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Mu4e - an e-mail client for GNU/Emacs

version 0.9.16

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Welcome to mu4e

Welcome to `mu4e` 0.9.16!

`mu4e` (`mu`-for-emacs) is an e-mail client for GNU-Emacs version 24 or higher, built on top of the `mu`[1] e-mail search engine. `mu4e` is optimized for fast handling of large amounts of e-mail.

Some of its highlights:

- Fully search-based: there are no folders[2], only queries.
- Fully documented, with example configurations
- User-interface optimized for speed, with quick key strokes for common actions
- Support for non-English languages (so "angstrom" matches "ngstrm")
- Asynchronous: heavy actions don't block `emacs`[3]
- Support for cryptography - signing, encrypting and decrypting
- Address auto-completion based on the contacts in your messages
- Extendable with your own snippets of elisp

In this manual, we go through the installation of `mu4e`, do some basic configuration and explain its daily use. We also show you how you can customize `mu4e` for your special needs.

At the end of the manual, there are some example configurations, to get you up to speed quickly: Appendix B [Example configurations], page 54. There's also an Appendix C [FAQ], page 60, which should help you with questions to some common questions.

[1] http://www.djcbsoftware.nl/code/mu

[2] that is, instead of folders, you use queries that match messages in a particular folder

[3] currently, the only exception to this is *sending mail*; there are solutions for that though - see the Appendix C [FAQ], page 60

1 Introduction

1.1 Why another e-mail client?

I (the author) spend a *lot* of time dealing with e-mail, both professionally and privately. Having an efficient e-mail client is essential. Since none of the existing ones worked the way I wanted, I created my own.

`emacs` is an integral part of my workflow, so it made a lot of sense to use it for e-mail as well. And as I had already written an e-mail search engine (`mu`), it seemed only logical to use that as a basis.

1.2 Other mail clients

Under the hood, `mu4e` is fully search-based, similar to programs like `notmuch`[1] and `sup`[2].

However, `mu4e`'s user-interface is quite different. `mu4e`'s mail handling (deleting, moving etc.) is inspired by *Wanderlust*[3] (another `emacs`-based e-mail client), `mutt`[4] and the `dired` file-manager for emacs.

`mu4e` tries to keep all the 'state' in your maildirs, so you can easily switch between clients, synchronize over IMAP, backup with `rsync` and so on. If you delete the database, you won't lose any information.

1.3 What `mu4e` does not do

There are a number of things that `mu4e` does **not** do:

- `mu`/`mu4e` do *not* get your e-mail messages from a mail server. That task is delegated to other tools, such as `offlineimap`[5], `isync/mbsync`[6] or `fetchmail`[7]. As long as the messages end up in a maildir, `mu4e` and `mu` are happy to deal with them.
- `mu4e` also does *not* implement sending of messages; instead, it depends on `smtpmail` (See Info file `smtpmail`, node '`Top`'), which is part of `emacs`. In addition, `mu4e` piggybacks on Gnus' message editor; See Info file `message`, node '`Top`'.

Thus, many of the things an e-mail client traditionally needs to do, are delegated to other tools. This leaves `mu4e` to concentrate on what it does best: quickly finding the mails you are looking for, and handle them as efficiently as possible.

1.4 Becoming a `mu4e` user

If `mu4e` looks like something for you, give it a shot! We're trying hard to make it as easy as possible to set up and use; and while you can use elisp in various places to augment `mu4e`, a

[1] http://notmuchmail.org
[2] http://sup.rubyforge.org/
[3] http://www.gohome.org/wl/
[4] http://www.mutt.org/
[5] http://offlineimap.org/
[6] http://isync.sourceforge.net/
[7] http://www.fetchmail.info/

lot of knowledge about programming or elisp shouldn't be required. The idea is to provide sensible defaults, and allow for customization.

When you take `mu4e` into use, it's a good idea to subscribe to the `mu`/`mu4e`-mailing list[8].

If you have suggestions for improvements or bug reports, please use the GitHub issues list[9]. In bug reports, please clearly specify the versions of `mu`/`mu4e` and `emacs` you are using, as well as any other relevant details. Also, if it is about the behavior for specific messages, please attach the raw message (that is, the message file as it exists in your maildir); you can of course strip off any personal information.

[8] http://groups.google.com/group/mu-discuss

[9] https://github.com/djcb/mu/issues

2 Getting started

In this chapter, we go through the installation of `mu4e` and its basic setup. After we have succeeded in Section 2.3 [Getting mail], page 6, and see Section 2.4 [Indexing your messages], page 6, we discuss the Section 2.5 [Basic configuration], page 7.

After these steps, `mu4e` should be ready to go!

2.1 Requirements

`mu`/`mu4e` are known to work on a wide variety of Unix- and Unix-like systems, including many Linux distributions, OS X and FreeBSD. `emacs` 23 or 24 (recommended) is required, as well as Xapian[1] and GMime[2].

`mu` has optional support for the Guile 2.x (Scheme) programming language. There are also some GUI-tools, which require GTK+ 3.x and Webkit.

If you intend to compile `mu` yourself, you need to have the typical development tools, such as C and C++ compilers (both `gcc` and `clang` should work), GNU Autotools and `make`, and the development packages for GMime, GLib and Xapian. Optionally (if you use them), you also need the development packages for GTK+, Webkit and Guile.

2.2 Installation

`mu4e` is part of `mu` - by installing the latter, the former is installed as well. Some Linux distributions provide packaged versions of `mu`/`mu4e`; if you can use those, there is no need to compile anything yourself. However, if there are no packages for your distribution, if they are outdated, or if you want to use the latest development versions, you can follow the steps below.

First, you need make sure you have the necessary dependencies; the details depend on your distribution. If you're using another distribution (or another OS), the below at least be helpful in identifying the packages to install.

We provide some instructions for Debian, Ubuntu and Fedora; if those do not apply to you, you can follow either [Building from a release tarball], page 5 or [Building from git], page 5.

2.2.1 Dependencies for Debian/Ubuntu

```
$ sudo apt-get install libgmime-2.6-dev libxapian-dev
# if libgmime-2.6-dev is not available, try libgmime-2.4-dev

# get emacs 23 or 24 if you don't have it yet
$ sudo apt-get install emacs24

# optional
$ sudo apt-get install guile-2.0-dev html2text xdg-utils

# optional: only needed for msg2pdf and mug (toy gtk+ frontend)
$ sudo apt-get install libwebkit-dev
```

[1] http://xapian.org/

[2] http://spruce.sourceforge.net/gmime/

2.2.2 Dependencies for Fedora

```
$ sudo yum install gmime-devel xapian-core-devel

# get emacs 23 or 24 if you don't have it yet
$ sudo yum install emacs

# optional
$ sudo yum install html2text xdg-utils

# optional: only needed for msg2pdf and mug (toy gtk+ frontend)
$ sudo yum install webkitgtk3-devel
```

2.2.3 Building from a release tarball

Using a release-tarball (as available from GoogleCode[3], installation follows the typical steps:

```
$ tar xvfz mu-<version>.tar.gz  # use the specific version
$ cd mu-<version>
# On the BSDs: use gmake instead of make
$ ./configure && make
$ sudo make install
```

Xapian, GMime and their dependencies must be installed.

2.2.4 Building from git

Alternatively, if you build from the git repository or use a tarball like the ones that `github` produces, the instructions are slightly different, and require you to have `autotools` (Autoconf, Automake, Libtool, and friends) installed:

```
# get from git (alternatively, use a github tarball)
$ git clone git://github.com/djcb/mu.git

$ cd mu
$ autoreconf -i && ./configure && make
# On the BSDs: use gmake instead of make
$ sudo make install
```

(Xapian, GMime and their dependencies must be installed).

After this, `mu` and `mu4e` should be installed[4] on your system, and be available from the command line in `emacs`.

You may need to restart `emacs`, so it can find `mu4e` in its `load-path`. If, even after restarting, `emacs` cannot find `mu4e`, you may need to add it to your `load-path` explicitly; check where `mu4e` is installed, and add something like the following to your configuration before trying again:

```
;; the exact path may differ -- check it
(add-to-list 'load-path "/usr/local/share/emacs/site-lisp/mu4e")
```

[3] http://code.google.com/p/mu0/downloads/list

[4] there's a hard dependency between versions of `mu4e` and `mu` - you cannot combine different versions

2.2.5 mu4e and emacs customization

There is some support for using the `emacs` customization system in `mu4e`, but for now, we recommend setting the values manually. Please refer to Appendix B [Example configurations], page 54 for a couple of examples of this; here we go through things step-by-step.

2.3 Getting mail

In order for `mu` (and, by extension, `mu4e`) to work, you need to have your e-mail messages stored in a *maildir*[5] - a specific directory structure with one-file-per-message. If you are already using a maildir, you are lucky. If not, some setup is required:

- *Using an external IMAP or POP server* - if you are using an IMAP or POP server, you can use tools like `getmail`, `fetchmail`, `offlineimap` or `isync` to download your messages into a maildir (`~/Maildir`, often). Because it is such a common case, there is a full example of setting `mu4e` up with `offlineimap` and Gmail; see Section B.3 [Gmail configuration], page 56.
- *Using a local mail server* - if you are using a local mail-server (such as `postfix` or `qmail`), you can teach them to deliver into a maildir as well, maybe in combination with `procmail`. A bit of googling should be able to provide you with the details.

2.4 Indexing your messages

After you have succeeded in Section 2.3 [Getting mail], page 6, we need to *index* the messages. That is - we need to scan the messages in the maildir and store the information about them in a special database. We can do that from `mu4e` – Chapter 3 [Main view], page 11, but the first time, it is a good idea to run it from the command line, which makes it easier to verify that everything works correctly.

Assuming that your maildir is at `~/Maildir`, we issue the following command:

```
$ mu index --maildir=~/Maildir
```

This should scan your `~/Maildir`[6] and fill the database, and give progress information while doing so.

The indexing process may take a few minutes the first time you do it (for thousands of e-mails); afterwards it is much faster, since `mu` only scans messages that are new or have changed. Indexing is discussed in full detail in the `mu-index` man-page.

After the indexing process has finished, you can quickly test if everything worked, by trying some command-line searches, for example

```
$ mu find hello
```

which lists all messages that match `hello`. For more examples of searches, see Section 7.1 [Queries], page 29, or check the `mu-find` and `mu-easy` man pages. If all of this worked well, we are well on our way setting things up; the next step is to do some basic configuration for `mu4e`.

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[5] http://en.wikipedia.org/wiki/Maildir; in this manual we use the term 'maildir' for both the standard and the hierarchy of maildirs that store your messages

[6] In most cases, you do not even need to provide the `--maildir=~/Maildir` since it is the default; see the `mu-index` man-page for details

2.5 Basic configuration

Before we can start using `mu4e`, we need to tell `emacs` to load it. So, add to your `~/.emacs` (or its moral equivalent, such as `~/.emacs.d/init.el`) something like:

```
(require 'mu4e)
```

If `emacs` complains that it cannot find `mu4e`, check your `load-path` and make sure that `mu4e`'s installation directory is part of it. If not, you can add it:

```
(add-to-list 'load-path MU4E-PATH)
```

with `MU4E-PATH` replaced with the actual path.

2.6 Folders

The next step is to tell `mu4e` where it can find your Maildir, and some special folders.

So, for example[7]:

```
;; these are actually the defaults
(setq
  mu4e-maildir       "~/Maildir"   ;; top-level Maildir
  mu4e-sent-folder   "/sent"       ;; folder for sent messages
  mu4e-drafts-folder "/drafts"     ;; unfinished messages
  mu4e-trash-folder  "/trash"      ;; trashed messages
  mu4e-refile-folder "/archive")   ;; saved messages
```

Note, `mu4e-maildir` takes an actual filesystem-path, the other folder names are all relative to `mu4e-maildir`. Also note that this must *not* be a symbolic link.

If you use `mu4e-context`, see Section 9.3 [Contexts and special folders], page 39 for what that means for these special folders.

2.7 Retrieval and indexing with mu4e

As we have seen, we can do all of the mail retrieval *outside* of `emacs`/`mu4e`. However, you can also do it from within `mu4e`.

2.7.1 Basics

To set up mail-retrieval from withing `mu4e`, set the variable `mu4e-get-mail-command` to the program or shell command you want to use for retrieving mail. You can then get your e-mail using *M-x mu4e-update-mail-and-index*, or *C-S-u* in all `mu4e`-views; alternatively, you can use *C-c C-u*, which may be more convenient if you use emacs in a terminal.

You can interrupt the (foreground) update process with *q*.

It is possible to update your mail and index periodically in the background, by setting the variable `mu4e-update-interval` to the number of seconds between these updates. If set to `nil`, it won't update at all. After you make changes to `mu4e-update-interval`, `mu4e` must be restarted before the changes take effect.

[7] Note that the folders (`mu4e-sent-folder`, `mu4e-drafts-folder`, `mu4e-trash-folder` and `mu4e-refile-folder`) can also be *functions* that are evaluated at runtime. This allows for dynamically changing them depending on the situation. See Chapter 10 [Dynamic folders], page 42 for details.

2.7.2 Handling errors during mail retrieval

If the mail-retrieval process returns with a non-zero exit code, `mu4e` shows a warning (unless `mu4e-index-update-error-warning` is set to `nil`), but then try to index your maildirs anyway (unless `mu4e-index-update-error-continue` is set to `nil`).

Reason for these defaults is that some of the mail-retrieval programs may return non-zero, even when the updating process succeeded; however, it is hard to tell such pseudo-errors from real ones like 'login failed'.

If you need more refinement, it may be useful to wrap the mail-retrieval program in a shell-script, for example `fetchmail` returns 1 to indicate 'no mail'; we can handle that with:

```
(setq mu4e-get-mail-command "fetchmail -v || [ $? -eq 1 ]")
```

A similar approach can be used with other mail retrieval programs, although not all of them have their exit codes documented.

2.7.3 Implicit mail retrieval

If you don't have a specific command for getting mail, for example because you are running your own mail-server, you can leave `mu4e-get-mail-command` at `"true"` (the default), in which case `mu4e` won't try to get new mail, but still re-index your messages.

2.7.4 Example setup

A simple setup could look something like:

```
(setq
  mu4e-get-mail-command "offlineimap"   ;; or fetchmail, or ...
  mu4e-update-interval 300)             ;; update every 5 minutes
```

A hook `mu4e-update-pre-hook` is available which is run right before starting the process. That can be useful, for example, to influence, `mu4e-get-mail-command` based on the the current situation (location, time of day, ...).

It is possible to get notifications when the indexing process does any updates - for example when receiving new mail. See `mu4e-index-updated-hook` and some tips on its usage in the Appendix C [FAQ], page 60.

2.8 Sending mail

`mu4e` re-uses Gnu's `message-mode` (See Info file `message`, node '`Top`') for writing mail and inherits the setup for sending mail as well.

For sending mail using SMTP, `mu4e` uses `smtpmail` (See Info file `smtpmail`, node '`Top`'). This package supports many different ways to send mail; please refer to its documentation for the details.

Here, we only provide some simple examples - for more, see Appendix B [Example configurations], page 54.

A very minimal setup:

```
;; tell message-mode how to send mail
(setq message-send-mail-function 'smtpmail-send-it)
;; if our mail server lives at smtp.example.org; if you have a local
;; mail-server, simply use 'localhost' here.
```

```
(setq smtpmail-smtp-server "smtp.example.org")
```

Since `mu4e` (re)uses the same `message mode` and `smtpmail` that Gnus uses, many settings for those also apply to `mu4e`.

2.8.1 Dealing with sent messages

By default, `mu4e` puts a copy of messages you sent in the folder determined by `mu4e-sent-folder`. In some cases, this may not be what you want - for example, when using Gmail-over-IMAP, this interferes with Gmail's handling of the sent messages folder, and you may end up with duplicate messages.

You can use the variable `mu4e-sent-messages-behavior` to customize what happens with sent messages. The default is the symbol `sent` which, as mentioned, causes the message to be copied to your sent-messages folder. Other possible values are the symbols `trash` (the sent message is moved to the trash-folder (`mu4e-trash-folder`), and `delete` to simply discard the sent message altogether (so Gmail can deal with it).

For Gmail-over-IMAP, you could add the following to your settings:

```
;; don't save messages to Sent Messages, Gmail/IMAP takes care of this
(setq mu4e-sent-messages-behavior 'delete)
```

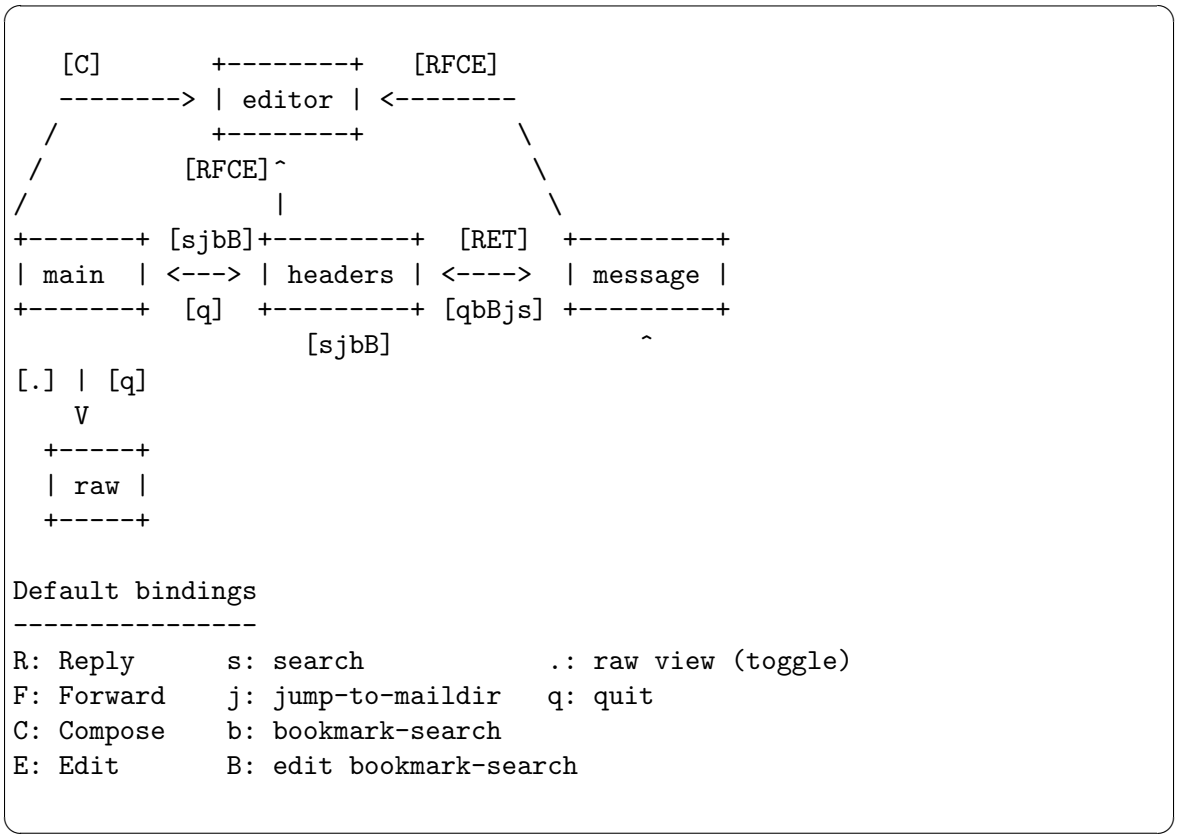
And that's it! We should now be ready to go.

For more complex needs, `mu4e-sent-messages-behavior` can also be a a parameter-less function that returns one of the mentioned symbols; see the built-in documentation for the variable.

2.9 Running mu4e

After following the steps in this chapter, we now (hopefully!) have a working `mu4e` setup. Great! In the next chapters, we walk you through the various views in `mu4e`.

For your orientation, the diagram below shows how the views relate to each other, and the default key-bindings to navigate between them.


[C]
[RFCE]
editor
[RFCE]
[sjbB]
[RET]
main
headers
message
[q]
[qbBjs]
[sjbB]
[.] | [q]
raw
Default bindings
R: Reply
s: search
.: raw view (toggle)
F: Forward
j: jump-to-maildir
q: quit
C: Compose
b: bookmark-search
E: Edit
B: edit bookmark-search

3 The main view

After you have installed `mu4e` (see Chapter 2 [Getting started], page 4), you can start it with *M-x mu4e*. `mu4e` does some checks to ensure everything is set up correctly, and then shows you the `mu4e` main view. Its major mode is `mu4e-main-mode`.

3.1 Overview

The main view looks something like the following:

```
* mu4e - mu for emacs version 0.X.X CG

  Basics

        * [j]ump to some maildir
        * enter a [s]earch query
        * [C]ompose a new message

  Bookmarks

        * [bu] Unread messages
        * [bt] Today's messages
        * [bw] Last 7 days
        * [bp] Messages with images
        * [bs] Sent mail
        * [bf] Flagged messages
        * [b]] Flow
        * [b/] Test

  Misc

        * [;]Switch focus
        * [U]pdate email & database

        * [N]ews
        * [A]bout mu4e
        * [H]elp
        * [q]uit
```

In the example above, you can see the letters "`CG`", which indicate:

- `C`: support for decryption of encrypted messages, and verifying signatures. See Section 5.6 [MSGV Crypto], page 23 in the Chapter 5 [Message view], page 18 for details.
- `G`: support for the Guile 2.0 programming language

Whether you see both, one or none of these letters depends on the way `mu` is built.

Let's walk through the menu.

3.2 Basic actions

First, the *Basics*:

- `[j]ump to some maildir`: after pressing `j` ("jump"), `mu4e` asks you for a maildir to visit. These are the maildirs you set in Section 2.5 [Basic configuration], page 7 and any of your own. If you choose `o` ("other") or `/`, you can choose from all maildirs under `mu4e-maildir`. After choosing a maildir, the messages in that maildir are listed, in the Chapter 4 [Headers view], page 13.
- `enter a [s]earch query`: after pressing `s`, `mu4e` asks you for a search query, and after entering one, shows the results in the Chapter 4 [Headers view], page 13.
- `[C]ompose a new message`: after pressing `C`, you are dropped in the Chapter 6 [Editor view], page 25 to write a new message.

3.3 Bookmarks

The next item in the Main view is *Bookmarks*. Bookmarks are predefined queries with a descriptive name and a shortcut - in the example above, we see the default bookmarks. You can view the list of messages matching a certain bookmark by pressing `b` followed by the bookmark's shortcut. If you'd like to edit the bookmarked query first before invoking it, use `B`.

Bookmarks are stored in the variable `mu4e-bookmarks`; you can add your own and/or replace the default ones; See Section 7.2 [Bookmarks], page 30.

3.4 Miscellaneous

Finally, there are some *Misc* (miscellaneous) actions:

- `[U]pdate email & database` executes the shell-command in the variable `mu4e-get-mail-command`, and afterwards updates the `mu` database; see Section 2.4 [Indexing your messages], page 6 and Section 2.3 [Getting mail], page 6 for details.
- `toggle [m]ail sending mode (direct)` toggles between sending mail directly, and queuing it first (for example, when you are offline), and `[f]lush queued mail` flushes any queued mail. This item is visible only if you have actually set up mail-queuing. Section 6.6 [Queuing mail], page 27
- `[A]bout mu4e` provides general information about the program
- `[H]elp` shows help information for this view
- Finally, `[q]uit mu4e` quits your `mu4e`-session

4 The headers view

The headers view shows the results of a query. The header-line shows the names of the fields. Below that, there is a line with those fields, for each matching message, followed by a footer line. The major-mode for the headers view is `mu4e-headers-mode`.

4.1 Overview

An example headers view:

```
Date V       Flgs  From/To              List       Subject
06:32        Nu    To Edmund Dants     GstDev       + Re: Gstreamer-V4L...
15:08        Nu    Abb Busoni          GstDev         + Re: Gstreamer-V...
18:20        Nu    Pierre Morrel        GstDev           \ Re: Gstreamer...
2013-03-18   S     Jacopo               EmacsUsr   + emacs server on win...
2013-03-18   S     Mercds              EmacsUsr    \ RE: emacs server ...
2013-03-18   S     Beachamp             EmacsUsr   + Re: Copying a whole...
22:07        Nu    Albert de Moncerf    EmacsUsr     \ Re: Copying a who...
2013-03-18   S     Gaspard Caderousse   GstDev     | Issue with GESSimpl...
2013-03-18   Ss    Baron Danglars       GuileUsr   | Guile-SDL 0.4.2 ava...
End of search results
```

Some notes to explain what you see in the example:

- The fields shown in the headers view can be influenced by customizing the variable `mu4e-headers-fields`; see `mu4e-header-info` for the list of built-in fields. Apart from the built-in fields, you can also create custom fields using `mu4e-header-info-custom`; see Section 4.5 [HV Custom headers], page 16 for details.
- By default, the date is shown with the `:human-date` field, which shows the *time* for today's messages, and the *date* for older messages. If you want to distinguish between 'today' and 'older', you can use the `:date` field instead.
- You can customize the date and time formats with the variable `mu4e-headers-date-format` and `mu4e-headers-time-format`, respectively. In the example, we use `:human-date`, which shows when the time when the message was sent today, and the date otherwise.
- By default, the subject is shown using the `:subject` field; however, it is also possible to use `:thread-subject`, which shows the subject of a thread only once, similar to the display of the `mutt` e-mail client.
- The header field used for sorting is indicated by "`V`" or "`^`"[1], corresponding to the sort order (descending or ascending, respectively). You can influence this by a mouse click, or `O`. Not all fields allow sorting.
- Instead of showing the `From:` and `To:` fields separately, you can use From/To (`:from-or-to` in `mu4e-headers-fields` as a more compact way to convey the most important information: it shows `From:` *except* when the e-mail was sent by

[1] or you can use little graphical triangles; see variable `mu4e-use-fancy-chars`

the user (i.e., you) - in that case it shows `To:` (prefixed by `To`[2], as in the example above). To determine whether a message was sent by you, `mu4e` uses the variable `mu4e-user-mail-address-list`, a list of your e-mail addresses.

- The 'List' field shows the mailing-list a message is sent to; `mu4e` tries to create a convenient shortcut for the mailing-list name; the variable `mu4e-user-mailing-lists` can be used to add your your own shortcuts. You can use `mu4e-mailing-list-patterns` to to specify generic shortcuts, e.g. to shorten list names which contain dots (mu4e defaults to shortening up to the first dot):

```
(setq mu4e-mailing-list-patterns '(``\\([-_a-z0-9.]+\\)\.lists\.company\.com''))
```

- The letters in the 'Flags' field correspond to the following: D=*draft*, F=*flagged* (i.e., 'starred'), N=*new*, P=*passed* (i.e., forwarded), R=*replied*, S=*seen*, T=*trashed*, a=*has-attachment*, x=*encrypted*, s=*signed*, u=*unread*. The tooltip for this field also contains this information.
- The subject field also indicates the discussion threads[3].
- The headers view is *automatically updated* if any changes are found during the indexing process, and if there is no current user-interaction. If you do not want such automatic updates, set `mu4e-headers-auto-update` to `nil`.
- There is a hook-function `mu4e-headers-found-hook` available which is invoked just after `mu4e` has completed showing the messages in the headers-view.

4.2 Keybindings

Using the below key bindings, you can do various things with these messages; these actions are also listed in the `Headers` menu in the `emacs` menu bar.

```
key          description
============================================================
n,p          view the next, previous message
],[          move to the next, previous unread message
y            select the message view (if it's visible)
RET          open the message at point in the message view

searching
---------
s            search
S            edit last query
/            narrow the search
b            search bookmark
B            edit bookmark before search
j            jump to maildir
M-left,\     previous query
M-right      next query

O            change sort order
```

[2] You can customize this by changing the variable `mu4e-headers-from-or-to-prefix` (a cons cell)

[3] using Jamie Zawinski's mail threading algorithm, http://www.jwz.org/doc/threading.html

```
P            toggle threading
Q            toggle full-search
V            toggle skip-duplicates
W            toggle include-related

marking
-------
d            mark for moving to the trash folder
=            mark for removing trash flag ('untrash')
DEL,D        mark for complete deletion
m            mark for moving to another maildir folder
r            mark for refiling
+,-          mark for flagging/unflagging
?,!          mark message as unread, read

u            unmark message at point
U            unmark *all* messages

%            mark based on a regular expression
T,t          mark whole thread, subthread

<insert>,*   mark for 'something' (decide later)
#            resolve deferred 'something' marks

x            execute actions for the marked messages

composition
-----------
R,F,C        reply/forward/compose
E            edit (only allowed for draft messages)


misc
----
;            switch focus
a            execute some custom action on a header
|            pipe message through shell command
C-+,C--      increase / decrease the number of headers shown
H            get help
C-S-u        update mail & reindex
q,z          leave the headers buffer
```

4.3 Marking

You can *mark* messages for a certain action, such as deletion or move. After one or more messages are marked, you can then execute (`mu4e-mark-execute-all`, `x`) these actions.

This two-step mark-execute sequence is similar to what e.g. `dired` does. It is how `mu4e` tries to be as quick as possible, while avoiding accidents.

The mark/unmark commands support the *region* (i.e., "selection") – so, for example, if you select some messages and press `DEL`, all messages in the region are marked for deletion.

You can mark all messages that match a certain pattern with `%`. In addition, you can mark all messages in the current thread (`T`) or sub-thread (`t`).

When you do a new search or refresh the headers buffer while you still have marked messages, you are asked what to do with those marks – whether to *apply* them before leaving, or *ignore* them. This behavior can be influenced with the variable `mu4e-headers-leave-behavior`.

For more information about marking, see Chapter 8 [Marking], page 34.

4.4 Sort order and threading

By default, `mu4e` sorts messages by date, in descending order: the most recent messages are shown at the top. In addition, the messages are *threaded*, i.e., shown in the context of a discussion thread; this also affects the sort order.

The header field used for sorting is indicated by "`V`" or "`^`"[4], indicating the sort order (descending or ascending, respectively).

You can change the sort order by clicking the corresponding field with the mouse, or with *`M-x mu4e-headers-change-sorting`* (`O`); note that not all fields can be used for sorting. You can toggle threading on/off using *`M-x mu4e-headers-toggle-threading`* or `P`. For both of these functions, unless you provide a prefix argument (`C-u`), the current search is updated immediately using the new parameters. You can toggle full-search (Chapter 7 [Searching], page 29) using *`M-x mu4e-headers-toggle-full-search`* or `Q`.

If you want to change the defaults for these settings, you can use the variables `mu4e-headers-sortfield` and `mu4e-headers-show-threads`.

4.5 Custom headers

Sometimes the normal headers that `mu4e` offers (Date, From, To, Subject etc.) may not be enough. For these cases, `mu4e` offers *custom headers* in both the headers-view and the message-view.

You can do so by adding a description of your custom header to `mu4e-header-info-custom`, which is a list of custom headers.

Let's look at an example – suppose we want to add a custom header that shows the number of recipients for a message, i.e., the sum of the number of recipients in the To: and Cc: fields. Let's further suppose that our function takes a message-plist as its argument (Section 12.3 [Message functions], page 47).

```
(add-to-list 'mu4e-header-info-custom
  '(:recipnum .
     ( :name "Number of recipients"  ;; long name, as seen in the message-view
       :shortname "Recip#"           ;; short name, as seen in the headers view
       :help "Number of recipients for this message" ;; tooltip
```

[4] or you can use little graphical triangles; see variable `mu4e-use-fancy-chars`

```
        :function (lambda (msg)
           (format "%d"
             (+ (length (mu4e-message-field msg :to))
                (length (mu4e-message-field msg :cc))))))))
```

Or, let's get the full mailing-list name:

```
(add-to-list 'mu4e-header-info-custom
 '(:full-mailing-list .
     ( :name "Mailing-list"               ;; long name, as seen in the message-view
       :shortname "ML"                    ;; short name, as seen in the headers view
       :help "Full name for mailing list" ;; tooltip
       :function (lambda (msg)
           (or (mu4e-message-field msg :mailing-list) "")))))
```

You can then add the custom header to your `mu4e-headers-fields`, just like the built-in headers. After evaluation, you headers-view should include a new header `Recip#` with the number of recipients, and/or `ML` with the full mailing-list name.

This function can be used in both the headers-view and the message-view; if you need something specific for one of these, you can check for the mode in your function, or create separate functions.

4.6 Actions

`mu4e-headers-action` (`a`) lets you pick custom actions to perform on the message at point. You can specify these actions using the variable `mu4e-headers-actions`. See Chapter 11 [Actions], page 44 for the details.

`mu4e` defines some default actions. One of those is for *capturing* a message: `a c` 'captures' the current message. Next, when you're editing some message, you can include the previously captured message as an attachment, using `mu4e-compose-attach-captured-message`. See `mu4e-actions.el` in the `mu4e` source distribution for more example actions.

4.7 Split view

Using the *Split view*, we can see the Chapter 4 [Headers view], page 13 and the Chapter 5 [Message view], page 18 next to each other, with the message selected in the former, visible in the latter. You can influence the way the splitting is done by customizing the variable `mu4e-split-view`. Possible values are:

- `horizontal` (this is the default): display the message view below the header view. Use `mu4e-headers-visible-lines` the set the number of lines shown (default: 8).
- `vertical`: display the message view on the right side of the header view. Use `mu4e-headers-visible-columns` to set the number of visible columns (default: 30).
- anything else: don't do any splitting

Some useful key bindings in the split view:

- `C-+` and `C--`: interactively change the number of columns or headers shown
- You can change the selected window from the headers-view to the message-view and vice-versa with `mu4e-select-other-view`, bound to `y`

5 The message view

After selecting a message in the Chapter 4 [Headers view], page 13, it appears in a message view window, which shows the message headers, followed by the message body. Its major mode is `mu4e-view-mode`.

5.1 Overview

An example message view:

```
From: randy@epiphyte.com
To: julia@eruditorum.org
Subject: Re: some pics
Flags: (seen attach)
Date: Mon 19 Jan 2004 09:39:42 AM EET
Maildir: /inbox
Attachments(2): [1]DSCN4961.JPG(1.3M), [2]DSCN4962.JPG(1.4M)

Hi Julia,

Some pics from our trip to Cerin Amroth. Enjoy!

All the best,
Randy.

On Sun 21 Dec 2003 09:06:34 PM EET, Julia wrote:

[....]
```

Some notes:

- The variable `mu4e-view-fields` determines the header fields to be shown; see `mu4e-header-info` for a list of built-in fields. Apart from the built-in fields, you can also create custom fields using `mu4e-header-info-custom`; see Section 5.7 [MSGV Custom headers], page 23.
- You can set the date format with the variable `mu4e-date-format-long`.
- By default, only the names of contacts in address fields are visible (see `mu4e-view-show-addresses` to change this). You can view the e-mail addresses by clicking on the name, or pressing `M-RET`.
- You can compose a message for the contact at point by either clicking `[mouse-2]` or pressing `C`.
- The body text can be line-wrapped using `visual-line-mode`. `mu4e` defines `w` to toggle between the wrapped and unwrapped state. If you want to do this automatically when viewing a message, invoke `visual-line-mode` in your `mu4e-view-mode-hook`.
- For messages that support it, you can toggle between html and text versions using `mu4e-view-toggle-html`, bound to `h`;

- You can hide cited parts in messages (the parts starting with "`>`") using `mu4e-view-hide-cited`, bound to `#`. If you want to do this automatically for every message, invoke the function in your `mu4e-view-mode-hook`.
- For search-related operations, see Chapter 7 [Searching], page 29.
- You can scroll down the message using `SPC`; if you do this at the end of a message,it automatically takes you to the next one. If you want to prevent this behavior, set `mu4e-view-scroll-to-next` to `nil`.

5.2 Keybindings

You can find most things you can do with this message in the *View* menu, or by using the keyboard; the default bindings are:

```
key           description
============================================================
n,p           view the next, previous message
],[           move to the next, previous unread message
y             select the headers view (if it's visible)

RET           scroll down
M-RET         open URL at point / attachment at point

SPC           scroll down, if at end, move to next message
S-SPC         scroll up

searching
---------
s             search
e             edit last query
/             narrow the search
b             search bookmark
B             edit bookmark before search
j             jump to maildir

M-left        previous query
M-right       next query

marking
-------
d             mark for moving to the trash folder
=             mark for removing trash flag ('untrash')
DEL,D         mark for complete deletion
m             mark for moving to another maildir folder
r             mark for refiling
+,-           mark for flagging/unflagging

u             unmark message at point
U             unmark *all* messages
```

```
%            mark based on a regular expression
T,t          mark whole thread, subthread

<insert>,*   mark for 'something' (decide later)
#            resolve deferred 'something' marks

x            execute actions for the marked messages

composition
-----------
R,F,C        reply/forward/compose
E            edit (only allowed for draft messages)

actions
-------
g            go to (visit) numbered URL (using `browse-url')
(or: <mouse-1> or M-RET with point on url)
C-u g visits multiple URLs
f            fetch (download )the numbered URL.
C-u f fetches multiple URLs
k            save the numbered URL in the kill-ring.
C-u k saves multiple URLs

e            extract (save) attachment (asks for number)
(or: <mouse-2> or S-RET with point on attachment)
C-u e extracts multiple attachments
o            open attachment (asks for number)
(or: <mouse-1> or M-RET with point on attachment)

a            execute some custom action on the message
A            execute some custom action on an attachment

misc
----
;            switch focus
c            copy address at point (with C-u copy long version)

h            toggle between html/text (if available)
w            toggle line wrapping
#            toggle show/hide cited parts

v            show details about the cryptographic signature

.            show the raw message view. 'q' takes you back.
C-+,C--      increase / decrease the number of headers shown
H            get help
```

```
C-S-u        update mail & reindex
q,z          leave the message view
```

For the marking commands, please refer to Section 8.1 [Marking messages], page 34.

5.3 Attachments

By default, `mu4e` uses the `xdg-open`-program[1] or (on OS X) the `open` program for opening attachments. If you want to use another program, you do so by setting the `MU_PLAY_PROGRAM` environment variable to the program to be used.

The default directory for extracting (saving) attachments is your home directory (`~/`); you can change this using the variable `mu4e-attachment-dir`, for example:

```
(setq mu4e-attachment-dir  "~/Downloads")
```

For more flexibility, `mu4e-attachment-dir` can also be a user-provided function. This function receives two parameters: the file-name and the mime-type as found in the e-mail message[2] of the attachment, either or both of which can be `nil`. For example:

```
(setq mu4e-attachment-dir
  (lambda (fname mtype)
     (cond
        ;; docfiles go to ~/Desktop
       ((and fname (string-match "\\.doc$" fname))  "~/Desktop")
       ;; ... other cases  ...
       (t "~/Downloads")))) ;; everything else
```

You can extract multiple attachments at once by prefixing the extracting command by `C-u`; so *`C-u e`* asks you for a range of attachments to extract (for example, *`1 3-6 8`*). The range `"‘a’"` is a shortcut for *all* attachments.

5.4 Viewing images inline

It is possible to show images inline in the message view buffer if you run `emacs` in GUI-mode. You can enable this by setting the variable `mu4e-view-show-images` to `t`. Since `emacs` does not always handle images correctly, this is not enabled by default. If you are using `emacs` 24 with *ImageMagick*[3] support, make sure you call `imagemagick-register-types` in your configuration, so it is used for images.

```
;; enable inline images
(setq mu4e-view-show-images t)
;; use imagemagick, if available
(when (fboundp 'imagemagick-register-types)
  (imagemagick-register-types))
```

5.5 Displaying rich-text messages

`mu4e` normally prefers the plain-text version for messages that consist of both a plain-text and html (rich-text) versions of the body-text. You can change this by setting `mu4e-view-`

[1] http://portland.freedesktop.org/wiki/

[2] sadly, often `application/octet-stream` is used for the mime-type, even if a better type is available

[3] http://www.imagemagick.org

`prefer-html` to `t`. And you can toggle this value (globally) using *h* in the message view; this also refreshes the message with the new setting.

If there is only an html-version, or if the plain-text version is too short in comparison with the html part[4], `mu4e` tries to convert the html into plain-text for display.

The default way to do that is to use the `emacs` built-in `html2text` function. However, you can set the variable `mu4e-html2text-command` to a either a shell command or a function instead.

5.5.1 Html2text commands

If `mu4e-html2text-command` is a shell command, it is expected to take html from standard input and write plain text in `UTF-8` encoding on standard output.

An example of such a program is the program that is actually *called* `html2text`[5]. After installation, you can set it up with something like the following:

```
(setq mu4e-html2text-command "html2text -utf8 -width 72")
```

An alternative to this is the Python `python-html2text` package; after installing that, you can tell `mu4e` to use it with something like:

```
(setq mu4e-html2text-command
  "html2markdown | grep -v '&nbsp_place_holder;'")
```

On OS X, there is a program called `textutil` as yet another alternative:

```
(setq mu4e-html2text-command
  "textutil -stdin -format html -convert txt -stdout")
```

5.5.2 Html2text functions

If `mu4e-html2text-command` refers to an elisp function, it is expected to take the current buffer in html as input, and transform it into text (just like the `html2text` function).

For example, emacs 24.4 and later versions include the `eww` browser which uses the `shr` html renderer; `mu4e` includes a little snippet to uses this with `mu4e-html2text-command`; for this, add the following to your configuration:

```
(require 'mu4e-contrib)
(setq mu4e-html2text-command 'mu4e-shr2text)
```

If you use the `mu4e-shr2text`, it might be useful to emulate some of the `shr` key bindings, with something like:

```
(add-hook 'mu4e-view-mode-hook
  (lambda()
    ;; try to emulate some of the eww key-bindings
    (local-set-key (kbd "<tab>") 'shr-next-link)
    (local-set-key (kbd "<backtab>") 'shr-previous-link)))
```

If you're using a dark theme, and the messages are hard to read, it can help to change the luminosity, e.g.:

```
(setq shr-color-visible-luminance-min 80)
```

[4] this is e.g. for the case where the text-part is only a short blurb telling you to use the html-version; see `mu4e-view-html-plaintext-ratio-heuristic`

[5] http://www.mbayer.de/html2text/

5.6 Crypto

The `mu4e` message view supports[6] decryption of encrypted messages, as well as verification of signatures. For signing/encrypting messages your outgoing messages, see Section 6.5 [Signing and encrypting], page 27.

Currently, only PGP/MIME is supported; PGP-inline and S/MIME are not.

For all of this to work, `gpg-agent` must be running, and it must set the environment variable `GPG_AGENT_INFO`. You can check from `emacs` with `M-x getenv GPG_AGENT_INFO`.

In many mainstream Linux/Unix desktop environments, everything works out-of-the-box, but if your environment does not automatically start `gpg-agent`, you can do so by hand:

```
$ eval $(gpg-agent --daemon)
```

This starts the daemon, and sets the environment variable.

5.6.1 Decryption

If you receive messages that are encrypted (using PGP/MIME), `mu4e` can try to decrypt them, base on the setting of `mu4e-decryption-policy`. If you set it to `t`, `mu4e` attempts to decrypt messages automatically; this is the default. If you set it to `nil`, `mu4e` *won't* attempt to decrypt anything. Finally, if you set it to `'ask`, it asks you what to do, each time an encrypted message is encountered.

When opening an encrypted message, `mu` consults `gpg-agent` to see if it already has unlocked the key needed to decrypt the message; if not, it prompts you for a password (typically with a separate top-level window). This is only needed once per session.

5.6.2 Verifying signatures

Some e-mail messages are cryptographically signed, and `mu4e` can check the validity of these signatures. If a message has one or more signatures, the message view shows an extra header `Signature:` (assuming it is part of your `mu4e-view-fields`), and one or more 'verdicts' of the signatures found; either `verified`, `unverified` or `error`. For instance:

```
Signature: unverified (Details)
```

You can see the details of the signature verification by activating the `Details` or pressing `v`. This pops up a little window with the details of the signatures found and whether they could be verified or not.

For more information, see the `mu-verify` manual page.

5.7 Custom headers

Sometimes the normal headers that `mu4e` offers (Date, From, To, Subject etc.) may not be enough. For these cases, `mu4e` offers *custom headers* in both the headers-view and the message-view.

See Section 4.5 [HV Custom headers], page 16 for an example of this; the difference for the message-view is that you should add your custom header to `mu4e-view-fields` rather than `mu4e-headers-fields`.

[6] Crypto-support in `mu4e` requires `mu` to have been build with crypto-support; see the Appendix C [FAQ], page 60

5.8 Actions

You can perform custom functions ("actions") on messages and their attachments. For a general discussion on how to define your own, see see Chapter 11 [Actions], page 44.

5.8.1 Message actions

`mu4e-view-action` (`a`) lets you pick some custom action to perform on the current message. You can specify these actions using the variable `mu4e-view-actions`; `mu4e` defines a number of example actions.

5.8.2 Attachment actions

Similarly, there is `mu4e-view-attachment-action` (`A`) for actions on attachments, which you can specify with `mu4e-view-attachment-actions`.

`mu4e` predefines a number of attachment-actions:

- `open-with` (`w`): open the attachment with some arbitrary program. For example, suppose you have received a message with a picture attachment; then, *`A w 1 RET gimp RET`* opens that attachment in *The Gimp*
- `pipe` (`|`: process the attachment with some Unix shell-pipe and see the results. Suppose you receive a patch file, and would like to get an overview of the changes, using the `diffstat` program. You can use something like: *`A | 1 RET diffstat -b RET`*.
- `emacs` (`e`): open the attachment in your running `emacs`. For example, if you receive some text file you'd like to open in `emacs`: *`A e 1 RET`*.

These actions all work on a *temporary copy* of the attachment.

6 The editor view

Writing e-mail messages takes place in the Editor View. `mu4e`'s editor view builds on top of Gnu's `message-mode`. Most of the `message-mode` functionality is available, as well some `mu4e`-specifics. Its major mode is `mu4e-compose-mode`.

6.1 Overview

```
From: Rupert the Monkey <rupert@example.com>
To: Wally the Walrus <wally@example.com>
Subject: Re: Eau-qui d'eau qui?
--text follows this line--

On Mon 16 Jan 2012 10:18:47 AM EET, Wally the Walrus wrote:

> Hi Rupert,
>
> Dude - how are things?
>
> Later -- wally.
```

6.2 Keybindings

`mu4e`'s editor view derives from Gnu's message editor and shares most of its keybindings. Here are some of the more useful ones (you can use the menu to find more):

```
key          description
---          -----------
C-c C-c      send message
C-c C-d      save to drafts and leave
C-c C-k      kill the message
C-c C-a      attach a file (pro-tip: drag & drop works as well)

(mu4e-specific)
C-S-u        update mail & reindex
```

6.3 Address autocompletion

`mu4e` supports[1] autocompleting addresses when composing e-mail messages. `mu4e` uses the e-mail addresses from the messages you sent or received as the source for this. Address auto-completion is enabled by default; if you want to disable it for some reason, set `mu4e-compose-complete-addresses` to `nil`.

Emacs 24 also supports cycling through the alternatives. When there are more than *5* matching addresses, they are shown in a `*Completions*` buffer. Once the number of matches gets below this number, one is inserted in the address field and you can cycle through the alternatives using `TAB`.

[1] `emacs` 23.2 or higher is required

6.3.1 Limiting the number of addresses

If you have a lot of mail, especially from mailing lists and the like, there can be a *lot* of e-mail addresses, many of which may not be very useful when auto-completing. For this reason, `mu4e` attempts to limit the number of e-mail addresses in the completion pool by filtering out the ones that are not likely to be relevant. The following variables are available for tuning this:

- `mu4e-compose-complete-only-personal` - when set to `t`, only consider addresses that were seen in *personal* messages – that is, messages in which one of my e-mail addresses was seen in one of the address fields. This is to exclude mailing list posts. You can define what is considered 'my e-mail address' using `mu4e-user-mail-address-list`, a list of e-mail address (defaults to `user-mail-address`, and when indexing from the command line, the `--my-address` parameter for `mu index`.
- `mu4e-compose-complete-only-after` - only consider e-mail addresses last seen after some date. Parameter is a string, parseable by `org-parse-time-string`. This excludes old e-mail addresses. The default is `"2010-01-01"`, i.e., only consider e-mail addresses seen since the start of 2010.
- `mu4e-compose-complete-ignore-address-regexp` - a regular expression to filter out other 'junk' e-mail addresses; defaults to "`no-?reply`".

6.4 Compose hooks

If you want to change some setting, or execute some custom action before message composition starts, you can define a *hook function*. `mu4e` offers two hooks:

- `mu4e-compose-pre-hook`: this hook is run *before* composition starts; if you are composing a *reply*, *forward* a message, or *edit* an existing message, the variable `mu4e-compose-parent-message` points to the message being replied to, forwarded or edited, and you can use `mu4e-message-field` to get the value of various properties (and see Section 12.3 [Message functions], page 47).
- `mu4e-compose-mode-hook`: this hook is run just before composition starts, when the whole buffer has already been set up. This is a good place for editing-related settings. `mu4e-compose-parent-message` (see above) is also at your disposal.

Let's look at some examples. First, suppose we want to set the `From:`-address for a reply message based on the receiver of the original:

```
;; 1) messages to me@foo.example.com should be replied with From:me@foo.example.com
;; 2) messages to me@bar.example.com should be replied with From:me@bar.example.com
;; 3) all other mail should use From:me@cuux.example.com
(add-hook 'mu4e-compose-pre-hook
  (defun my-set-from-address ()
    "Set the From address based on the To address of the original."
    (let ((msg mu4e-compose-parent-message)) ;; msg is shorter...
      (when msg
(setq user-mail-address
  (cond
    ((mu4e-message-contact-field-matches msg :to "me@foo.example.com")
      "me@foo.example.com")
```

```
((mu4e-message-contact-field-matches msg :to "me@bar.example.com")
  "me@bar.example.com")
(t "me@cuux.example.com")))))))
```

Second, as mentioned, `mu4e-compose-mode-hook` is especially useful for editing-related settings. For example:

```
(add-hook 'mu4e-compose-mode-hook
  (defun my-do-compose-stuff ()
    "My settings for message composition."
    (set-fill-column 72)
    (flyspell-mode)))
```

This hook is also useful for adding headers or changing headers, since the message is fully formed when this hook runs. For example, to add a `Bcc:`-header, you could add something like the following, using `message-add-header` from `message-mode`.

```
(add-hook 'mu4e-compose-mode-hook
  (defun my-add-bcc ()
    "Add a Bcc: header."
    (save-excursion (message-add-header "Bcc: me@example.com\n"))))
```

For a more general discussion about extending `mu4e`, see Chapter 12 [Extending mu4e], page 46.

6.5 Signing and encrypting

Signing and encrypting of messages is possible using `emacs-mime` (See Info file `emacs-mime`, node '`Composing`'), most easily accessed through the `Attachments`-menu while composing a message, or with *M-x mml-secure-message-encrypt-pgp*, *M-x mml-secure-message-sign-pgp*.

The support for encryption and signing is *independent* of the support for their counterparts, decrypting and signature verification (as discussed in Section 5.6 [MSGV Crypto], page 23). Even if your `mu4e` does not have support for the latter two, you can still sign/encrypt messages.

Currently, decryption and signature verification only works for PGP/MIME; inline-PGP and S/MIME are not supported.

Important note: the messages are encrypted when they are *sent*: this means that draft messages are *not* encrypted. So if you are using e.g. `offlineimap` or `mbsync` to synchronize with some remote IMAP-service, make sure the drafts folder is *not* in the set of synchronized folders, for obvious reasons.

6.6 Queuing mail

If you cannot send mail right now, for example because you are currently offline, you can *queue* the mail, and send it when you have restored your internet connection. You can control this from the Chapter 3 [Main view], page 11.

To allow for queuing, you need to tell `smtpmail` where you want to store the queued messages. For example:

```
(setq smtpmail-queue-mail t  ;; start in queuing mode
```

```
smtpmail-queue-dir   "~/Maildir/queue/cur")
```

For convenience, we put the queue directory somewhere in our normal maildir. If you want to use queued mail, you should create this directory before starting `mu4e`. The `mu mkdir` command may be useful here, so for example:

```
$ mu mkdir ~/Maildir/queue
$ touch ~/Maildir/queue/.noindex
```

The file created by the `touch` command tells `mu` to ignore this directory for indexing, which makes sense since it contains `smtpmail` meta-data rather than normal messages; see the `mu-mkdir` and `mu-index` man-pages for details.

Warning: when you switch on queued-mode, your messages *won't* reach their destination until you switch it off again; so, be careful not to do this accidentally!

6.7 Message signatures

Message signatures are the standard footer blobs in e-mail messages where you can put in information you want to include in every message. The text to include is set with `mu4e-compose-signature`.

If you don't want to include this automatically with each message, you can set `mu4e-compose-signature-auto-include` to `nil`; you can then still include the signature manually, using the function `message-insert-signature`, typically bound to *C-c C-w*.

6.8 Other settings

- If you want use `mu4e` as `emacs`' default program for sending mail, see Section A.1 [Emacs default], page 49.
- Normally, `mu4e` *buries* the message buffer after sending; if you want to kill the buffer instead, add something like the following to your configuration:

  ```
  (setq message-kill-buffer-on-exit t)
  ```

- If you want to exclude your own e-mail address when "replying to all", set `mu4e-compose-dont-reply-to-self` to `t`. In order for this to work properly you need to properly set the `user-mail-address` variable or in the case you use multiple e-mail addresses you need to set the `mu4e-user-mail-address-list` variable accordingly.

7 Searching

`mu4e` is fully search-based: even if you 'jump to a folder', you are executing a query for messages that happen to have the property of being in a certain folder (maildir).

Normally, queries return up to `mu4e-headers-results-limit` (default: 500) results. That is usually more than enough, and makes things significantly faster. Sometimes, however, you may want to show *all* results; you can enable this with *`M-x mu4e-headers-toggle-full-search`*, or by customizing the variable `mu4e-headers-full-search`. This applies to all search commands.

You can also influence the sort order and whether threads are shown or not; see Section 4.4 [Sort order and threading], page 16.

7.1 Queries

`mu4e` queries are the same as the ones that `mu find` understands[1]. Let's look at some examples here, please refer to the `mu-find` and `mu-easy` man pages for details and more examples.

- Get all messages regarding *bananas*:

  ```
  bananas
  ```

- Get all messages regarding *bananas* from *John* with an attachment:

  ```
  from:john flag:attach bananas
  ```

- Get all messages with subject *wombat* in June 2009

  ```
  subject:wombat date:20090601..20090630
  ```

- Get all messages with PDF attachments in the `/projects` folder

  ```
  maildir:/projects mime:application/pdf
  ```

- Get all messages about *Rupert* in the `/Sent Items` folder. Note that maildirs with spaces must be quoted.

  ```
  maildir:"/Sent Items" rupert
  ```

- Get all important messages which are signed:

  ```
  flag:signed prio:high
  ```

- Get all messages from *Jim* without an attachment:

  ```
  from:jim AND NOT flag:attach
  ```

- Get all messages with Alice in one of the contacts-fields (`to`, `from`, `cc`, `bcc`):

  ```
  contact:alice
  ```

- Get all unread messages where the subject mentions ngstrm: (search is case-insensitive and accent-insensitive, so this matches ngstrm, angstrom, aNGstrM, ...)

  ```
  subject:ngstrm flag:unread
  ```

- Get all unread messages between Mar-2002 and Aug-2003 about some bird:

  ```
  date:20020301..20030831 nightingale flag:unread
  ```

- Get today's messages:

[1] with the caveat that command-line queries are subject to the shell's interpretation before `mu` sees them

`date:today..now`

or, unless you have a really old Xapian

`date:today`

- Get all messages we got in the last two weeks regarding *emacs*:

  `date:2w..now emacs`

  or, unless you have a really old Xapian

  `date:2w.. emacs`

- Get messages from the *Mu* mailing list:

  `list:mu-discuss.googlegroups.com`

  Note - in the Chapter 4 [Headers view], page 13 you may see the 'friendly name' for a list; however, when searching you need the real name. You can see the real name for a mailing list from the friendly name's tool-tip.

- Get messages with a subject soccer, Socrates, society, ...; note that the '*'-wildcard can only appear as a term's rightmost character:

  `subject:soc*`

- Get all messages *not* sent to a mailing-list:

  `NOT flag:list`

- Get all mails with attachments with filenames starting with *pic*; note that the '*' wildcard can only appear as the term's rightmost character:

  `file:pic*`

- Get all messages with PDF-attachments:

  `mime:application/pdf`

  Get all messages with image attachments, and note that the '*' wildcard can only appear as the term's rightmost character:

  `mime:image/*`

7.2 Bookmarks

If you have queries that you use often, you may want to store them as *bookmarks*. Bookmark searches are available in the main view Chapter 3 [Main view], page 11, header view See Chapter 4 [Headers view], page 13, and message view See Chapter 5 [Message view], page 18, using (by default) the key `b` (*`M-x mu4e-search-bookmark`*), or `B` (*`M-x mu4e-search-bookmark-edit`*) which lets you edit the bookmark first.

7.2.1 Setting up bookmarks

`mu4e` provides a number of default bookmarks. Their definition is instructive:

```
(defvar mu4e-bookmarks
  '( ("flag:unread AND NOT flag:trashed" "Unread messages"      ?u)
     ("date:today..now"                  "Today's messages"     ?t)
     ("date:7d..now"                     "Last 7 days"          ?w)
     ("mime:image/*"                     "Messages with images" ?p))
  "A list of pre-defined queries; these show up in the main
```

```
screen. Each of the list elements is a three-element list of the
form (QUERY DESCRIPTION KEY), where QUERY is a string with a mu
query, DESCRIPTION is a short description of the query (this
shows up in the UI), and KEY is a shortcut key for the query.")
```

You can replace these or add your own items, by putting in your configuration (`~/.emacs`) something like:

```
(add-to-list 'mu4e-bookmarks
  '("size:5M..500M"       "Big messages"     ?b))
```

This prepends your bookmark to the list, and assigns the key `b` to it. If you want to *append* your bookmark, you can use `t` as the third argument to `add-to-list`.

In the various `mu4e` views, pressing `b` lists all the bookmarks defined in the echo area, with the shortcut key highlighted. So, to invoke the bookmark we just defined (to get the list of "Big Messages"), all you need to type is *`bb`*.

7.2.2 Lisp expressions as bookmarks

Instead of using strings, it is also possible to use Lisp expressions as bookmarks. The only requirement is that they evaluate to a query string.

For example, to get all the messages that are at most a week old in your inbox:

```
(add-to-list 'mu4e-bookmarks
  '((concat "maildir:/inbox AND date:"
      (format-time-string "%Y%m%d" (subtract-time (current-time) (days-to-time 7))))
    "Inbox messages in the last 7 days" ?W) t)
```

7.2.3 Editing bookmarks before searching

There is also *`M-x mu4e-headers-search-bookmark-edit`* (key `B`), which lets you edit the bookmarked query before invoking it. This can be useful if you have many similar queries, but need to change some parameter. For example, you could have a bookmark '`"date:today..now AND "`'[2], which limits any result to today's messages.

7.3 Maildir searches

Maildir searches are quite similar to bookmark searches (see Section 7.2 [Bookmarks], page 30), with the difference being that the target is always a maildir – maildir queries provide a 'traditional' folder-like interface to a search-based e-mail client. By default, maildir searches are available in the Chapter 3 [Main view], page 11, Chapter 4 [Headers view], page 13, and Chapter 5 [Message view], page 18, with the key `j` (`mu4e-jump-to-maildir`).

7.3.1 Setting up maildir shortcuts

You can search for maildirs like can for any other message property (e.g. with a query like `maildir:/myfolder`), but since it is so common, `mu4e` offers a shortcut for this.

For this to work, you need to set the variable `mu4e-maildir-shortcuts` to the list of maildirs you want to have quick access to, for example:

[2] Not a valid search query by itself

```
(setq mu4e-maildir-shortcuts
  '( ("/inbox"     . ?i)
     ("/archive"   . ?a)
     ("/lists"     . ?l)
     ("/work"      . ?w)
     ("/sent"      . ?s)))
```

This sets `i` as a shortcut for the `/inbox` folder – effectively a query `maildir:/inbox`. There is a special shortcut `o` or `/` for *other* (so don't use those for your own shortcuts!), which allows you to choose from *all* maildirs that you have. There is support for autocompletion; note that the list of maildirs is determined when `mu4e` starts; if there are changes in the maildirs while `mu4e` is running, you need to restart `mu4e`.

Each of the folder names is relative to your top-level maildir directory; so if you keep your mail in `~/Maildir`, `/inbox` would refer to `~/Maildir/inbox`. With these shortcuts, you can jump around your maildirs (folders) very quickly - for example, getting to the `/lists` folder only requires you to type *`jl`*, then change to `/work` with *`jw`*.

While in queries you need to quote folder names (maildirs) with spaces in them, you should *not* quote them when used in `mu4e-maildir-shortcuts`, since `mu4e` does that automatically for you.

The very same shortcuts are used by *`M-x mu4e-mark-for-move`* (default shortcut `m`); so, for example, if you want to move a message to the `/archive` folder, you can do so by typing *`ma`*.

7.4 Other search functionality

7.4.1 Navigating through search queries

You can navigate through previous/next queries using `mu4e-headers-query-prev` and `mu4e-headers-query-next`, which are bound to `M-left` and `M-right`, similar to what some web browsers do.

`mu4e` tries to be smart and not record duplicate queries. Also, the number of queries remembered has a fixed limit, so `mu4e` won't use too much memory, even if used for a long time. However, if you want to forget previous/next queries, you can use *`M-x mu4e-headers-forget-queries`*.

7.4.2 Narrowing search results

It can be useful to narrow existing search results, that is, to add some clauses to the current query to match fewer messages.

For example, suppose you're looking at some mailing list, perhaps by jumping to a maildir (*`M-x mu4e-headers-jump-to-maildir`*, `j`) or because you followed some bookmark (*`M-x mu4e-headers-search-bookmark`*, `b`). Now, you want to narrow things down to only those messages that have attachments.

This is when *`M-x mu4e-headers-search-narrow`* (`/`) comes in handy. It asks for an additional search pattern, which is appended to the current search query, in effect getting you the subset of the currently shown headers that also match this extra search pattern. `\` takes you back to the previous query, so, effectively 'widens' the search. Technically, narrowing the results of query `x` with expression `y` implies doing a search `(x) AND y`.

Note that messages that were not in your original search results because of `mu4e-headers-results-limit` may show up in the narrowed query.

7.4.3 Including related messages

It can be useful to not only show the messages that directly match a certain query, but also include messages that are related to these messages. That is, messages that belong to the same discussion threads are included in the results, just like e.g. Gmail does it. You can enable this behavior by setting `mu4e-headers-include-related` to `t`, and you can toggle between including/not-including with `W`.

Be careful though when e.g. deleting ranges of messages from a certain folder – the list may now also include messages from *other* folders.

7.4.4 Skipping duplicates

Another useful feature is skipping of *duplicate messages*. When you have copies of messages, there's usually little value in including more than one in search results. A common reason for having multiple copies of messages is the combination of Gmail and `offlineimap`, since that is the way the labels / virtual folders in Gmail are represented. You can enable skipping duplicates by setting `mu4e-headers-skip-duplicates` to `t`, and you can toggle between the skipping/not skipping with `V`.

Note, messages are considered duplicates when they have the same `Message-Id`.

8 Marking

In `mu4e`, the common way to do things with messages is a two-step process - first you *mark* them for a certain action, then you *execute* (`x`) those marks. This is similar to the way `dired` operates. Marking can happen in both the Chapter 4 [Headers view], page 13 and the Chapter 5 [Message view], page 18.

8.1 Marking messages

There are multiple ways to mark messages:

- *message at point*: you can put a mark on the message-at-point in either the Chapter 4 [Headers view], page 13 or Chapter 5 [Message view], page 18
- *region*: you can put a mark on all messages in the current region (selection) in the Chapter 4 [Headers view], page 13
- *pattern*: you can put a mark on all messages in the Chapter 4 [Headers view], page 13 matching a certain pattern with *`M-x mu4e-headers-mark-pattern`* (`%`)
- *thread/subthread*: You can put a mark on all the messages in the thread/subthread at point with *`M-x mu4e-headers-mark-thread`* and *`M-x mu4e-headers-mark-subthread`*, respectively

8.2 What to mark for

`mu4e` supports a number of marks:

```
mark for/as   | keybinding   | description
--------------+--------------+-----------------------------
'something'   | *, <insert>  | mark now, decide later
delete        | D, <delete>  | delete
flag          | +            | mark as 'flagged' ('starred')
move          | m            | move to some maildir
read          | !            | mark as read
refile        | r            | mark for refiling
trash         | d            | move to the trash folder
untrash       | =            | remove 'trash' flag
unflag        | -            | remove 'flagged' mark
unmark        | u            | remove mark at point
unmark all    | U            | remove all marks
unread        | ?            | marks as unread
action        | a            | apply some action
```

After marking a message, the left-most columns in the headers view indicate the kind of mark. This is informative, but if you mark many (say, thousands) messages, this slows things down significantly[1]. For this reason, you can disable this by setting `mu4e-headers-show-target` to `nil`.

[1] this uses an `emacs` feature called *overlays*, which are slow when used a lot in a buffer

`something` is a special kind of mark; you can use it to mark messages for 'something', and then decide later what the 'something' should be[2] Later, you can set the actual mark using *M-x mu4e-mark-resolve-deferred-marks* (`#`). Alternatively, `mu4e` will ask you when you try to execute the marks (`x`).

8.3 Executing the marks

After you have marked some messages, you can execute them with `x` (*M-x mu4e-mark-execute-all*).

8.4 Leaving the headers buffer

When you quit or update a headers buffer that has marked messages (for example, by doing a new search), `mu4e` asks you what to do with them, depending on the value of the variable `mu4e-headers-leave-behavior` – see its documentation.

8.5 Built-in marking functions

Some examples of `mu4e`'s built-in marking functions.

- *Mark the message at point for trashing*: press `d`
- *Mark all messages in the buffer as unread*: press *C-x h o*
- *Delete the messages in the current thread*: press *T D*
- *Mark messages with a subject matching "hello" for flagging*: press *% s hello RET*.

8.6 Custom mark functions

Sometimes, the built-in functions to mark messages may not be sufficient for your needs. For this, `mu4e` offers an easy way to define your own custom mark functions. You can choose one of the custom marker functions by pressing `&` in the Chapter 4 [Headers view], page 13 and Chapter 5 [Message view], page 18.

Custom mark functions are to be appended to the list `mu4e-headers-custom-markers`. Each of the elements of this list ('markers') is a list with two or three elements:

1. The name of the marker - a short string describing this marker. The first character of this string determines its shortcut, so these should be unique. If necessary, simply prefix the name with a unique character.
2. a predicate function, taking two arguments *msg* and *param*. *msg* is the message plist (see Section 12.3 [Message functions], page 47) and *param* is a parameter provided by the third of the marker elements (see the next item). The predicate function should return non-`nil` if the message matches.
3. (optionally) a function that is evaluated once, and the result is passed as a parameter to the predicate function. This is useful when user-input is needed.

Let's look at an example: suppose we want to match all messages that have more than *n* recipients – we could do this with the following recipe:

[2] This kind of 'deferred marking' is similar to the facility in `dired`, `midnight commander` (http://www.midnight-commander.org/) and the like, and uses the same key binding (`insert`).

```
(add-to-list 'mu4e-headers-custom-markers
  '("More than n recipients"
     (lambda (msg n)
       (> (+ (length (mu4e-message-field msg :to))
     (length (mu4e-message-field msg :cc))) n))
     (lambda ()
       (read-number "Match messages with more recipients than: "))) t)
```

After evaluating this expression, you can use it by pressing `&` in the headers buffer to select a custom marker function, and then `M` to choose this particular one (`M` because it is the first character of the description).

As you can see, it's not very hard to define simple functions to match messages. There are more examples in the defaults for `mu4e-headers-custom-markers`; see `mu4e-headers.el` and see Chapter 12 [Extending mu4e], page 46 for general information about writing your own functions.

8.7 Adding a new kind of mark

It is possible to configure new marks. To do so one can add entries in the list `mu4e-marks`. Such an element must have the following form:

```
(SYMBOL
  :char STRING
  :prompt STRING
  :ask-target (lambda () TARGET)
  :dyn-target (lambda (TARGET MSG) DYN-TARGET)
  :show-target (lambda (DYN-TARGET) STRING)
  :action (lambda (DOCID MSG DYN-TARGET) nil))
```

The symbol can be any symbol, except for 'unmark and 'something, which are reserved. The rest is a plist with the following elements:

- `:char` – the character to display in the headers view.
- `:prompt` – the prompt to use when asking for marks (used for example when marking a whole thread).
- `:ask-target` – a function run once per bulk-operation, and thus suitable for querying the user about a target for move-like marks. If nil, the TARGET passed to `:dyn-target` is nil.
- `:dyn-target` – a function run once per message (The message is passed as MSG to the function). This function allows to compute a per-message target, for refile-like marks. If nil, the DYN-TARGET passed to the `:action` is the TARGET obtained as above.
- `:show-target` – how to display the target in the headers view. If `:show-target` is nil the DYN-TARGET is shown (and DYN-TARGET must be a string).
- `:action` – the action to apply on the message when the mark is executed.

As an example, suppose we would like to add a mark for tagging messages (gmail-style), then we can run the following code (after loading mu4e):

```
(add-to-list 'mu4e-marks
  '(tag
```

```
    :char       "g"
    :prompt     "gtag"
    :ask-target (lambda () (read-string "What tag do you want to add?"))
    :action      (lambda (docid msg target)
   (mu4e-action-retag-message msg (concat "+" target)))))
```

As another example, suppose we would like to "archive and mark read" a message (gmail-style), then we can run the following code (after loading mu4e):

```
(add-to-list 'mu4e-marks
  '(archive
     :char       "A"
     :prompt     "Archive"
     :show-target (lambda (target) "archive")
     :action      (lambda (docid msg target)
    ;; must come before proc-move since retag runs
    ;; 'sed' on the file
    (mu4e-action-retag-message msg "-\\Inbox")
    (mu4e~proc-move docid nil "+S-u-N"))))
```

Adding to `mu4e-marks` list allows to use the mark in bulk operations (for example when tagging a whole thread), but does not bind the mark to a key to use at the top-level. This must be done separately. In our example:

```
(mu4e~headers-defun-mark-for tag)
(mu4e~headers-defun-mark-for archive)
(define-key mu4e-headers-mode-map (kbd "g") 'mu4e-headers-mark-for-tag)
(define-key mu4e-headers-mode-map (kbd "A") 'mu4e-headers-mark-for-archive)
```

9 Contexts

It can be useful to switch between different sets of settings in `mu4e`; a typical example is the case where you have different e-mail accounts for private and work email, each with their own values for folders, e-mail addresses, mailservers and so on.

The `mu4e-context` system is a `mu4e`-specific mechanism to allow for that; users can be define different *contexts* corresponding with groups of setting and either manually switch between them, or let `mu4e` determine the right context when composing a message based on some user-provided function.

Note that there are a number of existing ways to switch accounts in `mu4e`, for example using the method described in the Appendix D [Tips and Tricks], page 66 section of this manual. Those still work - but the new mechanism has the benefit of being a core part of `mu4e`, thus allowing for deeper integration.

9.1 What are contexts

Let's see what's contained in a context. Most of it is optional.

A `mu4e-context` is Lisp object with the following members:

- `name`: the name of the context, e.g. `work` or `private`
- `vars`: an association-list (alist) of variable settings for this account.
- `enter-func`: an (optional) function that takes no parameter and is invoked when entering the context. You can use this for extra setup etc.
- `leave-func`: an (optional) function that takes no parameter and is invoked when leaving the context. You can use this for clearing things up.
- `match-func`: an (optional) function that takes an `MSG` message plist as argument, and returns non-`nil` if this context matches the situation. `mu4e` uses the first context that matches, in a couple of situations:
  - when starting `mu4e` to determine the starting context; in this case, `MSG` is nil. You can use e.g. the host you're running or the time of day to determine which context matches.
  - before replying to or forwarding a message with the given message plist as parameter, or `nil` when composing a brand new message. The function should return `t` when this context is the right one for this message, or `nil` otherwise.
  - when determining the target folders for deleting, refiling etc; see Section 9.3 [Contexts and special folders], page 39.

`mu4e` uses a variable `mu4e-contexts`, which is a list of such objects.

9.2 Context policies

When you have defined contexts and you start `mu4e` it decides which context to use based on the variable `mu4e-context-policy`; similarly, when you compose a new message, the context is determined using `mu4e-compose-context-policy`.

For both of these, you can choose one of the following policies:

- a symbol `always-ask`: unconditionally ask the user what context to pick.

The other choices **only apply if none of the contexts match** (i.e., none of the contexts' match-functions returns `t`). We have the following options:

- a symbol `ask`: ask the user if `mu4e` can't figure things out the context by itself (through the match-function). This is a good policy if there are no match functions, or if the match functions don't cover all cases.
- a symbol `ask-if-none`: if there's already a context, don't change it; otherwise, ask the user.
- a symbol `pick-first`: pick the first (default) context. This is a good choice if you want to specify context for special case, and fall back to the first one if none match.
- `nil`: don't change the context; this is useful if you don't change contexts very often, and e.g. manually changes contexts with *`M-x mu4e-context-switch`*.

9.3 Contexts and special folders

As we discussed in Section 2.6 [Folders], page 7 and Chapter 10 [Dynamic folders], page 42, `mu4e` recognizes a number of special folders: `mu4e-sent-folder`, `mu4e-drafts-folder`, `mu4e-trash-folder` and `mu4e-refile-folder`.

When you have a headers-buffer with messages that belong to different contexts (say, a few different accounts), it is desirable for each of them to use the specific folders for their own context - so, for instance, if you trash a message, it needs to go to the trash-folder for the account it belongs to, which is not necessarily the current context.

To make this easy to do, whenever `mu4e` needs to know the value for such a special folder for a given message, it tries to determine the appropriate context using `mu4e-context-determine` (and policy `nil`; see Section 9.2 [Context policies], page 38). If it finds a matching context, it let-binds the `vars` for that account, and then determines the value for the folder. It does not, however, call the `enter-func` or `leave-func`, since we are not really switching context.

In practice, this what this means that a long as each of the accounts has a good `match-func`, all message operations automatically find the appropriate folders.

9.4 Example

Let's explain how contexts work by looking at an example. We define two contexts, 'Private' and 'Work' for a fictional user *Alice Derleth*.

Note that in this case, we automatically switch to the first context when starting; see the discussion in the previous section.

```
(setq mu4e-contexts
  `( ,(make-mu4e-context
 :name "Private"
 :enter-func (lambda () (mu4e-message "Switch to the Private context"))
 ;; leave-func not defined
 :match-func (lambda (msg)
(when msg
  (mu4e-message-contact-field-matches msg
    :to "aliced@home.example.com")))
 :vars '(  ( user-mail-address      . "aliced@home.example.com"  )
```

```
     ( user-full-name     . "Alice Derleth" )
     ( mu4e-compose-signature .
       (concat
         "Alice Derleth\n"
         "Lauttasaari, Finland\n"))))
         ,(make-mu4e-context
    :name "Work"
    :enter-func (lambda () (mu4e-message "Switch to the Work context"))
    ;; leave-fun not defined
    :match-func (lambda (msg)
  (when msg
    (mu4e-message-contact-field-matches msg
      :to "aderleth@miskatonic.example.com")))
    :vars '(  ( user-mail-address      . "aderleth@miskatonic.example.com" )
     ( user-full-name     . "Alice Derleth" )
     ( mu4e-compose-signature .
       (concat
         "Prof. Alice Derleth\n"
         "Miskatonic University, Dept. of Occult Sciences\n"))))))

    ;; set `mu4e-context-policy` and `mu4e-compose-policy` to tweak when mu4e should
    ;; guess or ask the correct context, e.g.

    ;; start with the first (default) context;
    ;; default is to ask-if-none (ask when there's no context yet, and none match)
    ;; (setq mu4e-context-policy 'pick-first)

    ;; compose with the current context is no context matches;
    ;; default is to ask
    ;; '(setq mu4e-compose-context-policy nil)
```

A couple of notes about this example:

- You can manually switch the focus use `M-x mu4e-context-switch`, by default bound to `;` in headers, view and main mode. The current focus appears in the mode-line.
- Normally, `M-x mu4e-context-switch` does not call the enter or leave functions if the 'new' context is the same as the old one. However, with a prefix-argument (`C-u`), you can force `mu4e` to invoke those function even in that case.
- The function `mu4e-context-current` returns the current-context; the current context is also visible in the mode-line when in headers, view or main mode.
- You can set any kind of variable; including settings for mail servers etc. However, settings such as `mu4e-maildir` and `mu4e-mu-home` are not changeable after they have been set without quitting `mu4e` first.
- `leave-func` (if defined) for the context we are leaving, is invoked before the `enter-func` (if defined) of the context we are entering.
- `enter-func` (if defined) is invoked before setting the variables.
- `match-func` (if defined) is invoked just before `mu4e-compose-pre-hook`.

- See the variables `mu4e-context-policy` and `mu4e-compose-context-policy` to tweak what `mu4e` should do when no context matches (or if you always want to be asked).
- Finally, be careful to get the quotations right – backticks, single quotes and commas and note the '.' between variable name and its value.

9.5 Some context tricks

It is possible to automatically fill `mu4e-user-address-list` by concatenating the `user-mail-address` fields of all contexts:

```
;; This sets `mu4e-user-mail-address-list' to the concatenation of all
;; `user-mail-address' values for all contexts. If you have other mail
;; addresses as well, you'll need to add those manually.
(setq mu4e-user-mail-address-list
  (delq nil
    (mapcar (lambda (context)
(when (mu4e-context-vars context)
  (cdr (assq 'user-mail-address (mu4e-context-vars context)))))
mu4e-contexts)))
```

10 Dynamic folders

In Section 2.6 [Folders], page 7, we explained how you can set up `mu4e`'s special folders:

```
(setq
  mu4e-sent-folder   "/sent"    ;; sent messages
  mu4e-drafts-folder "/drafts"    ;; unfinished messages
  mu4e-trash-folder  "/trash"    ;; trashed messages
  mu4e-refile-folder "/archive")   ;; saved messages01
```

In some cases, having such static folders may not suffice - perhaps you want to change the folders depending on the context. For example, the folder for refiling could vary, based on the sender of the message.

To make this possible, instead of setting the standard folders to a string, you can set them to be a *function* that takes a message as its parameter, and returns the desired folder name. This chapter shows you how to do that. For a more general discussion of how to extend `mu4e` and writing your own functions, see Chapter 12 [Extending mu4e], page 46.

If you use `mu4e-context`, see Section 9.3 [Contexts and special folders], page 39 for what that means for these special folders.

10.1 Smart refiling

When refiling messages, perhaps to archive them, it can be useful to have different target folders for different messages, based on some property of those message – smart refiling.

To accomplish this, we can set the refiling folder (`mu4e-refile-folder`) to a function that returns the actual refiling folder for the particular message. An example should clarify this:

```
(setq mu4e-refile-folder
  (lambda (msg)
    (cond
      ;; messages to the mu mailing list go to the /mu folder
      ((mu4e-message-contact-field-matches msg :to
 "mu-discuss@googlegroups.com")
"/mu")
      ;; messages sent directly to me go to /archive
      ;; also `mu4e-user-mail-address-p' can be used
      ((mu4e-message-contact-field-matches msg :to "me@example.com")
"/private")
      ;; messages with football or soccer in the subject go to /football
      ((string-match "football\\|soccer"
 (mu4e-message-field msg :subject))
"/football")
      ;; messages sent by me go to the sent folder
      ((find-if
 (lambda (addr)
   (mu4e-message-contact-field-matches msg :from addr))
 mu4e-user-mail-address-list)
mu4e-sent-folder)
```

```
;; everything else goes to /archive
;; important to have a catch-all at the end!
(t  "/archive"))))
```

This can be very powerful; you can select some messages in the headers view, then press `r`, and have them all marked for refiling to their particular folders.

Some notes:

- We set `mu4e-refile-folder` to an anonymous (`lambda`) function. This function takes one argument, a message plist[1]. The plist corresponds to the message at point. See Section 12.3 [Message functions], page 47 for a discussion on how to deal with them.
- In our function, we use a `cond` control structure; the function returns the first of the clauses that matches. It's important to make the last clause a catch-all, so we always return *some* folder.
- We use the convenience function `mu4e-message-contact-field-matches`, which evaluates to `t` if any of the names or e-mail addresses in a contact field (in this case, the `To:`-field) matches the regular expression. With `mu4e` version 0.9.16 or newer, the contact field can in fact be a list instead of a single value, such as `'(:to :cc)'`

10.2 Other dynamic folders

Using the same mechanism, you can create dynamic sent-, trash-, and drafts-folders. The message-parameter you receive for the sent and drafts folder is the *original* message, that is, the message you reply to, or forward, or edit. If there is no such message (for example when composing a brand new message) the message parameter is `nil`.

Let's look at an example. Suppose you want a different trash folder for work-email. You can achieve this with something like:

```
(setq mu4e-trash-folder
(lambda (msg)
;; the 'and msg' is to handle the case where msg is nil
(if (and msg
(mu4e-message-contact-field-matches msg :to "me@work.example.com"))
"/trash-work"
"/trash")))
```

Good to remember:

- The *msg* parameter you receive in the function refers to the *original message*, that is, the message being replied to or forwarded. When re-editing a message, it refers to the message being edited. When you compose a totally new message, the *msg* parameter is `nil`.
- When re-editing messages, the value of `mu4e-drafts-folder` is ignored.

[1] a property list describing a message

11 Actions

`mu4e` lets you define custom actions for messages in the Chapter 4 [Headers view], page 13 and for both messages and attachments in the Chapter 5 [Message view], page 18. Custom actions allow you to easily extend `mu4e` for specific needs – for example, marking messages as spam in a spam filter or applying an attachment with a source code patch.

You can invoke the actions with key `a` for actions on messages, and key `A` for actions on attachments.

For general information extending `mu4e` and writing your own functions, see Chapter 12 [Extending mu4e], page 46.

11.1 Defining actions

Defining a new custom action comes down to writing an elisp-function to do the work. Functions that operate on messages receive a *msg* parameter, which corresponds to the message at point. Something like:

```
(defun my-action-func (msg)
"Describe my message function."
;; do stuff
)
```

Messages that operate on attachments receive a *msg* parameter, which corresponds to the message at point, and an *attachment-num*, which is the number of the attachment as seen in the message view. An attachment function looks like:

```
(defun my-attachment-action-func (msg attachment-num)
"Describe my attachment function."
;; do stuff
)
```

After you have defined your function, you can add it to the list of actions[1], either `mu4e-headers-actions`, `mu4e-view-actions` or `mu4e-view-attachment-actions`. The format[2] of each action is a cons-cell, `(DESCRIPTION . VALUE)`; see below for some examples. If your shortcut is not also the first character of the description, simply prefix the description with that character.

Let's look at some examples.

11.2 Headers view actions

Suppose we want to inspect the number of recipients for a message in the Chapter 4 [Headers view], page 13. We add the following to our configuration:

```
(defun show-number-of-recipients (msg)
  "Display the number of recipients for the message at point."
  (message "Number of recipients: %d"
```

[1] Instead of defining the functions separately, you can obviously also add a `lambda`-function directly to the list; however, separate functions are easier to change

[2] Note, the format of the actions has changed since version 0.9.8.4, and you must change your configuration to use the new format; `mu4e` warns you when you are using the old format.

```
    (+ (length (mu4e-message-field msg :to))
      (length (mu4e-message-field msg :cc)))))

;; define 'N' (the first letter of the description) as the shortcut
;; the 't' argument to add-to-list puts it at the end of the list
(add-to-list 'mu4e-headers-actions
  '("Number of recipients" . show-number-of-recipients) t)
```

After evaluating this, `a N` in the headers view shows the number of recipients for the message at point.

11.3 Message view actions

As another example, suppose we would like to search for messages by the sender of the message at point:

```
(defun search-for-sender (msg)
  "Search for messages sent by the sender of the message at point."
  (mu4e-headers-search
    (concat "from:" (cdar (mu4e-message-field msg :from)))))

;; define 'x' as the shortcut
(add-to-list 'mu4e-view-actions
  '("xsearch for sender" . search-for-sender) t)
```

If you wonder why we use `cdar`, remember that the `From:`-field is a list of `(NAME . EMAIL)` cells; thus, `cdar` gets us the e-mail address of the first in the list. `From:`-fields rarely contain multiple cells.

11.4 Attachment actions

Finally, let's define an attachment action. As mentioned, attachment-action functions receive *2* arguments, the message and the attachment number to use.

The following example action counts the number of lines in an attachment, and defines `n` as its shortcut key (the `n` is prefixed to the description).

```
(defun count-lines-in-attachment (msg attachnum)
  "Count the number of lines in an attachment."
  (mu4e-view-pipe-attachment msg attachnum "wc -l"))

;; defining 'n' as the shortcut
(add-to-list 'mu4e-view-attachment-actions
  '("ncount lines" . count-lines-in-attachment) t)
```

11.5 Example actions

`mu4e` includes a number of example actions in the file `mu4e-actions.el` in the source distribution (see *`C-h f mu4e-action-TAB`*). For example, for viewing messages in an external web browser, or listening to a message's body-text using text-to-speech.

12 Extending mu4e

`mu4e` is designed to be easily extendible - that is, write your own emacs-lisp to make `mu4e` behave exactly as you want. Here, we provide some guidelines for doing so.

12.1 Extension points

There are a number of places where `mu4e` lets you plug in your own functions:

- Custom functions for message headers in the message-view and headers-view - see Section 4.5 [HV Custom headers], page 16, Section 5.7 [MSGV Custom headers], page 23
- Using message-specific folders for drafts, trash, sent messages and refiling, based on a function - see Chapter 10 [Dynamic folders], page 42
- Using an attachment-specific download-directory - see the variable `mu4e-attachment-dir`.
- Apply a function to a message in the headers view - see Section 11.2 [Headers view actions], page 44
- Apply a function to a message in the message view - see Section 11.3 [Message view actions], page 45
- Add a new kind of mark for use in the headers view - see Section 8.7 [Adding a new kind of mark], page 36
- Apply a function to an attachment - see Section 11.4 [Attachment actions], page 45
- Custom function to mark certain messages - see Section 8.6 [Custom mark functions], page 35
- Using various *mode*-hooks, `mu4e-compose-pre-hook` (see Section 6.4 [Compose hooks], page 26), `mu4e-index-updated-hook` (see Appendix C [FAQ], page 60)

You can also write your own functions without using the above. If you want to do so, key useful functions are `mu4e-message-at-point` (see below), `mu4e-headers-for-each` (to iterate over all headers, see its docstring) and `mu4e-view-for-each-part` (to iterate over all parts/attachments, see its docstring). There is also `mu4e-view-for-each-uri` to iterate of all the URIs in the current message.

Another useful function is `mu4e-headers-find-if` which searches for a message matching a certain pattern; again, see its docstring.

12.2 Available functions

The whole of `mu4e` consists of hundreds of elisp functions. However, the majority of those are for *internal* use only; you can recognize them easily, because they all start with `mu4e~`. These function make all kinds of assumptions, and they are subject to change, and should therefore *not* be used. The same is true for *variables* that start with `mu4e~`; don't touch them. Let me repeat that:

```
Do not use mu4e~... functions or variables!
```

In addition, you should use functions in the right context; functions that start with `mu4e-view-` are only applicable to the message view, while functions starting with `mu4e-headers-` are only applicable to the headers view. Functions without such prefixes are applicable everywhere.

12.3 Message functions

Many functions in `mu4e` deal with message plist (property lists). They contain information about messages, such as sender and recipient, subject, date and so on. To deal with these plists, there are a number of `mu4e-message-` functions (in `mu4e-message.el`), such as `mu4e-message-field` and `mu4e-message-at-point`, and a shortcut to combine the two, `mu4e-message-field-at-point`.

For example, to get the subject of the message at point, in either the headers view or the message view, you could write:

```
(mu4e-message-field (mu4e-message-at-point) :subject)
```

Note that:

- The contact fields (To, From, Cc, Bcc) are lists of cons-pairs `(name . email)`; `name` may be `nil`. So, for example:

  ```
  (mu4e-message-field some-msg :to)
  ;; => (("Jack" . "jack@example.com") (nil . "foo@example.com"))
  ```

  If you are only looking for a match in this list (e.g., "Is Jack one of the recipients of the message?"), there is a convenience function `mu4e-message-contact-field-matches` to make this easy.
- The message body is only available in the message view, not in the headers view.

Note that the message-functions work available to `mu4e` – the headers that are stored in the database and, in `mu4e-message-view`-context, the message body.

If you need access to other parts of the message, it is possible to do so by hand, using the raw-message and some third-party tool like `procmail`'s `formail`:

```
(defun my-mu4e-any-message-field-at-point (hdr)
  "Quick & dirty way to get an arbitrary header HDR at
point. Requires the 'formail' tool from procmail."
  (replace-regexp-in-string "\n$" ""
    (shell-command-to-string
      (concat "formail -x " hdr " -c < "
(shell-quote-argument (mu4e-message-field-at-point :path))))))
```

12.4 Contact functions

It can sometimes be useful to rewrite the contact information that `mu4e` provides, for example to convert them to some standardized format, or to fix spelling errors. And sometimes, you may want to remove certain contacts altogether.

For this, `mu4e` provides `mu4e-contact-rewrite-function`, which passes each contact to a user-provided function, which is expected to return either the possibly rewritten contact or `nil` to remove the contact from the list - note that the latter can also be achieved using `mu4e-compose-complete-ignore-address-regexp`.

Each of the contacts are property-lists ('plists'), with properties `:name` (which may be `nil`), and `:mail`, and a number of other properties which you should return unchanged.

Let's look at an example:

```
(defun my-rewrite-function (contact)
```

```
  (let ((name (or (plist-get contact :name) ""))
 (mail (plist-get contact :mail)))
    (cond
      ;; jonh smiht --> John Smith
      ((string= "jonh smiht" name)
(plist-put contact :name "John C. Smith")
contact)
      ;; remove evilspammer from the contacts list
      ((string= "evilspammer@example.com" mail) nil)
      ;; others stay as the are
      (t contact))))

(setq mu4e-contact-rewrite-function 'my-rewrite-function)
```

This function is called for each of your contacts.

12.5 Utility functions

`mu4e-utils` contains a number of utility functions; we list a few here; see their docstrings for the details:

- `mu4e-read-option`: read one option from a list. For example:

  ```
  (mu4e-read-option "Choose an animal: "
  '(("Monkey" . monkey) ("Gnu" . gnu) ("xMoose" . moose)))
  ```

  The user is presented with:

  ```
  Choose an animal: [M]onkey, [G]nu, [x]Moose
  ```

- `mu4e-ask-maildir`: ask for a maildir; try one of the shortcuts (`mu4e-maildir-shortcuts`), or the full set of available maildirs.
- `mu4e-running-p`: return `t` if the `mu4e` process is running, `nil` otherwise.
- `(mu4e-user-mail-address-p addr)`: return `t` if *addr* is one of the user's e-mail addresses (as per `mu4e-user-mail-address-list`).
- `mu4e-log` logs to the `mu4e` debugging log if it is enabled; see `mu4e-toggle-logging`.
- `mu4e-message`, `mu4e-warning`, `mu4e-error` are the `mu4e` equivalents of the normal elisp `message`, `user-error`[1] and `error` functions.

[1] `user-error` only appears in `emacs` 24.2 and later; in older versions it falls back to `error`

Appendix A Interaction with other tools

In this chapter, we discuss some ways in ways in which `mu4e` can cooperate with other tools.

A.1 Emacs default

`emacs` allows you to select an e-mail program as the default program it uses when you press `C-x m` (`compose-mail`), call `report-emacs-bug` and so on. If you want to use `mu4e` for this, you can do so by adding the following to your configuration:

```
(setq mail-user-agent 'mu4e-user-agent)
```

A.2 Org-mode links

It can be useful to include links to e-mail messages or even search queries in your org-mode files. `mu4e` supports this with the `org-mu4e` module; you can set it up by adding it to your configuration:

```
(require 'org-mu4e)
```

this expects org-mode 8.x.[1]

After this, you can use the normal `org-mode` mechanisms to store links: *`M-x org-store-link`* stores a link to a particular message when you are in Chapter 5 [Message view], page 18. When you are in Chapter 4 [Headers view], page 13, *`M-x org-store-link`* links to the *query* if `org-mu4e-link-query-in-headers-mode` is non-`nil`, and to the particular message otherwise (which is the default).

You can insert this link later with *`M-x org-insert-link`*. From `org-mode`, you can go to the query or message the link points to with either *`M-x org-agenda-open-link`* in agenda buffers, or *`M-x org-open-at-point`* elsewhere - both typically bound to *`C-c C-o`*.

You can also directly *capture* such links - for example, to add e-mail messages to your todo-list. For that, `org-mu4e` has a function `org-mu4e-store-and-capture`. This captures the message-at-point (or header - see the discussion on `org-mu4e-link-query-in-headers-mode` above), then calls org-mode's capture functionality.

You can add some specific capture-template for this, for example, to add a message to your todo-list, and set a deadline for processing it within two days, you could add this to `org-capture-templates`:

```
("P" "process-soon" entry (file+headline "todo.org" "Todo")
"* TODO %a %?\nDEADLINE: %(org-insert-time-stamp (org-read-date nil t \"+2d\"))")
```

If you use the functionality a lot, you may want to define key-bindings for that in headers and view mode:

```
(define-key mu4e-headers-mode-map (kbd "C-c c") 'org-mu4e-store-and-capture)
(define-key mu4e-view-mode-map    (kbd "C-c c") 'org-mu4e-store-and-capture)
```

[1] If you have an older version, you can try `org-old-mu4e` instead

A.3 Org-contacts

Note, `mu4e` supports built-in address autocompletion; Section 6.3 [Address autocompletion], page 25, and that is the recommended way to do this. However, it is also possible to manage your addresses with `org-mode`, using `org-contacts`[2].

`mu4e-actions` defines a useful action (Chapter 11 [Actions], page 44) for adding a contact based on the `From:`-address in the message at point. To enable this, add to your configuration something like:

```
(setq mu4e-org-contacts-file  <full-path-to-your-org-contacts-file>)
(add-to-list 'mu4e-headers-actions
  '("org-contact-add" . mu4e-action-add-org-contact) t)
(add-to-list 'mu4e-view-actions
  '("org-contact-add" . mu4e-action-add-org-contact) t)
```

After this, you should be able to add contacts using `a o` in the headers view and the message view, using the `org-capture` mechanism. Note, the shortcut character `o` is due to the first character of `org-contact-add`.

A.4 BBDB

Note, `mu4e` supports built-in address autocompletion; Section 6.3 [Address autocompletion], page 25, and that is the recommended way to do this. However, it is also possible to manage your addresses with the current (2015-06-23) development release of `BBDB`, or releases of `BBDB` after 3.1.2.[3].

To enable BBDB, add to your `~/.emacs` (or its moral equivalent, such as `~/.emacs.d/init.el`) the following *after* the `(require 'mu4e)` line:

```
;; Load BBDB (Method 1)
(require 'bbdb-loaddefs)
;; OR (Method 2)
;; (require 'bbdb-loaddefs "/path/to/bbdb/lisp/bbdb-loaddefs.el")
;; OR (Method 3)
;; (autoload 'bbdb-insinuate-mu4e "bbdb-mu4e")
;; (bbdb-initialize 'message 'mu4e)
(setq bbdb-mail-user-agent (quote message-user-agent))
(setq mu4e-view-mode-hook (quote (bbdb-mua-auto-update visual-line-mode)))
(setq mu4e-compose-complete-addresses nil)
(setq bbdb-mua-pop-up t)
(setq bbdb-mua-pop-up-window-size 5)
```

After this, you should be able to:

- In mu4e-view mode, add the sender of the email to BBDB with `C-u :`
- Tab-complete addresses from BBDB when composing emails
- View the BBDB contact while viewing a message

[2] http://julien.danjou.info/software/org-contacts.el

[3] http://savannah.nongnu.org/projects/bbdb/

A.5 Sauron

The `emacs`-package `sauron`[4] (by the same author) can be used to get notifications about new mails. If you run something like the below script from your `crontab` (or have some other way of having it execute every n minutes), you receive notifications in the `sauron`-buffer when new messages arrive.

```
#!/bin/sh

# the mu binary
MU=mu

# put the path to your Inbox folder here
CHECKDIR="/home/$LOGNAME/Maildir/Inbox"

sauron_msg () {
DBUS_COOKIE="/home/$LOGNAME/.sauron-dbus"
if test "x$DBUS_SESSION_BUS_ADDRESS" = "x"; then
  if test -e $DBUS_COOKIE; then
    export DBUS_SESSION_BUS_ADDRESS="`cat $DBUS_COOKIE`"
  fi
fi
if test -n "x$DBUS_SESSION_BUS_ADDRESS"; then
  dbus-send --session                           \
    --dest="org.gnu.Emacs"                      \
    --type=method_call                          \
      "/org/gnu/Emacs/Sauron"                   \
      "org.gnu.Emacs.Sauron.AddMsgEvent"        \
      string:shell uint32:3 string:"$1"
fi
}

#
# -mmin -5: consider only messages that were created / changed in the
# the last 5 minutes
#
for f in `find $CHECKDIR -mmin -5 -a -type f`; do
  subject=`$MU view $f | grep '^Subject:' | sed 's/^Subject://'`
  sauron_msg "mail: $subject"
done
```

You might want to put:

```
(setq sauron-dbus-cookie t)
```

in your setup, to allow the script to find the D-Bus session bus, even when running outside its session.

[4] Sauron can be found at https://github.com/djcb/sauron, or in the Marmalade package-repository at http://http://marmalade-repo.org/

A.6 Speedbar

`speedbar` is an `emacs`-extension that shows navigational information for an `emacs` buffer in a separate frame. Using `mu4e-speedbar`, `mu4e` lists your bookmarks and maildir folders and allows for one-click access to them.

`mu4e` loads `mu4e-speedbar` automatically; all you need to do to activate it is *`M-x speedbar`*. Then, when then switching to the Chapter 3 [Main view], page 11, the speedbar-frame is updated with your bookmarks and maildirs. For speed reasons, the list of maildirs is determined when `mu4e` starts; if the list of maildirs changes while `mu4e` is running, you need to restart `mu4e` to have those changes reflected in the speedbar and in other places that use this list, such as auto-completion when jumping to a maildir.

`mu4e-speedbar` was contributed by *Antono Vasiljev*.

A.7 Mu-cite

`mu-cite`[5] is a package to control the way message citations look like (i.e., the message you responded to when you reply to them or forward them), with its latest version available at http://www.jpl.org/elips/mu/.

After installing `mu-cite`, you can use something like the following to make it work with `mu4e`:

```
(require 'mu-cite)
(setq mu4e-cite-function 'mu-cite-original)
(setq mu-cite-top-format '("On " date ", " from " wrote:\n\n"))
(setq mu-cite-prefix-format '(" > "))
```

A.8 Dired

It is possible to attach files to `mu4e` messages using `dired` (See Info file `emacs`, node '`Dired`'), using the following steps (based on a post on the `mu-discuss` mailing list by *Stephen Eglen*).

To prepare for this, you need a special version of the `gnus-dired-mail-buffers` function so it understands `mu4e` buffers as well; so put in your configuration:

```
(require 'gnus-dired)
;; make the `gnus-dired-mail-buffers' function also work on
;; message-mode derived modes, such as mu4e-compose-mode
(defun gnus-dired-mail-buffers ()
  "Return a list of active message buffers."
  (let (buffers)
    (save-current-buffer
      (dolist (buffer (buffer-list t))
(set-buffer buffer)
(when (and (derived-mode-p 'message-mode)
(null message-sent-message-via))
  (push (buffer-name buffer) buffers))))
    (nreverse buffers)))
```

[5] Note, despite its name, `mu-cite` is a project unconnected to `mu/mu4e`

```
(setq gnus-dired-mail-mode 'mu4e-user-agent)
(add-hook 'dired-mode-hook 'turn-on-gnus-dired-mode)
```

Then, mark the file(s) in `dired` you would like to attach and press `C-c RET C-a`, and you'll be asked whether to attach them to an existing message, or create a new one.

Appendix B Example configurations

In this chapter, we show some example configurations. While it is very useful to see some working settings, we'd like to warn against blindly copying such things.

B.1 Minimal configuration

An (almost) minimal configuration for `mu4e` might look like this - as you see most is commented-out.

```
;; example configuration for mu4e

;; make sure mu4e is in your load-path
(require 'mu4e)

;; Only needed if your maildir is _not_ ~/Maildir
;; Must be a real dir, not a symlink
;;(setq mu4e-maildir "/home/user/Maildir")

;; these must start with a "/", and must exist
;; (i.e.. /home/user/Maildir/sent must exist)
;; you use e.g. 'mu mkdir' to make the Maildirs if they don't
;; already exist

;; below are the defaults; if they do not exist yet, mu4e offers to
;; create them. they can also functions; see their docstrings.
;; (setq mu4e-sent-folder   "/sent")
;; (setq mu4e-drafts-folder "/drafts")
;; (setq mu4e-trash-folder  "/trash")

;; smtp mail setting; these are the same that `gnus' uses.
(setq
   message-send-mail-function   'smtpmail-send-it
   smtpmail-default-smtp-server "smtp.example.com"
   smtpmail-smtp-server         "smtp.example.com"
   smtpmail-local-domain        "example.com")
```

B.2 Longer configuration

A somewhat longer configuration, showing some more things that you can customize.

```
;; example configuration for mu4e
(require 'mu4e)

;; path to our Maildir directory
(setq mu4e-maildir "/home/user/Maildir")

;; the next are relative to `mu4e-maildir'
;; instead of strings, they can be functions too, see
```

```
;; their docstring or the chapter 'Dynamic folders'
(setq mu4e-sent-folder   "/sent"
      mu4e-drafts-folder "/drafts"
      mu4e-trash-folder  "/trash")

;; the maildirs you use frequently; access them with 'j' ('jump')
(setq   mu4e-maildir-shortcuts
    '(("/archive"     . ?a)
      ("/inbox"       . ?i)
      ("/work"        . ?w)
      ("/sent"        . ?s)))

;; a  list of user's e-mail addresses
(setq mu4e-user-mail-address-list '("foo@bar.example.com" "cuux@example.com")

;; when you want to use some external command for text->html
;; conversion, e.g. the 'html2text' program
;; (setq mu4e-html2text-command "html2text")

;; the headers to show in the headers list -- a pair of a field
;; and its width, with `nil' meaning 'unlimited'
;; (better only use that for the last field.
;; These are the defaults:
(setq mu4e-headers-fields
    '( (:date          .  25)    ;; alternatively, use :human-date
       (:flags         .   6)
       (:from          .  22)
       (:subject       .  nil))) ;; alternatively, use :thread-subject

;; program to get mail; alternatives are 'fetchmail', 'getmail'
;; isync or your own shellscript. called when 'U' is pressed in
;; main view.

;; If you get your mail without an explicit command,
;; use "true" for the command (this is the default)
(setq mu4e-get-mail-command "offlineimap")

;; general emacs mail settings; used when composing e-mail
;; the non-mu4e-* stuff is inherited from emacs/message-mode
(setq mu4e-reply-to-address "foo@bar.example.com"
      user-mail-address "foo@bar.example.com"
      user-full-name  "Foo X. Bar")
(setq mu4e-compose-signature
   "Foo X. Bar\nhttp://www.example.com\n")

;; smtp mail setting
(setq
```

```
      message-send-mail-function 'smtpmail-send-it
      smtpmail-default-smtp-server "smtp.example.com"
      smtpmail-smtp-server "smtp.example.com"
      smtpmail-local-domain "example.com"

      ;; if you need offline mode, set these -- and create the queue dir
      ;; with 'mu mkdir', i.e.. mu mkdir /home/user/Maildir/queue
      smtpmail-queue-mail  nil
      smtpmail-queue-dir  "/home/user/Maildir/queue/cur")

    ;; don't keep message buffers around
    (setq message-kill-buffer-on-exit t)
```

B.3 Gmail configuration

Gmail is a popular e-mail provider; let's see how we can make it work with `mu4e`. Since we are using IMAP, you must enable that in the Gmail web interface (in the settings, under the "Forwarding and POP/IMAP"-tab).

Gmail users may also be interested in [Including related messages], page 33.

B.3.1 Setting up offlineimap

First of all, we need a program to get the e-mail from Gmail to our local machine; for this we use `offlineimap`; on Debian (and derivatives like Ubuntu), this is as easy as:

```
$ sudo apt-get install offlineimap
```

while on Fedora (and similar) you need:

```
$ sudo yum install offlineimap
```

Then, we can configure `offlineimap` by editing `~/.offlineimaprc`:

```
[general]
accounts = Gmail
maxsyncaccounts = 3

[Account Gmail]
localrepository = Local
remoterepository = Remote

[Repository Local]
type = Maildir
localfolders = ~/Maildir

[Repository Remote]
type = IMAP
remotehost = imap.gmail.com
remoteuser = USERNAME@gmail.com
remotepass = PASSWORD
ssl = yes
maxconnections = 1
```

```
realdelete = no
```

Obviously, you need to replace `USERNAME` and `PASSWORD` with your actual Gmail username and password. After this, you should be able to download your mail:

```
$ offlineimap
 OfflineIMAP 6.3.4
Copyright 2002-2011 John Goerzen & contributors.
Licensed under the GNU GPL v2+ (v2 or any later version).

Account sync Gmail:
 ***** Processing account Gmail
 Copying folder structure from IMAP to Maildir
 Establishing connection to imap.gmail.com:993.
Folder sync [Gmail]:
 Syncing INBOX: IMAP -> Maildir
 Syncing [Gmail]/All Mail: IMAP -> Maildir
 Syncing [Gmail]/Drafts: IMAP -> Maildir
 Syncing [Gmail]/Sent Mail: IMAP -> Maildir
 Syncing [Gmail]/Spam: IMAP -> Maildir
 Syncing [Gmail]/Starred: IMAP -> Maildir
 Syncing [Gmail]/Trash: IMAP -> Maildir
Account sync Gmail:
 ***** Finished processing account Gmail
```

We can now run `mu` to make sure things work:

```
$ mu index
mu: indexing messages under /home/foo/Maildir [/home/foo/.mu/xapian]
| processing mail; processed: 520; updated/new: 520, cleaned-up: 0
mu: elapsed: 3 second(s), ~ 173 msg/s
mu: cleaning up messages [/home/foo/.mu/xapian]
/ processing mail; processed: 520; updated/new: 0, cleaned-up: 0
mu: elapsed: 0 second(s)
```

We can run both the `offlineimap` and the `mu index` from within `mu4e`, but running it from the command line makes it a bit easier to troubleshoot as we are setting things up.

Note: when using encryption, you probably do *not* want to synchronize your Drafts-folder, since it contains the unencrypted messages. You can use OfflineIMAP's `folderfilter` for that.

B.3.2 Settings

Next step: let's make a `mu4e` configuration for this:

```
(require 'mu4e)

;; default
;; (setq mu4e-maildir "~/Maildir")

(setq mu4e-drafts-folder "/[Gmail].Drafts")
(setq mu4e-sent-folder   "/[Gmail].Sent Mail")
```

```
(setq mu4e-trash-folder  "/[Gmail].Trash")

;; don't save message to Sent Messages, Gmail/IMAP takes care of this
(setq mu4e-sent-messages-behavior 'delete)

;; (See the documentation for `mu4e-sent-messages-behavior' if you have
;; additional non-Gmail addresses and want assign them different
;; behavior.)

;; setup some handy shortcuts
;; you can quickly switch to your Inbox -- press ``ji''
;; then, when you want archive some messages, move them to
;; the 'All Mail' folder by pressing ``ma''.

(setq mu4e-maildir-shortcuts
    '( ("/INBOX"               . ?i)
       ("/[Gmail].Sent Mail"   . ?s)
       ("/[Gmail].Trash"       . ?t)
       ("/[Gmail].All Mail"    . ?a)))

;; allow for updating mail using 'U' in the main view:
(setq mu4e-get-mail-command "offlineimap")

;; something about ourselves
(setq
   user-mail-address "USERNAME@gmail.com"
   user-full-name  "Foo X. Bar"
   mu4e-compose-signature
    (concat
      "Foo X. Bar\n"
      "http://www.example.com\n"))

;; sending mail -- replace USERNAME with your gmail username
;; also, make sure the gnutls command line utils are installed
;; package 'gnutls-bin' in Debian/Ubuntu

(require 'smtpmail)
(setq message-send-mail-function 'smtpmail-send-it
   starttls-use-gnutls t
   smtpmail-starttls-credentials '(("smtp.gmail.com" 587 nil nil))
   smtpmail-auth-credentials
     '(("smtp.gmail.com" 587 "USERNAME@gmail.com" nil))
   smtpmail-default-smtp-server "smtp.gmail.com"
   smtpmail-smtp-server "smtp.gmail.com"
   smtpmail-smtp-service 587)

;; alternatively, for emacs-24 you can use:
```

```
;;(setq message-send-mail-function 'smtpmail-send-it
;;     smtpmail-stream-type 'starttls
;;     smtpmail-default-smtp-server "smtp.gmail.com"
;;     smtpmail-smtp-server "smtp.gmail.com"
;;     smtpmail-smtp-service 587)

;; don't keep message buffers around
(setq message-kill-buffer-on-exit t)
```

And that's it – put the above in your `~/.emacs`, change `USERNAME` etc. to your own, and restart `emacs`, and run *M-x mu4e*.

B.4 Other settings

Finally, here are some more settings that are useful, but not enabled by default for various reasons.

```
;; use 'fancy' non-ascii characters in various places in mu4e
(setq mu4e-use-fancy-chars t)

;; save attachment to my desktop (this can also be a function)
(setq mu4e-attachment-dir "~/Desktop")

;; attempt to show images when viewing messages
(setq mu4e-view-show-images t)
```

Appendix C FAQ - Frequently Asked Questions

In this chapter we list a number of actual and anticipated questions and their answers.

C.1 General

1. *Does* `mu4e` *provide context-sensitive help information?* Yes - pressing `H` should take you to the right section in this manual.
2. *How can I quickly delete/move/trash a lot of messages?* You can select ('mark' in `emacs`-speak) the messages like you would select text in a buffer; the actions you then take (e.g., `DEL` for delete, `m` for move and `t` for trash) apply to all selected messages. You can also use functions like `mu4e-headers-mark-thread` (`T`), `mu4e-headers-mark-subthread` (`t`) to mark whole threads at the same time, and `mu4e-headers-mark-pattern` (`%`) to mark all messages matching a certain regular expression.
3. `mu4e` *seems to return a subset of all matches - how can I get all?* For speed reasons, `mu4e` returns only up to the value of the variable `mu4e-search-result-limit` (default: 500) matches. To show *all*, use *`M-x mu4e-headers-toggle-full-search`* (`Q`), or customize the variable `mu4e-headers-full-search`. This applies to all search commands.
4. *How can I get notifications when receiving mail?* There is `mu4e-index-updated-hook`, which gets triggered when the indexing process triggered sees an update (not just new mail though). To use this hook, put something like the following in your setup (assuming you have `aplay` and some soundfile, change as needed):

   ```
   (add-hook 'mu4e-index-updated-hook
     (defun new-mail-sound ()
       (shell-command "aplay ~/Sounds/boing.wav&")))
   ```
5. *It seems my headers-buffer is automatically updated when new messages are found during the indexing process – can I disable this somehow?* Yes - set `mu4e-headers-auto-update` to `nil`.
6. *I don't use* `offlineimap`, `fetchmail` *etc., I get my mail through my own mailserver. What should I use for* `mu4e-get-mail-command`? Use `"true"` (or don't do anything, it's the default). This makes getting mail a no-op, but the messages are still re-indexed.
7. *How can I re-index my messages without getting new mail?* Use *`M-x mu4e-update-index`*
8. *When I try to run* `mu index` *while* `mu4e` *is running I get errors like:*

   ```
   mu: mu_store_new_writable: xapian error
     'Unable to get write lock on ~/.mu/xapian: already locked
   ```

   What to do about this? You get this error because the underlying Xapian database is locked by some other process; it can be opened only once in read-write mode. There is not much `mu4e` can do about this, but if is another `mu` instance that is holding the lock, you can ask it to (gracefully) terminate:

   ```
   pkill -2 -u $UID mu # send SIGINT
   sleep 1
   mu index
   ```

   `mu4e` automatically restarts `mu` when it needs it. In practice, this seems to work quite well.

9. *I don't like the* `Indexing...` *messages that the indexing process gives me. Can I turn them off?.* Yes: set the variable `mu4e-hide-index-messages` to non-`nil`.
10. *Can I automatically apply the marks on messages when leaving the headers buffer?* Yes you can – see the documentation for the variable `mu4e-headers-leave-behavior`.
11. *How can I set* `mu4e` *as the default e-mail client in* `emacs`*?* See Section A.1 [Emacs default], page 49.
12. *Can* `mu4e` *use some fancy Unicode characters instead of these boring plain-ASCII ones?* Glad you asked! Yes, if you set `mu4e-use-fancy-chars` to `t`, `mu4e` uses such fancy characters in a number of places. Since not all fonts include all characters, you may want to install the `unifont` and/or `symbola` fonts on your system.
13. *Can I start* `mu4e` *in the background?* Yes - if you provide a prefix-argument (`C-u`), `mu4e` starts, but does not show the main-window.
14. *Some IMAP-synchronization programs such as* `mbsync` *(but not* `offlineimap`*) don't like it when message files do not change their names when they are moved to different folders. Can* `mu4e` *somehow accommodate this?* Yes - you can set the variable `mu4e-change-filenames-when-moving` to non-nil.
15. `offlineimap` *uses IMAP's UTF-7 for encoding non-ascii folder names, while* `mu` *expects UTF-8 (so, e.g.* `/` [1] *becomes* `/&MH4wijCCMEgwSg-`*). How can I make* `mu4e` *display such folders correctly?* This is best solved by telling `offlineimap` to use UTF-8 instead – see https://github.com/djcb/mu/issues/68#issuecomment-8598652.
16. *Does* `mu4e` *support searching for CJK (Chinese-Japanese-Korean) characters?* Yes, if you have `Xapian` 1.2.8 or newer, and set the environment variable `XAPIAN_CJK_NGRAM` to non-empty before indexing, both when using `mu` from the command-line and from `mu4e`.
17. *How can I customize the function to select a folder?* The `mu4e-completing-read` variable can be customized to select a folder in any way. The variable can be set to a function that receives five arguments, following `completing-read`. The default value is `ido-completing-read`; to use emacs's default behaviour, set the variable to `completing-read`. Helm users can use the same value, and by enabling `helm-mode` use helm-style completion.
18. *I have a lot of Maildir folders, so regenerating them each time makes things slow. What can I do?* Set `mu4e-cache-maildir-list` to `t` (but make sure to read its docstring).

C.2 Reading messages

1. *How can I view attached images in my message view buffers?* See Section 5.4 [Viewing images inline], page 21.
2. *How can I word-wrap long lines in when viewing a message?* You can toggle between wrapped and non-wrapped states using `w`. If you want to do this automatically, invoke `visual-line-mode` in your `mu4e-view-mode-hook`.
3. *How can I perform custom actions on messages and attachments?* See Chapter 11 [Actions], page 44.

[1] some Japanese characters

4. *Does* `mu4e` *support crypto (i.e., decrypting messages and verifying signatures)?* Yes – if `mu` was built with `GMime` 2.6 or later, it is possible to do both (note, only PGP/MIME is supported). In the Chapter 3 [Main view], page 11 the support is indicated by a big letter `C` on the right hand side of the `mu4e` version. See [Decryption], page 23 and [Verifying signatures], page 23. For encryption and signing messages, see Section C.3 [Writing messages], page 62.
5. *How can I prevent* `mu4e` *from automatically marking messages as 'read' when i read them?* Set `mu4e-view-auto-mark-as-read` to nil.
6. *Does* `mu4e` *support including all related messages in a thread, like Gmail does?* Yes – see [Including related messages], page 33.
7. *There seem to be a lot of duplicate messages – how can I get rid of them?* See [Skipping duplicates], page 33.
8. *How can I use the* `eww` *browser to view rich-text messages?* See [Html2text functions], page 22.
9. *Some messages are almost unreadable in emacs - can I view them in an external web browser?* Indeed, airlines often send messages that heavily depend on html and are hard to digest inside emacs. Fortunately, there's an *action* (Section 11.3 [Message view actions], page 45) defined for this. Simply add to your configuration:

   ```
   (add-to-list 'mu4e-view-actions
     '("ViewInBrowser" . mu4e-action-view-in-browser) t)
   ```

   Now, when viewing such a difficult message, type `aV`, and the message opens inside a webbrowser. You can influence the browser with `browse-url-generic-program`.
10. *How can read encrypted messages that I sent?.* Since you do not own the recipient's key you typically cannot read those mails - so the trick is to encrypt outgoing mails with your key, too. This can be automated by adding the following snippet to your configuration (courtesy of user `kpachnis`):

    ```
    (require 'epg-config)
    (setq mml2015-use 'epg
          epg-user-id "gpg_key_id"
          mml2015-encrypt-to-self t
          mml2015-sign-with-sender t)
    ```

11. *view-as-pdf seems to hang for some e-mails - what can I do about that?* Short answer: install `nspluginwrapper`. Longer answer: `mu` comes with `msg2pdf`, which is a program used to convert the messages to pdf, and which depends on WebKit, which in some cases needs `nspluginwrapper` and it waits for a long time if it's not there. So, installing `nspluginwrapper` prevents that.

C.3 Writing messages

1. *What's the deal with replies to messages I wrote myself?* Like many other mail-clients, `mu4e` treats replies to messages you wrote yourself as special – these message keep the same `To:` and `Cc:` as the original message. This is to ease the common case of following up to a message you wrote earlier.
2. *How can I automatically set the* `From:`*-address for a reply-message, based on some field in the original?* See Section 6.4 [Compose hooks], page 26.

3. *And what about customizable folders for draft messages, sent messages, trashed messages, based on e.g. the* `From:` *header?* See Chapter 10 [Dynamic folders], page 42.
4. *Can I define aliases for (groups of) e-mail addresses?* Sure - see ⟨undefined⟩ [(emacs) Mail Aliases], page ⟨undefined⟩.
5. *How can I automatically add some header to an outgoing message?* Once more, see Section 6.4 [Compose hooks], page 26.
6. *How can I influence the way the original message looks when replying or forwarding?* Since `mu4e-compose-mode` derives from `message-mode`, you can re-use many of its facilities. See Info file `message`, node '`Insertion Variables`'.
7. *How can I easily include attachments in the messages I write?* You can drag-and-drop from your desktop; alternatively, you can use `dired` – see Section A.8 [Dired], page 52.
8. `mu4e` *seems to remove myself from the* `Cc:`*-list; how can I prevent that?* Set `mu4e-compose-keep-self-cc` to `t` in your configuration.
9. *How can I start a new message-thread from a reply?* Remove the `In-Reply-To` header, and `mu4e` automatically removes the (hidden) `References` header as well when sending it. This makes the message show up as a top-level message rather than as a response.
10. *How can I sign or encrypt messages?* You can do so using `emacs`' MIME-support – check the `Attachments`-menu while composing a message. Also see Section 6.5 [Signing and encrypting], page 27.
11. *Can I use* `BBDB` *with* `mu4e`*?* Yes, with the current (2015-06-23) development release of BBDB `http://savannah.nongnu.org/projects/bbdb/`, or releases of BBDB after 3.1.2. Section A.4 [BBDB], page 50.
12. *After sending some messages, it seems the buffer for these messages stay around. How can I get rid of those?*

    ```
    (setq message-kill-buffer-on-exit t)
    ```

13. *Sending big messages is slow and blocks emacs - what can I do about it?* For this, there's `https://github.com/jwiegley/emacs-async` (also available from the Emacs package repository); add the following snippet to your configuration:

    ```
    (require 'smtpmail-async)
    (setq
      send-mail-function 'async-smtpmail-send-it
      message-send-mail-function 'async-smtpmail-send-it)
    ```

    With this, messages are sent using background emacs-instance.

    A word of warning though, this tends to not be as reliable as sending the message in the normal, synchronous fashion, and people have reported silent failures, that is, message are not sent but there is no indication of that.

    You can check the progress of the background by checking the `*Messages*`-buffer, which should show something like:

    ```
    Delivering message to "William Shakespeare" <will@example.com>...
    Mark set
    Saving file /home/djcb/Maildir/sent/cur/20130706-044350-darklady:2,S...
    Wrote /home/djcb/Maildir/sent/cur/20130706-044350-darklady:2,S
    Sending...done
    ```

The first and final messages are the most important, and there may be considerable time between them, depending on the size of the message.

14. *Is it possible to compose messages in a separate frame?* Yes - set the variable `mu4e-compose-in-new-frame` to `t`.

15. *How can I apply format=flowed to my outgoing messages, enabling receiving clients that support this feature to reflow my paragraphs?* Plain text emails with `Content-Type: text/plain; format=flowed` can be reflowed (i.e. line endings removed, paragraphs refilled) by receiving clients that support this standard. Clients that don't support this, show them as is, which means this feature is truly non-invasive.

    Here's an explanatory blog post which also shows why this is a desirable feature: https://mathiasbynens.be/notes/gmail-plain-text (if you don't have it, your mails mostly look quite bad especially on mobile devices) and here's the RFC with all the details: http://www.ietf.org/rfc/rfc2646.txt.

    To add this to outgoing mu4e emails, activate `use-hard-newlines` and use only `M-q` or `fill-paragraph` for your paragraphs, Emacs indicates intra-paragraph breaks with soft newlines and inter-paragraph breaks with hard newlines. When the Gnus code sees these on outgoing emails, it automatically sets `format=flowed`.

    To enable this, you can use something like this in your init.el:

```
;; tip submitted by mu4e user cpbotha
(add-hook 'mu4e-compose-mode-hook
          (defun cpb-compose-setup ()
            "Outgoing mails get format=flowed."
            (use-hard-newlines t 'guess)))
```

C.4 Known issues

Although they are not really *questions*, we end this chapter with a list of known issues and/or missing features in `mu4e`. Thus, users won't have to search in vain for things that are not there (yet), and the author can use it as a todo-list.

- *mu4e does not work well if the* `emacs` *language environment is not UTF-8*; so, if you encounter problems with encodings, be sure to have `(set-language-environment "UTF-8")` in your `~/.emacs`.
- *Thread handling is incomplete.* While threads are calculated and are visible in the headers buffer, you cannot collapse/open them.
- *The key-bindings are somewhat hard-coded.* That is, the main menu assumes the default key-bindings, as do the clicks-on-bookmarks.
- *The* `emacs` *front-end of the* `notmuch` *e-mail indexer conflicts with* `mu4e`. `notmuch` running in parallel with `mu4e` leads to

  `error in process filter: mu4e-error-handler: Error 70: cannot read ~/Maildir/...`

  when sending a reply to some e-mail. This seems to be caused by `notmuch` changing the name of the original message file while `mu4e` is working on it. To prevent this, deactivate `notmuch` in your Emacs setup.

- *The PDF-version of the manual does not show any of the non-ASCII characters* - this is because the `texi2pdf` documentation system does not support those. There is not much we can do about that.

For a more complete list, please refer to the issues-list in the github-repository.

Appendix D Tips and Tricks

D.1 Fancy characters

When using 'fancy characters' (`mu4e-use-fancy-chars`) with the *Inconsolata*-font (and likely others as well), the display may be slightly off; the reason for this issue is that Inconsolata does not contain the glyphs for the 'fancy' arrows and the glyphs that are used as replacements are too high.

To fix this, you can use something like the following workaround (in your `.emacs`-file):

```
(if (equal window-system 'x)
    (progn
      (set-fontset-font "fontset-default" 'unicode "Dejavu Sans Mono")
      (set-face-font 'default "Inconsolata-10")))
```

Other fonts with good support for Unicode are `unifont` and `symbola`.

For a more complete solution, but with greater overhead, you can also try the *unicode-fonts* package:

```
(require 'unicode-fonts)
(require 'persistent-soft) ; To cache the fonts and reduce load time
(unicode-fonts-setup)
```

D.2 Multiple accounts

Note: - for `mu4e` version 0.9.16 and higher, the recommended way to deal with multiple accounts is through `mu4e`'s built-in Chapter 9 [Contexts], page 38 system. For older versions, the below still works.

Using mu4e with multiple email accounts is fairly easy. Although variables such as `user-mail-address`, `mu4e-sent-folder`, `message-*`, `smtpmail-*`, etc. typically only take one value, it is easy to change their values using `mu4e-compose-pre-hook`. The setup described here is one way of doing this (though certainly not the only way).

This setup assumes that you have multiple mail accounts under `mu4e-maildir`. As an example, we'll use `~/Maildir/Account1` and `~/Maildir/Account2`, but the setup works just as well if `mu4e-maildir` points to something else.

First, you need to make sure that all variables that you wish to change based on user account are set to some initial value. So set up your environment with e.g., your main account:

```
(setq mu4e-sent-folder "/Account1/Saved Items"
      mu4e-drafts-folder "/Account1/Drafts"
      user-mail-address "my.address@account1.example.com"
      smtpmail-default-smtp-server "smtp.account1.example.com"
      smtpmail-local-domain "account1.example.com"
      smtpmail-smtp-server "smtp.account1.example.com"
      smtpmail-stream-type 'starttls
      smtpmail-smtp-service 25)
```

Then create a variable `my-mu4e-account-alist`, which should contain a list for each of your accounts. Each list should start with the account name, (which *must* be identical to the account's directory name under `~/Maildir`), followed by `(variable value)` pairs:

```
(defvar my-mu4e-account-alist
  '(("Account1"
     (mu4e-sent-folder "/Account1/Saved Items")
     (mu4e-drafts-folder "/Account1/Drafts")
     (user-mail-address "my.address@account1.example.com")
     (smtpmail-default-smtp-server "smtp.account1.example.com")
     (smtpmail-local-domain "account1.example.com")
     (smtpmail-smtp-user "username1")
     (smtpmail-smtp-server "smtp.account1.example.com")
     (smtpmail-stream-type starttls)
     (smtpmail-smtp-service 25))
    ("Account2"
     (mu4e-sent-folder "/Account2/Saved Items")
     (mu4e-drafts-folder "/Account2/Drafts")
     (user-mail-address "my.address@account2.example.com")
     (smtpmail-default-smtp-server "smtp.account2.example.com")
     (smtpmail-local-domain "account2.example.com")
     (smtpmail-smtp-user "username2")
     (smtpmail-smtp-server "smtp.account2.example.com")
     (smtpmail-stream-type starttls)
     (smtpmail-smtp-service 587))))
```

You can put any variable you want in the account lists, just make sure that you put in *all* the variables that differ for each account. Variables that do not differ need not be included. For example, if you use the same smtp server for both accounts, you don't need to include the smtp-related variables in `my-mu4e-account-alist`.

Note that some SMTP servers (such as Gmail) require the SMTP username to match the user mail address. In this case, your mail is appear to originate from whichever SMTP account you use. Thus unless you are certain your SMTP server does not have this requirement, you should generally use different SMTP account credentials for each mail account.

Now, the following function can be used to select an account and set the variables in `my-mu4e-account-alist` to the correct values:

```
(defun my-mu4e-set-account ()
  "Set the account for composing a message."
  (let* ((account
          (if mu4e-compose-parent-message
              (let ((maildir (mu4e-message-field mu4e-compose-parent-message :maildir)
                (string-match "/\\(.*?\\)/" maildir)
                (match-string 1 maildir))
            (completing-read (format "Compose with account: (%s) "
                                     (mapconcat #'(lambda (var) (car var))
                                                my-mu4e-account-alist "/"))
                             (mapcar #'(lambda (var) (car var)) my-mu4e-account-alist)
                             nil t nil nil (caar my-mu4e-account-alist))))
         (account-vars (cdr (assoc account my-mu4e-account-alist))))
    (if account-vars
        (mapc #'(lambda (var)
```

```
                    (set (car var) (cadr var)))
                  account-vars)
        (error "No email account found"))))
```

This function then needs to be added to `mu4e-compose-pre-hook`:

```
(add-hook 'mu4e-compose-pre-hook 'my-mu4e-set-account)
```

This way, `my-mu4e-set-account` is called every time you edit a message. If you compose a new message, it simply asks you for the account you wish to send the message from (TAB completion works). If you're replying or forwarding a message, or editing an existing draft, the account is chosen automatically, based on the first component of the maildir of the message being replied to, forwarded or edited (i.e., the directory under `~/Maildir`).

D.3 Refiling messages

By setting `mu4e-refile-folder` to a function, you can dynamically determine where messages are to be refiled. If you want to do this based on the subject of a message, you can use a function that matches the subject against a list of regexes in the following way. First, set up a variable `my-mu4e-subject-alist` containing regexes plus associated mail folders:

```
(defvar my-mu4e-subject-alist '(("kolloqui\\(um\\|a\\)" . "/Kolloquium")
                                ("Calls" . "/Calls")
                                ("Lehr" . "/Lehre")
                                ("webseite\\|homepage\\|website" . "/Webseite"))
  "List of subjects and their respective refile folders.")
```

Now you can use the following function to automatically refile messages based on their subject line:

```
(defun my-mu4e-refile-folder-function (msg)
  "Set the refile folder for MSG."
  (let ((subject (mu4e-message-field msg :subject))
        (folder (or (cdar (member* subject my-mu4e-subject-alist
                                   :test #'(lambda (x y)
                                             (string-match (car y) x))))
                    "/General")))
    folder))
```

Note the `"/General"` folder: it is the default folder in case the subject does not match any of the regexes in `my-mu4e-subject-alist`.

In order to make this work, you'll of course need to set `mu4e-refile-folder` to this function:

```
(setq mu4e-refile-folder 'my-mu4e-refile-folder-function)
```

If you have multiple accounts, you can accommodate them as well:

```
(defun my-mu4e-refile-folder-function (msg)
  "Set the refile folder for MSG."
  (let ((maildir (mu4e-message-field msg :maildir))
        (subject (mu4e-message-field msg :subject))
        folder)
    (cond
     ((string-match "Account1" maildir)
```

```
      (setq folder (or (catch 'found
                         (dolist (mailing-list my-mu4e-mailing-lists)
                           (if (mu4e-message-contact-field-matches
                                 msg :to (car mailing-list))
                               (throw 'found (cdr mailing-list)))))
                       "/Account1/General")))
     ((string-match "Gmail" maildir)
      (setq folder "/Gmail/All Mail"))
     ((string-match "Account2" maildir)
      (setq folder (or (cdar (member* subject my-mu4e-subject-alist
                                      :test #'(lambda (x y)
                                                (string-match
                                                   (car y) x))))
                       "/Account2/General"))))
   folder))
```

This function actually uses different methods to determine the refile folder, depending on the account: For *Account2*, it uses `my-mu4e-subject-alist`, for the *Gmail* account it simply uses the folder "All Mail". For Account1, it uses another method: it files the message based on the mailing list to which it was sent. This requires another variable:

```
(defvar my-mu4e-mailing-lists
  '(("mu-discuss@googlegroups.com" . "/Account1/mu4e")
    ("pandoc-discuss@googlegroups.com" . "/Account1/Pandoc")
    ("auctex@gnu.org" . "/Account1/AUCTeX"))
  "List of mailing list addresses and folders where
   their messages are saved.")
```

D.4 Saving outgoing messages

Like `mu4e-refile-folder`, the variable `mu4e-sent-folder` can also be set to a function, in order to dynamically determine the save folder. One might, for example, wish to automatically put messages going to mailing lists into the trash (because you'll receive them back from the list anyway). If you have set up the variable `my-mu4e-mailing-lists` as mentioned, you can use the following function to determine a save folder:

```
(defun my-mu4e-sent-folder-function (msg)
  "Set the sent folder for the current message."
  (let ((from-address (message-field-value "From"))
        (to-address (message-field-value "To")))
    (cond
     ((string-match "my.address@account1.example.com" from-address)
      (if (member* to-address my-mu4e-mailing-lists
                   :test #'(lambda (x y)
                             (string-match (car y) x)))
          "/Trash"
        "/Account1/Sent"))
     ((string-match "my.address@gmail.com" from-address)
      "/Gmail/Sent Mail")
     (t (mu4e-ask-maildir-check-exists "Save message to maildir: ")))))
```

Note that this function doesn't use `(mu4e-message-field msg :maildir)` to determine which account the message is being sent from. The reason is that that the function in `mu4e-sent-folder` is called when you send the message, but before mu4e has created the message struct from the compose buffer, so that `mu4e-message-field` cannot be used. Instead, the function uses `message-field-value`, which extracts the values of the headers in the compose buffer. This means that it is not possible to extract the account name from the message's maildir, so instead the from address is used to determine the account.

Again, the function shows three different possibilities: for the first account (`my.address@account1.example.com`) it uses `my-mu4e-mailing-lists` again to determine if the message goes to a mailing list. If so, the message is put in the trash folder, if not, it is saved in `/Account1/Sent`. For the second (Gmail) account, sent mail is simply saved in the Sent Mail folder.

If the from address is not associated with Account1 or with the Gmail account, the function uses `mu4e-ask-maildir-check-exists` to ask the user for a maildir to save the message in.

D.5 Confirmation before sending

To protect yourself from sending messages too hastily, you can add a final confirmation, which you can of course make as elaborate as you wish.

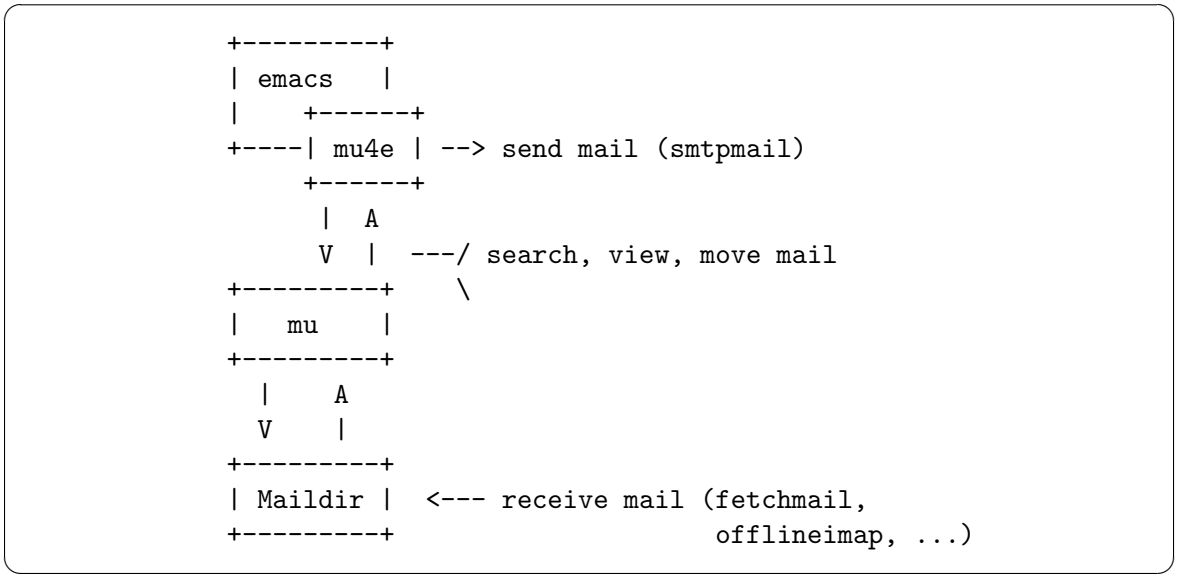
```
(add-hook 'message-send-hook
  (lambda ()
    (unless (yes-or-no-p "Sure you want to send this?")
      (signal 'quit nil))))
```

Appendix E How it works

While perhaps not interesting for all users of `mu4e`, some curious souls may want to know how `mu4e` does its job.

E.1 High-level overview

At a high level, we can summarize the structure of the `mu4e` system using some ascii-art:



In words:

- Your e-mail messages are stored in a Maildir-directory (typically, `~/Maildir` and its subdirectories), and new mail comes in using tools like `fetchmail`, `offlineimap`, or through a local mail server.
- `mu` indexes these messages periodically, so you can quickly search for them. `mu` can run in a special `server`-mode, where it provides services to client software.
- `mu4e`, which runs inside `emacs` is such a client; it communicates with `mu` (in its `server`-mode to search for messages, and manipulate them.
- `mu4e` uses the facilities offered by `emacs` (the Gnus message editor and `smtpmail`) to send messages.

E.2 `mu server`

`mu4e` is based on the `mu` e-mail searching/indexer. The latter is a C-program; there are different ways to communicate with a client that is emacs-based.

One way to implement this, would be to call the `mu` command-line tool with some parameters and then parse the output. In fact, that was the first approach – `mu4e` would invoke e.g., `mu find` and process the output in `emacs`.

However, with this approach, we need to load the entire e-mail *Xapian* database (in which the message is stored) for each invocation. Wouldn't it be nicer to keep a running `mu` instance around? Indeed, it would - and thus, the `mu server` sub-command was born.

Running `mu server` starts a simple shell, in which you can give commands to `mu`, which then spits out the results/errors. `mu server` is not meant for humans, but it can be used manually, which is great for debugging.

E.3 Reading from the server

In the design, the next question was what format `mu` should use for its output for `mu4e` (`emacs`) to process. Some other programs use JSON here, but it seemed easier (and possibly, more efficient) just to talk to `emacs` in its native language: *s-expressions*, and interpret those using the `emacs`-function `read-from-string`. See Section E.4 [The message s-expression], page 72 for details on the format.

So, now let's look how we process the data from `mu server` in `emacs`. We'll leave out a lot of detail, `mu4e`-specifics, and look at a bit more generic approach.

The first thing to do is to create a process (for example, with `start-process`), and then register a filter function for it, which is invoked whenever the process has some data for us. Something like:

```
(let ((proc (start-process <arguments>)))
  (set-process-filter proc 'my-process-filter)
  (set-process-sentinel proc 'my-process-sentinel))
```

Note, the process sentinel is invoked when the process is terminated – so there you can clean things up. The function `my-process-filter` is a user-defined function that takes the process and the chunk of output as arguments; in `mu4e` it looks something like (pseudo-lisp):

```
(defun my-process-filter (proc str)
  ;; mu4e-buf: a global string variable to which data gets appended
  ;; as we receive it
  (setq mu4e-buf (concat mu4e-buf str))
  (when <we-have-received-a-full-expression>
      <eat-expression-from mu4e-buf>
      <evaluate-expression>))
```

`<evaluate-expression>` de-multiplexes the s-expression we got. For example, if the s-expression looks like an e-mail message header, it is processed by the header-handling function, which appends it to the header list. If the s-expression looks like an error message, it is reported to the user. And so on.

The language between frontend and backend is documented in the `mu-server` man-page. `mu4e` can log these communications; you can use *`M-x mu4e-toggle-logging`* to turn logging on and off, and you can view the log using *`M-x mu4e-show-log`* (`$`).

E.4 The message s-expression

A typical message s-expression looks something like the following:

```
(:docid 32461
 :from (("Nikola Tesla" . "niko@example.com"))
 :to (("Thomas Edison" . "tom@example.com"))
 :cc (("Rupert The Monkey" . "rupert@example.com"))
 :subject "RE: what about the 50K?"
 :date (20369 17624 0)
```

```
 :size 4337
 :message-id "C8233AB82D81EE81AF0114E4E74@123213.mail.example.com"
 :path  "/home/tom/Maildir/INBOX/cur/133443243973_1.10027.atlas:2,S"
 :maildir "/INBOX"
 :priority normal
 :flags (seen)
 :parts ( (:index 1 :mime-type "text/plain" :size 12345 :attachment nil)
          (:index 2 :name "photo.jpg" :mime-type "image/jpeg"
           :size 147331 :attachment t)
          (:index 3 :name "book.pdf" :mime-type "application/pdf"
           :size 192220 :attachment t))
 :references  ("C8384574032D81EE81AF0114E4E74@123213.mail.example.com"
"38203498230942D81EE81AF0114E4E74@123213.mail.example.com")
 :in-reply-to "38203498230942D81EE81AF0114E4E74@123213.mail.example.com"
 :body-txt "Hi Tom,
 ....
")
```

This s-expression forms a property list (`plist`), and we can get values from it using `plist-get`; for example `(plist-get msg :subject)` would get you the message subject. However, it's better to use the function `mu4e-message-field` to shield you from some of the implementation details that are subject to change; and see the other convenience functions in `mu4e-message.el`.

Some notes on the format:

- The address fields are *lists* of pairs `(name . email)`, where `name` can be nil.
- The date is in format `emacs` uses (for example in `current-time`).[1]
- Attachments are a list of elements with fields `:index` (the number of the MIME-part), `:name` (the file name, if any), `:mime-type` (the MIME-type, if any) and `:size` (the size in bytes, if any).
- Messages in the Chapter 4 [Headers view], page 13 come from the database and do not have `:attachments`. `:body-txt` or `:body-html` fields. Message in the Chapter 5 [Message view], page 18 use the actual message file, and do include these fields.

E.4.1 Example: ping-pong

As an example of the communication between `mu4e` and `mu`, let's look at the `ping-pong`-sequence. When `mu4e` starts, it sends a command `ping` to the `mu server` backend, to learn about its version. `mu server` then responds with a `pong` s-expression to provide this information (this is implemented in `mu-cmd-server.c`).

We start this sequence when `mu4e` is invoked (when the program is started). It calls `mu4e-proc-ping`, and registers a (lambda) function for `mu4e-proc-pong-func`, to handle the response.

```
-> cmd:ping
<- (pong "mu" :version "x.x.x" :doccount 10000)
```

[1] Emacs 32-bit integers have only 29 bits available for the actual number; the other bits are use by `emacs` for internal purposes. Therefore, we need to split `time_t` in two numbers.

When we receive such a `pong` (in `mu4e-proc.el`), the lambda function we registered is called, and it compares the version we got from the `pong` with the version we expected, and raises an error, if they differ.

Appendix F Logging and debugging

As explained in Appendix E [How it works], page 71, `mu4e` communicates with its backend (`mu server`) by sending commands and receiving responses (s-expressions).

For debugging purposes, it can be very useful to see this data. For this reason, `mu4e` can log all these messages. Note that the 'protocol' is documented to some extent in the `mu-server` manpage.

You can enable (and disable) logging with *`M-x mu4e-toggle-logging`*. The log-buffer is called `*mu4e-log*`, and in the Chapter 3 [Main view], page 11, Chapter 4 [Headers view], page 13 and Chapter 5 [Message view], page 18, there's a keybinding `$` that takes you there. You can quit it by pressing `q`.

Logging can be a bit resource-intensive, so you may not want to leave it on all the time. By default, the log only maintains the most recent 1200 lines. `mu` itself keeps a log as well, you can find this it in `<MUHOME>/log/mu.log`, typically `~/.mu/log/mu.log`.

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Version 1.2, November 2002

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