

Htlc 0.0.2

Hypertext Link Checker and Corrector
Updated for Htlc version 0.0.2, 17.08.2024

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This file documents the utility Htlc for checking and correcting hypertext links

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1 Overview

Htlc checks and corrects links in HTML files that are part of file sets downloaded by Wget.

GNU Wget ([\[wget\]](#), [page 7](#)) is a tool for downloading sets of files from the internet. A set is build recursively by following links in already downloaded files that contain HTML markup. The links are converted so that they point to the local copies of the referenced files.

Filenames can contain characters that are not allowed in URLs. Therefore in online mode,

- the browser takes the link from the HTML file and encodes it as a valid URL and
- the server decodes the URL so that the filename can be looked up in the file system.

Wget must behave like a browser when it downloads the link target but must change the link in the local copy of the HTML file so that it can be resolved without a browser or a server. This means that in the local copy of the HTML file the link is changed to the file name as it is used in the file system.

It depends on many factors whether Wget can resolve and convert a link correctly. In particular, HTML files which were composed by humans sometimes contain errors that prevent Wget from working correctly. When the links are resolved online these errors can go unnoticed due to browser heuristics. Some examples from practical experience are:

- A link contains characters that cannot be decoded in the codepage of the HTML file (maybe the link was copied from the filesystem browser)
- The filename in a link is already percent-encoded but the filename in the filesystem is not (maybe the link was copied from the URL field in the browser)
- Special characters in a link are encoded as HTML entities (how can this happen?)

As a result of such errors Wget does not download the link target or does not convert the link in the local copy of the HTML file correctly. It then points to a non-existing file or to the file on the internet.

Htlc helps to resolve these problems. It is meant to be used interactively and provides the following services:

- Check whether the link targets in the downloaded HTML files exist in the file system.
- Use heuristic rules to find files whose names differ from the names given in the links.
- Change the links in the downloaded HTML files so that they work correctly.
- Produce a list of cleaned up URLs for files that were not downloaded.

2 Usage

Htlc implicitly assumes that the downloaded files are stored in a directory structure that matches the structure of the URLs used for download. For example, if a file was downloaded from the URL

```
http://abc.de/fg/hi.jkl
```

then the local copy must be stored at

```
download_directory/abc.de/fg/hi.jkl
```

Therefore when the files are downloaded with Wget options like `-nd` (no directories), `-nH` (no host directories) and others *must not* be used. See directory options in *GNU Wget Manual*, Section 2.6.

Htlc also assumes that Wget already converted links to files that were downloaded (option `-k`, Section 2.11 on recursive retrieval options).

2.1 Invocation

Htlc is executed with the command

```
htlc [OPTIONS].
```

For multi-valued options the values must be repeated separately for each value.

The following options are available:

`-d dir`

`--base_directory dir`

(required) The directory where Wget downloaded the files. This option must be given exactly once.

`-s server`

`--server_names server`

(required) The names of the servers from which Wget downloaded the files. This option must be given at least once.

Only links to targets on the given servers are checked by `htlc`.

For example, if Wget downloaded files recursively starting with the URL

```
http://abc.de/index.html
```

and host spanning was deactivated then all files were downloaded in the directory

```
download_directory/abc.de
```

Therefore `htlc` must be called with the option `'-s abc.de'`.

If Wget was called with the `-H` option (span hosts) then the base directory might contain several subdirectories with server names. For a complete link check each server must be given in the command invocation.

`-o file`

`--output file`

(optional) Write output to this file instead of `stdout`.

`-m file`

`--missing_links file`

(optional) Write URLs for missing link targets to the given file.

The URLs are generated from the links in the downloaded HTML files and cleaned up using heuristic rules.

This file can be used to attempt a second download with `'wget -x -i file'`.

Sometimes servers send back an error page if a file cannot be found. Therefore it is recommended to download to another directory and only move those file to the main directory that have useful content.

If missing link targets could be downloaded `htlc` should be run once again. With the option `-f` the links to these targets will then be changed so that they point to the downloaded files.

`-c string`

`--character_mapping string`

(optional) Replace characters in links.

This option must be repeated for every sequence of characters that shall be substituted by another sequence of characters. The value of *string* has the form '*src_chars/dst_chars*' where *src_chars* is a sequence of characters that will be substituted by *dst_chars*.

This option is useful for links with characters that cannot be decoded in the codepage of the HTML file.

`-f keyword`

`--fix_links keyword`

(optional) Fix links in the local copies of HTML files.

The following changes are made for links whose targets exists in the file system:

1. URL encodings are removed so that the link contains the path in the file system verbatim.
2. Absolute links are replaced by relative links.

Only links with the given keyword are fixed. Possible keywords are:

- [LINK NEEDS CORRECTION]
- [SIMILAR TARGET]: If there is more than one file with the same name as in the link the link is changed to the first file that is found.

Before the changes are made a backup of the HTML file is created with the same name and `.bak` appended. In case this name is already used an extension `.n` is append with *n* being a number.

Changing absolute links to relative links can be necessary in the following cases:

- For whatever reasons, Wget downloaded the target but did not change the link.
- Missing targets were downloaded separately (see option `-m`) and the links must be corrected.

`-e`

`--errors_only`

(optional) Report only errors.

`-h`

`--help` (optional) Print a help message and exit.

2.2 Output

`htlc` writes the check results to `stdout` or to an explicitly given file (see option `-o`). Each file in the base directory (see option `-d`) whose name ends with `htm` or `html` is checked. The pattern matching is case insensitive.

For each check a separate line is written to the output file that begins with a keyword of the form `[...]`. The keyword indicates the result of the check. Further data pertaining to the check is written after the keyword.

The following keywords exist:

[CHECKING FILE]

Data: The full path to the HTML file that is checked.

[CODEC]

Data: The codepage that is used to decode the file. It is determined from the content type meta header and the BOM. If they are not available, a default codepage is used.

[TARGET DOWNLOADED]

Result: The link target was downloaded. The link contains the local file name and path verbatim.

Data: The link in the HTML file.

[LINK NEEDS CORRECTION]

Result: The link target was downloaded. The link does not contain the local file name and path verbatim but the file could be found with the heuristic rules.

Data: The link in the HTML file and the local file name and path.

[SIMILAR TARGET]

Result: The link target was not downloaded but a file with the same name exists in a different directory.

Data: The link in the HTML file and the local file name and path.

[TARGET NOT DOWNLOADED]

Result: The link target was not downloaded and the file could not be found with the heuristic rules.

Data: The link in the HTML file.

[LINK IGNORED]

Result: The link was not checked because it is not a file link. For example, links starting with 'mailto:' or 'javascript:' are not checked.

Data: The link in the HTML file.

[FIXING FILE]

Result: The option `-f` was set and the checked file is fixed.

Data: The full path to the HTML file that is fixed.

[PARAMETER ERROR]

Result: A command line parameter value is not valid. For example, the string for character mapping (see option `-c`).

Data: The invalid parameter value.

[INTERNAL ERROR]

Result: An error in the program's execution occurred. For example, a file read or write error or a programming error.

Data: A description of the error.

2.3 Recommendations

It is recommended to use `Htlc` interactively as follows:

1. Run `htlc` with options `-d`, `-s` and `-o`. This gives an overview of the checked HTML files, the links in these files and the errors.
2. Check the syntax of those links whose targets were not downloaded. For each suspicious character, write down a mapping string to replace this character with option `-c`.

3. Run `htlc` with the additional options `-c` and `-m`. This makes sense even if no suspicious characters were found in the links and therefore `-c` cannot be used. The URLs generated by option `-m` are cleaned up and may lead to additional files that can be downloaded.
4. Use `wget -x -i` with the URL list generated by option `-m`. Move the downloaded files to the appropriate places.
5. Run `htlc` with options `-d`, `-s`, `-o` and `-c`. This shows whether the additional files improve the links.
6. Run `htlc` with options `-d`, `-s`, `-o`, `-c` and `-f`. This corrects the links whose targets can be found in the file system.
7. Run `htlc` with options `-d`, `-s` and `-o` to see what errors remain after the link correction.

Except in the first invocation, the option `-e` should be used to show only errors.

3 Improvements

Suggestions for future releases of Htlc:

- If a missing target with HTML content was downloaded separately then it can be used as the starting point of a second recursive download.
- Currently Htlc does not change the file names and paths but only the links. It would be more secure to change the file names and paths so that they contain only characters 'a-z A-Z 0-9 _ .'. This influences not only links to a single file but also to all other files whose path was changed.
- If several consecutive space characters are encoded as HTML entities they are decoded as a single space character.

4 References

[wget] GNU Wget: <https://www.gnu.org/software/wget>

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Version 1.3, 3 November 2008

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