Mfmod_pcre

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1 Overview

This package extends `mailfromd`, a powerful mail filtering utility designed for use with mail transport agents supporting the *milter* protocol (see *Mailfromd Manual*).

Mail filtering language (*MFL*) which is used to program `mailfromd`, uses POSIX regular expressions (either basic or extended, at the user's option). `Mfmod_pcre` extends it by providing support for Perl-compatible regular expressions.

It is written as a loadable module (see Section "mfmod" in *Mailfromd Manual*) and requires `mailfromd` version 8.14.91 or later and `pcre2` 10.35 or later.

This manual describes `mfmod_pcre` version 1.1 and discusses its use. It supposes that the reader is sufficiently acquainted with `mailfromd` and Perl-compatible regular expressions.

For a complete description of `mailfromd`, refer to *Mailfromd Manual*.

For a description of Perl-compatible regular expressions, see `https://pcre.org/original/doc/html/pcresyntax.html`.

2 Basic Usage

To load `mfmod_pcre` into your MFL program, first make sure that `mailfromd` search path (see Section "include search path" in *Mailfromd Manual*) contains directory where the `pcre.mf` interface file is installed and search path for dynamically loaded modules (see Section "mfmod-path" in *Mailfromd Manual*) contains directory where the loaded library `mfmod_pcre.so` resides. Once these prerequisites are met, add the `require` statement:

```
require 'pcre'
```

Now you can use Perl-compatible regexps in your code.

Names of all functions exported by the module begin with the `pcre_` prefix. For example, `pcre_string_matches` checks whether its second argument matches a regular expression supplied as its first argument. The function returns true (1) if the string matches the expression, and false (0) otherwise. E.g.:

```
if pcre_string_matches('.+?@.+', address)
  # do something with address
fi
```

This function suits for casual use, but you should be aware of its drawbacks. First, it compiles regular expression on each call, which hurts performance. Secondly, while it allows to use capturing groups in regex, it provides no way to retrieve matched substrings.

The function `pcre_string_match` is free from the second limitation. If the string matches, this function returns a *match descriptor*, a positive integer value describing the match. This value can then be used with other functions to retrieve information about the match. For example, `pcre_numbered_substring` retrieves the captured string:

```
    set mh pcre_string_match('(\d+)\s+(.+?)\s+(\S+@\S+)', input_line)
    if mh
      # Regular expression matches
      echo "Ordinal number: " . pcre_numbered_substring(mh, 1)
      echo "Personal part: " . pcre_numbered_substring(mh, 2)
      echo "Email: " . pcre_numbered_substring(mh, 3)

      pcre_match_free(mh)
    else
      # Expression doesn't match
    fi
```

Notice the use of `pcre_match_free`: when no longer needed, match descriptor should be disposed of using this function.

A similar function `pcre_named_substring` is provided to retrieve named captured groups.

Both numbered and named groups can be expanded within a string using the `pcre_expand` function. Numbered groups are referred to as `$n` and named ones as `$+{name}`. For example:

```
    set mh pcre_string_match('(?<ord>\d+)\s+(?<personal>.+?)\s+(?<email>\S+@\S+)', input_l
    if mh
      # Regular expression matches
      set printable_email pcre_expand(mh, '"$+{personal}" <$+{email}>')
      pcre_match_free(mh)
    fi
```

However, `pcre_string_match` still suffers from the first limitation: it compiles the regular expression on each call. To overcome this limitation, use *precompiled regular expressions*.

The function `pcre_compile` compiles the regexp given as its argument and returns *regexp descriptor*, a numeric value that is used to refer to that expression in other `pcre_` calls:

```
    number rx pcre_compile('(\d+)\s+(.+?)\s+(\S+@\S+)')
```

Thus, a regexp can be compiled once (e.g. in the `begin` section) and then used as many times as needed. A set of functions is provided to use precompiled regexps. For example, `pcre_matches` and `pcre_match` are similar to the functions discussed above, except that they take regexp descriptor as their first argument:

```
    number rx pcre_compile('(\d+)\s+(.+?)\s+(\S+@\S+)')
    set mh pcre_match(rx, input_line)
    if mh
      # Regular expression matches
      set printable_email pcre_expand(mh, '"$2" <$3>')
      pcre_match_free(mh)
    fi
```

3 Matching Entire Messages

Two functions are provided to search for regular expressions within emails. They are declared as follows:

```
func pcre_match_message(number rx, number msg; string charset)
  returns string
func pcre_string_match_message(string regex, number msg; string charset)
  returns string
```

The message to search in is given by *message descriptor*, i.e. an integer number identifying it. This descriptor is returned by one of the following calls:

`mailbox_get_message`
> See Section "Mailbox functions" in *Mailfromd Manual*.

`current_message`
> See Section "current_message" in *Mailfromd Manual*.

`message_from_stream`
> See Section "Message functions" in *Mailfromd Manual*.

Message searching fuctions can be used to search in plain as well as in multipart (MIME) messages. When searching in a MIME message, it is descended recursively and each its part is searched individually.

On success (a match is found), these functions return a string describing where the match was found. For example, '`1`' means that the plaintext message body matched, '`1.2`' means second part of a multipart message, '`1.2.3`' means third subpart of the second part of a multipart message, etc.

On error, an empty string is returned.

Only textual parts of a MIME message are considered. A *textual part*, for the matching purposes, is a part whose `Content-Type` header matches one the globbing patterns in the *text mime type* list. By default this list contains a single value: '`text/*`'.

More patterns can be added to text mime type list using the `pcre_text_mime_add` function. It takes variable number of arguments, e.g.:

```
pcre_text_time_add("application/x-json", "x-text/*")
```

Similarly, the function `pcre_text_mime_del` allows you to delete elements from this list. Note, that it treats its arguments literally, not as globbing patterns. For example, suppose the following call is done when the text mime type list contains two elements: '`text/*`', and '`*/x-sh`':

```
pcre_text_time_del('text/*')
```

This will remove only one item: '`text/*`', but won't touch '`*/x-sh`' (which it would do, if it treated its argument as a globing pattern).

Finally, the function `pcre_text_mime_init` removes all entries from the list.

4 Functions

This chapter describes function calls exported by the module. The functions are grouped by their purpose.

4.1 Compile

number **pcre_compile** (*string* `pattern`)   [Function]
>   Compiles regular expression *pattern* and returns *regexp descriptor*, a numeric value
>   that will be used to refer to that regular expression when calling other `pcre_` functions.
>
>   If the regular expression is erroneous and cannot be compiled, the function throws
>   `e_regcomp` exception (see Section "Built-in Exceptions" in *Mailfromd Manual*).

4.2 Matching Strings

The functions below return *match descriptor*, i.e. a positive number that can be used to
retrieve further information about the match (see Section 4.3 [Capturing groups], page 4).
On failure (string doesn't match the oregular expression), they return 0.

   If the supplied match descriptor is not valid, these functions will raise the `e_range`
exception.

number **pcre_match** (*number* `rx`, *string* `subject`)   [Function]
>   First argument is regex descriptor returned by previous call to `pcre_compile`.
>
>   The function matches *subject* against the regular expression referred to by *rx*. Returns
>   match descriptor on success and 0 on failure.

number **pcre_string_match** (*string* `rs`, *string* `subject`)   [Function]
>   Compiles *rs* into a regular expression and matches string *subject* against it. Returns
>   match descriptor on success and 0 on failure.

   When no longer used, the match descriptor should be freed:

void **pcre_match_free** (*number* `mh`)   [Function]
>   Frees the resources allocated for the match descriptor *mh* and returns it to the pool
>   for eventual re-use.

   The two functions below return a boolean value: true (1) if the string matches and false
(0) if it doesn't.

number **pcre_matches** (*number* `rx`, *string* `subject`)   [Function]
>   First argument is regex descriptor returned by a previous call to `pcre_compile`.
>
>   Returns true if *string* matches that regular expression and false otherwise.

number **pcre_string_matches** (*string* `rs`, *string* `subject`)   [Function]
>   Compiles *rs* into a regular expression and matches string *subject* against it. Returns
>   true if the match is found and false otherwise.

4.3 Working with Capturing Groups

The following functions are used to retrieve actual content of a captured group after a
successive match. The match is identified by match descriptor returned from a prior call to
`prce_match` or `pcre_string_match`.

   These functions will raise the `e_range` exception, if the match descriptor is invalid, and
the `e_inval` exception, if the substring number or name refer to a non-existing capturing
group.

string **pcre_numbered_substring** (*number* `mh`, *number* `n`)   [Function]
>   Returns text of the *n*th captured group of the match *mh*.

string **pcre_named_substring** (*number* `mh`, *string* `name`)   [Function]
>   Returns text of the named captured group *name* in the match *mh*.

string **pcre_expand** (*number* `mh`, *string* `input`)   [Function]
>   Given match descriptor *mh*, replace in *input* all references to capturing groups with
>   their actual text and return the resulting string.
>
>   Numbered capturing groups are referred to as '`$n`', where *n* is the group number
>   (0-based, 0 being the portion of the text matching entire regular expression). If *n* is
>   greater than 9, it should be enclosed in curly braces (e.g. '`${10}`').
>
>   Named capturing groups are referred to as '`$+{name}`', where *name* is the group name.

4.4 Message Matching

The functions in this section match the body of an email message against a regular expression. If the message is a multipart one (MIME), then its parts are descended recursively and each part that is recognized as a textual one is matched against the regexp.

The message is identified by its *descriptor*, a numeric value returned from a previous call to `mailbox_get_message`, `message_from_stream`, `current_message`, or similar function.

On success, these functions return a string identifying the part of the message that matched. For example, '`1`' means the body of a plaintext email message. '`1.2`' means second part (part numbers are 1-based) of a multipart message.

If the match isn't found, empty string is returned.

string **pcre_match_message** (*number* `rx`, *number* `msg`; *string*   [Function]
        `charset`)
>   Checks whether the body of the message *msg* (or any of its parts, if it is a MIME
>   message) matches regular expression referred to by descriptor *rx*.
>
>   If optional *charset* is supplied, each message part is re-coded to that charset before
>   matching.

string **pcre_string_match_message** (*string* `rs`, *number* `msg`; *string*   [Function]
        `charset`)
>   Compiles *rs* and checks whether the body of the message *msg* (or any of its parts, if
>   it is a MIME message) matches it.
>
>   If optional *charset* is supplied, each message part is re-coded to that charset before
>   matching.

These functions use the `Content-Type` header to decide whether to apply the regular expression to the given message part, or just to skip it. An internal structure called *text mime type* list contains globbing patterns of the eligible content type values. The actual value of the `Content-Type` header is matched against each list element in turn, until either a match is found (in which case the part will be processed) or the end of list is reached (in which case the part will be skipped).

By default, the text mime type list is initialized with a single value: '`text/*`'. To maintain the list, the following functions are provided:

```
void pcre_text_mime_init ()                                              [Function]
```
    Clears the list.

```
void pcre_text_mime_add (...)                                           [Function]
```
    Arguments are strings in form '*part*/*subpart*', where both *part* and *subpart* can be shell-style globbing patterns. The supplied strings are appended to the list.

```
void pcre_text_mime_del (...)                                           [Function]
```
    Deletes from the list those patterns that match literally its arguments.

5 Downloads and Other Links

The program can be downloaded from `https://download.gnu.org.ua/release/mfmod_pcre`.

    The source repository is available at `https://git.gnu.org.ua/mfmod_pcre.git/`.

    The package development page is at `https://puszcza.gnu.org.ua/projects/mfmod_pcre`.

6 Bug Reports

If you think you found a bug in `mfmod_pcre` or in its documentation, please send a mail to `gray@gnu.org` (Sergey Poznyakoff) or use the bug tracker at `https://puszcza.gnu.org.ua/bugs/?group=mfmod_pcre` (requires authorization).

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