf` other cf's will be built (but not installed).

Slackware:

Configuration directory: `/usr/share/sendmail/cf/cf` contains `.mc` files for lots sites (as examples).

Pick one or make one (use `cp`), edit it (say `xx.mc`)

Use the `Build` command to create the cf.
`Build xx` creates `xx.cf` from `xx.mc`

Then use `cp` to copy it into the `/etc/mail` (may also be called /etc/sendmail) directory, giving it the correct name (`sendmail.cf` or `submit.cf`)

mc File Notes

In general:

when adding a `FEATURE`
add it at the end of the existing features

when adding a `MAILER`
add it at the end of the existing mailers

and so forth.

In some cases order matters in the `.mc` file.

Warning: in the following slides
I've had to split lines to fit the slides,
some of the capabilities will not allow you to do that in the files.

sendmail.mc

local mail only:
You can modify so that mail is local only

```
DAEMON_OPTIONS('Family=inet, Name=MTA,
  Addr=127.0.0.1')dnl
```

Slackware uses the default from `config.mc` which lacks the restrictive `Addr` entry.

procmail:
You need the procmail feature and feature (there by default on Slackware, not on Ubuntu).

```
FEATURE(`local_procmail',`',
  `procmail -t -Y -a $h -d $u')dnl
MAILER(procmail)dnl
```

mail filter:

```
INPUT_MAIL_FILTER(`mimedefang',
  `S=unix:/var/spool/mimedefang/mimedfang.sock,
    F=T,T+S:5m;R:5m')dnl
```

The filter name, the socket to talk to the filter on, parameters for using the filter.
You start the filter as a separate daemon.

sendmail.mc

mail host:
You can have your local mail handled by a mail hub. All mail that is destined for the local machine goes to this machine instead. Useful if you have a central server for alot of machines and accounts.

```
define(‘MAIL_HUB’,‘mailserver.example.com’)
```

smart host:
You may have your non-local mail handled by a mail exchanger. All non-local mail is sent to this machine and relayed from there to the destination machine. (Note: the exchanger needs to have relaying enabled for the machines that it expects to relay for.) Useful if you are behind a firewall and only the mail exchanger has permission to send mail to external machines.

```
define(‘SMART_HOST’,‘mailserver.example.com’)
```

masquerade:
You may modify the return address so that mail appears to come from a different place. Usually you modify this to your domain name or to the name of your mail exchanger.

```
MASQUERADE_AS(cecs.csulb.edu)
```

Files

Configuration files are located in `/etc/mail`
Change the file, run "make" to update the database (`.db`) file.

`local-host-names`:
Your machine may be called as any one of these names so the mail server recognizes them all as being the machine it is running on.

```
localhost
charlotte.cecs.csulb.edu
cecs.csulb.edu
```

`access`:
Controls who can use your mailer for what.

```
connect:192.168.1 RELAY
connect:net.cecs.csulb.edu RELAY
```

You are willing to relay mail machines inside your private subnet.