gnu-pw-mgr - derive a password from an id

For version , October 2015

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This program is designed to make it easy to reconstruct difficult passwords when they are needed while limiting the risk of attack. The user of this program inputs a self-defined transformation of a web site URL and obtains the password and user name hint for that web site. You must, however, be able to remember this password id, or the password is lost forever.

The Wikipedia has an excellent article on passwords in general and there is a paper published at Stanford* that describes a browser plug-in that is substantially similar to this program.

* Blake Ross; Collin Jackson, Nicholas Miyake, Dan Boneh and John C. Mitchell (2005). "Stronger Password Authentication Using Browser Extensions". Proceedings of the 14th Usenix Security Symposium. USENIX. pp. 1732

1 Introduction to password management

This introductory chapter will superficially cover password management issues and describe how this program addresses them.

1.1 How evil-doers access your accounts

First and foremost, because people give them their credentials (user name and password). Not deliberately, of course. They leave them around or reply to a phishing scam or whatever. There's nothing providers of security assistance can do about it. That's the user's responsibility. Be careful out there. Keep your systems clean of spyware and watch for phishers.

The next most common method is for a site to get "hacked" and the crooks make off with password files. Hopefully, they've been hash encoded, but they are sometimes in the clear. If they are hashed, then the crackers will try to reverse the hash and see how far and wide they can use your credentials.

Other possibilities are telescopes, line taps, wireless sniffing and so on. Unless you are a secret agent working on national security matters, these possibilities are not terribly likely possibilities.

The purpose of this software is to render useless, limit the potential damage, or, at least, make it difficult to gain much use out of any information captured. And, also, make it convenient enough to use that it is actually used. A very secure password scheme that is a nuisance to use, won't be used, and is therefore not very useful.

1.2 How to keep evil-doers at bay

First and foremost, make sure you know which web site you are interacting with when you supply credentials. Do not blindly click an email that looks like one from Pay Pal or your bank. Go to your financial institutions via a bookmark or a well-established link.

Next, use different passwords at different web sites. Unless you restrict yourself to very few web sites, this means you must manage them somehow. Pieces of paper get lost. Password list files can wind up getting compromised. If that happens, your entire online world is now open. Encrypted password list files can get decrypted, yielding the same possibility.

Do not use either words or common transformations of words for passwords. Such techniques severly limit possibilities and constrained possibilities are searched more quickly.

Use long passwords. The longer they are, the more difficult (compute costly) they are to break.

1.3 How gnu-pw-mgr helps

Passwords must be long, not based on dictionary words, never repeated, and not recorded where they can be gotten at. You can't do it by memory.

This program addresses the recording problem by not recording passwords. They get re-computed every time, based on two separate factors each of which is unlikely to come into the hands of miscreants. The first factor is a series of one or more password "seeds" or "salts". You specify a tag for it and the seed itself is a block of text that contains at least 64 characters. The second factor is a transformation of the web site address. That transformation should be easy to remember, fairly easy to type, include odd capitalization, use multiple unusual punctuation characters, have a secret word or two and never, ever be written down.

The text, the URL transform and the tag get hashed together to construct the password. Since different web sites have different password requirements and allowances, the result is trimmed and tweaked until it meets the requirements. It is always possible that new requirements might pop up, and the password polishing code has been written to be extensible.

Using this program not only makes it simple to have different passwords for different web sites, it actually makes it inconvenient to use the same password. It does not support the same password, so you would have to remember the jumble of letters and numbers for any alternate web site. You won't do that.

`gnu-pw-mgr` works by storing the seed in a private configuration file and obtaining the password identifier either from the command line or by reading it from standard input. This configuration file must be secured from reading and writing by other users, but obtaining access will not reveal passwords. The key to this is the *password identifier*. It is the second factor in the authentication (password re-creation) that is never recorded.

The configuration file does not need to be super secret. What needs to be super secret is the transformation used for constructing password identifiers. That transform includes a prefix, a suffix, alternate capitalizations and a variety of word separators. For example, you could prefix every domain name with "access" and suffix it with "por-favor", then use an unusual spelling of the domain, perhaps "ExAmplE.moC". This yields a password id of "access/ExAmplE+moC=por-favor". You can remember that fairly easily. If a bad actor gets your seed file, they won't work out the transform any time soon.

On the other hand, if someone does happen to see you create the transform, it will still do no good, unless they also get the second factor: the seed file. This is true even if they also get one password. There is no way to derive the seed file from the password id and the resulting password. It is a one way hash function. It is not an encryption.

Every site has their own set of attributes that make for acceptable passwords, the hash of the inputs must be modified. The hash of the password id by itself is used as a key to look up any previously established password constraints (see Section 2.3 [password options],

page 7). These password attributes are length, character types required and/or prohibited from being in the password and some hint about your login name or id. That name need not be exactly your login name, just something that will remind you about which one you use for the site. It may be omitted, if you are sure you can remember.

These site specific options are then used to format the password display.

1.4 The answers to security questions

Many sites now add security questions that you must answer when you first set up your account. There are several problems with these:

1. The questions are often common, so if the answers become known from one site, the answers can be used at another.
2. Some answers can be researched.
3. Sometimes, you may select an answer that turns out to be difficult to remember or changes for you at some point.
4. If an answer requires two words, you are often out of luck. "Pick one."

It's a mess. `gnu-pw-mgr` supports a '`--confirm`' option for answers to confirmation/security questions. Give that option a word or two from the question, and it will print out a 12 character sequence of alphabetic characters that are unique to the web site and unique for the option argument. For example, in the `gnu-pw-mgr` program's `base.test` test, the confirmation option arguments `dog` and `pet` produce the strings `xkzrraogchyh` and `brrxsbesatfj`, respectively. These may be answers to the questions, '`what was your dog's name`' or '`what was your favorite pet`', for example. These answers are valid only for the '`who`' password id and the test's seed string. With a different password id or seed, you would get a different answer.

2 Invoking gnu-pw-mgr

The password id should contain a fairly consistent permutation of the URL you are logging in to. "Fairly" because you may wish to vary your financial institutions differently than your newspaper. e.g. "my/banK$moC" versus "bLog-oRg". And then surround the id with prefixes and suffixes. Separate these with punctuation characters to make dictionary attacks more difficult.

Only the passwords for one password id are ever printed. If the command line contains multiple operands (arguments after the options), then they are assembled into one password id with space characters separating the original operands.

One password is printed for every configured seed value. Seed values are added by specifying just the `--tag` and `--text` options. The tag is also printed with each password. The `--login-id`, `--length`, `--cclass` and `--specials` options are associated with each password id. Password ids are never stored anywhere.

Example usage can be seen in the example section below.

This chapter was generated by **AutoGen**, using the `agtexi-cmd` template and the option descriptions for the `gnu-pw-mgr` program. This software is released under the GNU General Public License, version 3 or later.

2.1 gnu-pw-mgr help/usage (--help)

This is the automatically generated usage text for gnu-pw-mgr.

The text printed is the same whether selected with the `help` option (`--help`) or the `more-help` option (`--more-help`). `more-help` will print the usage text by passing it through a pager program. `more-help` is disabled on platforms without a working `fork(2)` function. The `PAGER` environment variable is used to select the program, defaulting to `more`. Both will exit with a status code of 0.

```
gnu-pw-mgr - derive a password from an id - Ver. 1.6
Usage:  gnu-pw-mgr [ -<flag> [<val>] | --<name>[{=| }<val>] ]... [ <pw-id> ]

Options for adding and removing seeds in the configuration file.:

  Flg Arg Option-Name    Description
   -t Str tag            seed tag
                                - prohibits these options:
                                login-id
                                cclass
                                length
                                specials
                                no-header
                                use-pbkdf2
                                - may not be preset
   -s Str text           seed text
                                - requires the option 'tag'
                                - may not be preset

Options for specifying password attributes.:

  Flg Arg Option-Name    Description
   -i Str login-id       a reminder of your login id
                                - may not be preset
   -l Num length         sets password length
                                - it must be in the range:
                                  4 to 128
                                - may not be preset
   -c Mbr cclass         password character class
                                - may not be preset
                                - is a set membership option
      Num use-pbkdf2     compute password with PKCS#5 PBKDF2
                                - disabled as '--no-pbkdf2'
                                - enabled by default
                                - may not be preset
      Str specials       set alternate special characters
                                - may not be preset
      Str select-chars   select only certain bytes of a password
```

```
Options for management and output format.:

  Flg Arg Option-Name    Description
   -H no  no-header      omit printing the password headers
                                - may not be preset
   -C Str confirm        print confirmation question answer
                                - may not be preset
   -S no  status         Show status of a password id
                                - may not be preset
   -d no  delete         Remove a password entry
                                - may not be preset

Options supported by the AutoOpts option library.:

  Flg Arg Option-Name    Description
   -v opt version        output version information and exit
   -h no  help           display extended usage information and exit
   -M no  more-help      extended usage information passed thru pager
      Str load-opts      load options from a config file
                                - disabled as '--no-load-opts'
                                - may appear multiple times

Options are specified by doubled hyphens and their name or by a single
hyphen and the flag character.

The valid "cclass" option keywords are:
  alpha       upper       lower       digit       special     no-special
  no-alpha    no-triplets pin         alnum       two-upper   two-lower
  two-digit   two-special
  or an integer mask with any of the lower 14 bits set
or you may use a numeric representation.  Preceding these with a '!'
will clear the bits, specifying 'none' will clear all bits, and 'all'
will set them all.  Multiple entries may be passed as an option
argument list.
The password id should contain a fairly consistent permutation of the URL
you are logging in to.  "Fairly" because you may wish to vary your
financial institutions differently than your newspaper.  e.g.  "my/banK$moC"
versus "bLog-oRg".  And then surround the id with prefixes and suffixes.
Separate these with punctuation characters to make dictionary attacks more
difficult.

Only the passwords for one password id are ever printed.  If the command
line contains multiple operands (arguments after the options), then they
are assembled into one password id with space characters separating the
original operands.

One password is printed for every configured seed value.  Seed values are
```

```
added by specifying just the '--tag' and '--text' options.  The tag is also
printed with each password.  The '--login-id', '--length', '--cclass' and
'--specials' options are associated with each password id.  Password ids
are never stored anywhere.

Please send bug reports to:  <bkorb@gnu.org>
```

2.2 seed-options options

Options for adding and removing seeds in the configuration file.. The `--text` option or the `--tag` option (when by itself) tell the program to manage password "seeds" in its database (configuration file). Both options together add a new seed, and `--tag`, by itself on the command line, removes a seed.

seed option.

This is the "define a seed for a series of passwords" option. This option takes a hierarchy argument `SEED`. This option is **not** a command line option. It is also the only option that is directly processed from the config file.

The seed value consists of three named parts (sub-options):

'`tag`' These are displayed next to each displayed password to help identify them.

'`text`' This is not displayed, but is used for the SHA initial value. This may be arbitrarily long.

'`ver`' The version of `gnu-pw-mgr` used to initially store the seed. This is used to determine the password tweaking algorithm to use when the generated password does not meet the site criteria (see Section 2.3 [the password character class option], page 7). On rare occasions, new character class restrictions may cause a change in the algorithm used to tweak passwords. When this is done, the old algorithm is still used to tweak passwords from the older seeds.

It is expected that when you must create a new password for an existing site, you will add a seed to your config file. Specify only the `--tag` and `--text` command line options and the program will insert the new triplet into the configuration file. Specify only the tag and no other command line arguments, and the associated seed entry will be removed. After that, every password id will have a new "most recent" password associated with it. You are expected to gradually update all of your passwords and retire seed values no longer in use.

New sites will not need a new seed. Simply supplying the new `<pw-id>` command argument will yield a new password.

tag option (-t).

This is the "seed tag" option. This option takes a string argument `TAG`.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.
- must not appear in combination with any of the following options: login-id, cclass, length, specials, no-header, pbkdf2.

The tag for a seed to be added to or removed from the config file. The use depends on whether or not there is a `--text` option.

text option (-s).

This is the "seed text" option. This option takes a string argument `TEXT`.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.
- must appear in combination with the following options: tag.

The text for a password seed to be added to the config file. This text cannot include the 7 character sequence `"</text>"`.

This text must be at least 64 characters long. The expectation is you will write a sentence or two that you can easily remember, including any capitalization, punctuation and spacing. You should include some non-alphabetic, non-digit characters here and there to make a dictionary attack more difficult. But if you need to reconstruct this, you need to remember them.

If the text is shorter than 64 characters, it will be padded out. In such a case, you will need to save the configuration file some place secure or it will be extremely difficult to reconstruct it, should that become necessary.

2.3 password-options options

Options for specifying password attributes.. The `--cclass`, `--length`, `--tag` and `--specials` options are stored in the configuration file. They are associated with a password ID via the sha check sum of the id. They will be recalled the next time that id is used.

login-id option (-i).

This is the "a reminder of your login id" option. This option takes a string argument.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.

It is sometimes difficult to remember your login name for a given site. Or even, perhaps, if you have ever set up an account on a particular site. By specifying this option, you will know both that you have set it up and you will have a reminder what your login name is. Avoid using your real login name.

The `login-id` has no effect on the final password, so it may be specified or altered at any time.

length option (-l).

This is the "sets password length" option. This option takes a number argument.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.

Some web sites are more restrictive. Some are more generous. Set this value in your home config file to change your default and specify it on the command line for specific sites. Use of this option requires a `<pw-id>` operand.

Password lengths of 4 through 7 characters are limited to "pin" numbers. "pin" numbers are 4 or more digits. All other passwords must be at least 8 characters long. The default length is 16.

Password lengths beyond 40 characters force the use of the pbkdf2 algorithm. i.e. '`--no-pbkdf2`' is ignored. This limit is derived from "MIN_BUF_LEN - 8".

cclass option (-c).

This is the "password character class" option. This option takes a set-member argument.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.
- This option takes a keyword as its argument list. Each entry turns on or off membership bits. These bits can be tested with bit tests against the option value macro (OPT_VALUE_CCLASS). The available keywords are:

```
alpha       upper       lower
digit       special     no-special
no-alpha    no-triplets pin
alnum       two-upper   two-lower
two-digit   two-special
```

This option augments or specifies which character classes either must or must not appear in the final password.

Some sites disallow special characters, other sites require them, and still others require them, but only certain ones. If disallowed, specify `no-special` and special characters will be replaced with digits. If `special` is specified specifically, then in the absence of a '+' or '/' character, one character will be replaced with a hyphen. Other characters may be substituted for these three special characters with the `--specials` option.

Explanations of the keywords:

'`upper`' There must be at least one upper case letter.

'`lower`' There must be at least one lower case letter. Both this and '`upper`' together require one of each.

'`alpha`' There must be at least one alphabetic character, either upper or lower If either '`upper`' or '`lower`' is specified, this attribute is a no-op.

'`no-alpha`'
Alphabetic characters are prohibited. This conflicts with '`upper`', '`lower`' and '`alpha`'.

'`digit`' There must be at least one decimal digit character.

'`no-triplets`'
When three characters in a row are the same, the third is fiddled. Letters are changed to the next letter and `z` becomes `a`. Digits are handled similarly. Special characters are replaced with the third possible special character (`-`, unless modified with `--specials`). (Yes, there are a few such sites.)

‘`special`’ The password must contain at least one ‘`special character`’ (a non-alphabetic, non-digit character).

‘`no-special`’
The password must not contain any characters that are not alphabetic or decimal digits.

‘`pin`’ The password is all digits, a Personal Identification Number. This is an abbreviation for `no-alpha + no-special + digit`.

‘`alnum`’ This is an abbreviation for `alpha + digit`.

‘`two-*`’ Two of a particular character class are required. Specifying this implies "at least one of" the specified type. Two upper case, lower case, punctuation (special) and digit characters may be specified this way.

pbkdf2 option.

This is the “compute password with pkcs#5 pbkdf2” option. This option takes a number argument.

This option has some usage constraints. It:

- can be disabled with –no-pbkdf2 and enabled with –use-pbkdf2.
- It is enabled by default.
- may not be preset with environment variables or configuration (rc/ini) files.

By default, passwords are created by hashing together using the pbkdf2 funcion with SHA1 as the HMAC function. The seed string is passed as the salt data and the password id glued to the tag text for each seed is passed as the password data. The data are processed 10007 times. This can be over-ridden by disabling pbkdf2 entirely or by specifying a different count.

Normally, this option should not be used. If, however, you are getting invalid password complaints by your web site, this option might be used to change the computed password. Any value other than `10007` will yield a completely different password. For the several users of a pre-release version of this program, specify `no-pbkdf2` to yield the original password result.

Please see RFC 2898 for a specification of the PBKDF2 (Password-Based Key Derivation Function version 2) function.

specials option.

This is the “set alternate special characters” option. This option takes a string argument.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.

The password is a base64 encoding of a sha256 hash of various inputs. Base64 encoding uses ’`+`’ and ’/’ characters and when this program is required to have at least one special character in the result, it will replace one character with a hyphen (`-`).

However, some web sites require special characters and constrain them to be in a particular set that does not include these three: ‘`/+-`’. Therefore, specify this option with

exactly three characters in the string argument. They will be used to replace the three characters above. The first two may be the same, but the third *must* be different from the first two. This option is accepted, but serves no purpose if `no-special` has been specified in the `--cclass` option.

select-chars option.

This is the "select only certain bytes of a password" option. This option takes a string argument. There exists at least one web site that asks you to enter just some of the password characters, like the second, tenth and sixteenth. With long, memorable resistant passwords, this can be difficult to do. For such web sites, provide this option with the string "2,10,16" as the option argument. The characters to select are space or comma separated values. The result cannot be longer than the original password.

2.4 formatting-options options

Options for management and output format..

no-header option (-H).

This is the "omit printing the password headers" option.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.

By default, the output includes column headers. Suppressing it is intended for automated logins. The login name hint will not be provided, but the `tag` is printed.

confirm option (-C).

This is the "print confirmation question answer" option. This option takes a string argument.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.

Some web sites use "confirmation questions" that, supposedly, only you know the answer to. Unfortunately, these are often times questions that can be researched by others or they can be questions that you have forgotten the answers to or may have multiple answers for. The net result is that you are locked out. This option makes it easy to get consistent answers to these questions and have these answers be different for every web site, just like your password.

Providing this option will cause the argument to be merged into the hash source (changing the resulting password). Exactly 12 letters will be extracted from the hash and converted to lower case. The string argument to this option should be the last word or two from the question, yielding an easy-to-remember way of obtaining a consistent answer to these inscrutable questions.

You will need to update your confirmation question answers when you update your password seed.

status option (-S).

This is the "show status of a password id" option.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.

Show all the modified password attributes for a password id. If there are no special attributes, the word "default" is printed. No password id is invalid, but some may have all default values, consequently there is no special information kept about it.

Command line options will affect the output, but will not be stored for future use.

delete option (-d).

This is the "remove a password entry" option.

This option has some usage constraints. It:

- may not be preset with environment variables or configuration (rc/ini) files.

This will print out the attributes associated with a particular password id and remove them from the configuration file.

2.5 presetting/configuring gnu-pw-mgr

Any option that is not marked as *not presettable* may be preset by loading values from configuration ("rc" or "ini") files.

Configuration files may be in a wide variety of formats. The basic format is an option name followed by a value (argument) on the same line. Values may be separated from the option name with a colon, equal sign or simply white space. Values may be continued across multiple lines by escaping the newline with a backslash.

Multiple programs may also share the same initialization file. Common options are collected at the top, followed by program specific segments. The segments are separated by lines like:

```
[GNU-PW-MGR]
```

or by

```
<?program gnu-pw-mgr>
```

Do not mix these styles within one configuration file.

Compound values and carefully constructed string values may also be specified using XML syntax:

```
<option-name>
   <sub-opt>...&lt;...&gt;...</sub-opt>
</option-name>
```

yielding an `option-name.sub-opt` string value of

```
"...<...>..."
```

`AutoOpts` does not track suboptions. You simply note that it is a hierarchicly valued option. `AutoOpts` does provide a means for searching the associated name/value pair list (see: optionFindValue).

The command line options relating to configuration and/or usage help are:

version (-v)

Print the program version to standard out, optionally with licensing information, then exit 0. The optional argument specifies how much licensing detail to provide. The default is to print just the version. The licensing infomation may be selected with an option argument. Only the first letter of the argument is examined:

'`version`' Only print the version. This is the default.

'`copyright`'
: Name the copyright usage licensing terms.

'`verbose`' Print the full copyright usage licensing terms.

2.6 gnu-pw-mgr exit status

One of the following exit values will be returned:

'`0 (EXIT_SUCCESS)`'
: Successful program execution.

'`1 (EXIT_INVALID)`'
: the option/argument configuration is invalid

'`2 (EXIT_NO_MEM)`'
: insufficient memory

'`3 (EXIT_BAD_USER)`'
: no password entry for current user

'`4 (EXIT_HOMELESS)`'
: home directory could not be found

'`5 (EXIT_PERM)`'
: config file improperly protected

'`6 (EXIT_NO_CONFIG)`'
: config file missing

'`7 (EXIT_BAD_CONFIG)`'
: cannot update config file

'`8 (EXIT_NO_SEED)`'
: no seeds were specified in the config file

'`9 (EXIT_BAD_SEED)`'
: The seed value was invalid

'`10 (EXIT_BAD_SELECT_CHARS)`'
: the list of characters for the –select-chars option is bad

'`16 (EXIT_CODING_ERROR)`'
: There is a coding error that should be reported

'`66 (EX_NOINPUT)`'
: A specified configuration file could not be loaded.

‘70 (EX_SOFTWARE)’
: libopts had an internal operational error. Please report it to autogen-users@lists.sourceforge.net. Thank you.

2.7 gnu-pw-mgr Examples

Before running the program to print a password, you must first initialize its database with at least one seed.

```
gnu-pw-mgr --tag "first-seed-tag" --text \
"This is only a 'test'.  Were it *real*,
you _would_ likely know?"
```

These two strings along with a password id are used to create a ‘sha256’ hash code password. So, now you are able to print a password.

```
gnu-pw-mgr --login-id "user-name" --length 32 \\
    --cclass=upper,lower,digit,special \\
    my example.com
```

In this example, the password id is the string "my example.com". The space character is inserted between the command line operands. The options are associated with this id via another ‘sha256’ sum of just the id. The "user-name" would typically be either your actual user name for the site, or something that could readily remind you of the login id. If omitted, just do not forget it. The length specifies the maximum length allowed for a password on the site. You will get a password of that length. The --cclass defines the allowed and/or required character class(es) for the passwords for the site.

With the above seed and invocation, you will see printed out exactly this:

```
seed-tag     login id hint: user-name   pw:
first-seed-tag iQiF1g5aLQ0JqFIUbR/svpTS+F/PCeoy
```

Henceforth typing just ‘gnu-pw-mgr my example.com’ will always yield this output. The options above are now associated with the password id via a hash code. The gnu-pw-mgr database (either ~/.local/gnupwmgr.cfg or ~/.gnupwmgrrc, but the former preferred) will now be this (hash code abbreviated):

```
<seed>
  <tag>first-seed-tag</tag>
  <text>This is only a 'test'.  Were it *real*,
you _would_ likely know?</text>
</seed>
<program per_pw_id>
<pwtag id="*HASH*">
  cclass = =alpha + upper + lower + digit + special
</pwtag>
<pwtag id="*HASH*">length = 32</pwtag>
<pwtag id="*HASH*">login-id = 'user-name'</pwtag>
```

2.8 gnu-pw-mgr Authors

Written by Bruce Korb.

2.9 gnu-pw-mgr Notes

This program specifies its own configuration file and disallows the use of any other. This file should be modified by running this program and not by editing it. The `--seed` and `--load-opts` options cannot be specified on the command line and the `--seed` option is only recognized in a configuration file.

Password ids should have some always-used prefix and/or suffix glued onto a domain name or some trivial permutation of the domain name. If you forget your password id, then the associated password is irretrievably lost. The prefix and suffix should be easily remembered. If you do not add a prefix or suffix and the configuration file becomes compromised, then you have lost the keys to all your passwords because it becomes trivial to guess password ids.

For example, always prepending '`_mine_`' to a domain would yield '`_mine_example.com`' for your password id at '`example.com`'. Password ids are not stored anywhere.

3 Invoking sort-pw-cfg

This program will sort (and merge) the per-domain password attributes. If there are duplicate entries, the last entry seen will survive. The result will be sorted by password id hash code and option name.

The "header" portion of the config file (the seeds and the <program...> marker) are taken from the first config file listed and ignored in the remaining files.

Example usage can be seen in the example section below.

This chapter was generated by **AutoGen**, using the `agtexi-cmd` template and the option descriptions for the `sort-pw-cfg` program.

3.1 sort-pw-cfg help/usage (`--help`)

This is the automatically generated usage text for sort-pw-cfg.

The text printed is the same whether selected with the `help` option (`--help`) or the `more-help` option (`--more-help`). `more-help` will print the usage text by passing it through a pager program. `more-help` is disabled on platforms without a working `fork(2)` function. The `PAGER` environment variable is used to select the program, defaulting to `more`. Both will exit with a status code of 0.

```
sort-pw-cfg - sort/merge password config file - Ver. 1.6
Usage:  sort-pw-cfg [ -<flag> [<val>] | --<name>[{=| }<val>] ]... \
                [ <cfg-file> ...]
  Flg Arg Option-Name    Description
   -o Fil output         send result to this file
   -d no  default        select default config file for first input file
   -v opt version        output version information and exit
   -h no  help           display extended usage information and exit
   -M no  more-help      extended usage information passed thru pager

Options are specified by doubled hyphens and their name or by a single
hyphen and the flag character.
```

```
If no arguments are provided, input arguments are read from stdin,
one per line; blank and '#'-prefixed lines are comments.
'stdin' may not be a terminal (tty).
This program will sort (and merge) the per-domain password attributes.  If
there are duplicate entries, the last entry seen will survive.  The result
will be sorted by password id hash code and option name.

The "header" portion of the config file (the seeds and the <program...>
marker) are taken from the first config file listed and ignored in the
remaining files.
```

3.2 output option (-o)

This is the "send result to this file" option. This option takes a file argument. Normally, the first named file is rewritten with the entries ordered by the hash code with duplicates removed. Use this option to redirect output to the named file.

3.3 default option (-d)

This is the "select default config file for first input file" option. Instead of starting with the first operand (or first file in the standard input file list), start processing password id's with the contents of the standard configuration file. The additional files will override or augment this file.

3.4 sort-pw-cfg exit status

One of the following exit values will be returned:

'0 (EXIT_SUCCESS)'
: Successful program execution.

'1 (EXIT_INVALID)'
: the option/argument configuration is invalid

'2 (EXIT_NO_MEM)'
: insufficient memory

'3 (EXIT_BAD_USER)'
: no password entry for current user

'4 (EXIT_HOMELESS)'
: home directory could not be found

'5 (EXIT_PERM)'
: config file improperly protected

'6 (EXIT_NO_CONFIG)'
: config file missing

'7 (EXIT_BAD_CONFIG)'
: cannot update config file

‘8 (EXIT_NO_SEED)’
: no seeds were specified in the config file

‘9 (EXIT_BAD_SEED)’
: The seed value was invalid

‘10 (EXIT_BAD_SELECT_CHARS)’
: the list of characters for the –select-chars option is bad

‘16 (EXIT_CODING_ERROR)’
: There is a coding error that should be reported

3.5 sort-pw-cfg Authors

Written by Bruce Korb.

4 Warnings

Things to consider.

4.1 Cleanups that need doing

It is entirely possible that there are some web sites out there with password requirements that this program cannot (at present) necessarily comply with. There are some possible workarounds:

1. Request the addition of a new character classification flag. If the issue can be satisfied by fiddling the emitted password a little bit (with the `--pbkdf2` option), that would be faster and easier than implementing a new option.
2. Likely, something else, surely. Please send a bug report (preferably a patch :) so the issue can be fixed.

4.2 Shell history

It is imprudent to leave your invocations in your shell history. These are often stored away in your home directory, unless you do something to keep it out of your history. It should not be the end of the world because it is troublesome to also obtain the configuration file. Still, it is not wise to tempt fate.

If you use BASH for your shell,

```
HISTCONTROL=ignorespace
HISTIGNORE=gnu-pw-mgr *:*/gnu-pw-mgr *
unset HISTFILE
```

are your friends. Press the space bar before the command name, or specify that anything that looks like a “gnu-pw-mgr” command should be ignored or eliminate history entirely.

Also, if you put your password id’s on the command line, they become part of the process history and can be found. If that is a conceivable problem, then you may prefer to not put it on the command line and then type it in in response to a prompt. Your password id will not be echoed back as you type it.

4.3 Best gnu-pw-mgr practices

Try out several password id transforms before changing all your passwords on all your sites. You may decide it is too hard or too easy and want to change it. However, once you have gone to the trouble of changing the passwords on a lot of sites, you won't be especially eager to do it again. So, play with it on one site you use a lot, change the password a lot as you change the transform and then make a good decision.

Once you need to or are required to change a password, add another seed to your configuration file. Henceforth, you will be presented two passwords. If you have updated your password, use the more recent one. (That is what See Section 2.2 [gnu-pw-mgr seed-options], page 6.) Otherwise, login with the old password and update to the new one. Eventually, you should be able to retire the old seed.

When choosing your password id transform, use things that you can easily remember. Especially if some nonsense thing can be easily remembered. Separate the components with unusual things like multiple punctuation characters. Do odd things with the top level domain. cApitaliZe strangely. Use a slightly different transform for financial institutions. If someone gets ahold of your seed file, you want to hope that a dictionary attack will not be readily successful.

But lastly and most important: be sure you can remember your transform(s). If you forget, your password is gone. So choose what you can remember and be consistent.

4.4 Password reset arrangements

Some sites will allow you to set up password resets using alternate channels (i.e. not your primary email address). Take advantage of this whenever possible. If someone gains access to your email, you don't want them to reset all your passwords, intercept the restore access emails and, thus, gain access to all your password protected accounts.

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Version 1.3, 3 November 2008

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