

# Composer CMS: Content Make System

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# Chapter 1

## Composer CMS



“Creating Made Simple.”

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Composer CMS v3.1	License: GPL
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– Formats: webpage / html / pdf / epub / revealjs.html / docx

### 1.1 Overview

**Composer is a simple but powerful CMS based on Pandoc, Bootstrap and GNU Make.** It is a document and website build system that processes directories or individual files in Markdown format.

Traditionally, CMS stands for Content Management System. Composer is designed to be a Content **Make** System. Written content is vastly easier to manage as plain text, which can be crafted with simple editors and tracked with revision control. However, professional documentation, publications, and websites require formatting that is dynamic and feature-rich.

Pandoc is an extremely powerful document conversion tool, and is a widely used standard for processing Markdown into other formats. While it has reasonable defaults, there are a large number of options, and additional tools are required for some formats and features.

Composer consolidates all the necessary components, simplifies the options, and prettifies the output formats, all in one place. It also serves as a build system, so that large repositories can be managed as documentation archives or published as Static Websites.

```
#####
h >> Composer CMS v3.0 :: ../composer
#####
h MAKEFILE_LIST      [../composer/Makefile]
h COMPOSER_INCLUDES  [../composer/.composer.mk]
h CURDIR             [../composer]
h MAKECMDGOALS        [all] (all)
h MAKELEVEL          [1]
#####
l >> Creating         | ../composer :: Composer-v3.0_Manual.pdf
l >> Creating         | ../composer :: README.html
l >> Creating         | ../composer :: README.pdf
l >> Creating         | ../composer :: README.epub
l >> Creating         | ../composer :: README.revealjs.html
l >> Creating         | ../composer :: README.docx
```

### 1.2 Quick Start

Use make help to get started:

```
make [-f .../ Makefile] [ variables ] <filename>.<extension>
```

```
make [-f .../ Makefile] [variables] <target>
```

Create documents from source Markdown files (see Formatting Variables):

```
make README.html
make Composer-v3.1.Manual.html c_list="README.md LICENSE.md"
```

Save a persistent configuration (see Recommended Workflow and Configuration Settings):

```
make template >.composer.mk
$EDITOR .composer.mk
    override COMPOSER_TARGETS := .targets Composer-v3.1.Manual.html
    override Composer-v3.1.Manual.html := README.md LICENSE.md
make clean
make all
```

Recursively install and build an entire directory tree (see Recommended Workflow):

```
cd .../ documents
mv .../ composer .Composer
make -f .Composer/Makefile install-all
make all-all
```

See help-all for full details and additional targets.

## 1.3 Principles

The guiding principles of Composer:

- All source files in readable plain text
- Professional output, suitable for publication
- Minimal dependencies, and entirely command-line driven
- Separate content and formatting; writing and publishing are independent
- Inheritance and dependencies; global, tree, directory and file overrides
- Fast; both to initiate commands and for processing to complete

Direct support for key document types (see Document Formatting):

- Static Websites
- HTML
- PDF
- EPUB
- Reveal.js Presentations
- Microsoft Word & PowerPoint

## 1.4 Requirements

Composer has almost no external dependencies. All needed components are integrated directly into the repository, including Pandoc. Composer does require a minimal command-line environment based on GNU tools, particularly GNU Make, which is standard for all GNU/Linux systems. The Windows Subsystem for Linux for Windows and MacPorts for macOS both provide suitable environments.

The one large external requirement is TeX Live, and it can be installed using the package managers of each of the above systems. It is only necessary for creating PDF files.

Below are the versions of the components in the repository, and the tested versions of external tools for this iteration of Composer. Use check to validate your system.



Repository	Commit	License
Pandoc	2.18	GPL
YQ	v4.24.2	MIT
Bootstrap	v5.1.3	MIT
Bootlint	v1.1.0	MIT
Bootswatch	v5.1.3	MIT
Font-Awesome	6.1.2	MIT / CC-BY
Water.css	d950cbc9f8607521587f	MIT
Markdown Viewer	3bd40d84c071379440b3	MIT
Markdown Themes	6b3643d0f703727d8472	None
Reveal.js	4.3.1	MIT
Google Firebase	v12.4.7	MIT

Project	Composer Version
GNU Bash	5.1.16
– GNU Coreutils	8.32
– GNU Findutils	4.9.0
– GNU Sed	4.8
GNU Make	4.3
– Pandoc	2.18
– YQ	4.24.2
– TeX Live PDF	2021 3.141592653-2.6-1.40.22
Supporting Tools:	»
– Git SCM	2.37.4
– GNU Diffutils	3.8
– Rsync	3.2.4

Markdown Viewer is included both for its CSS stylesheets, and for real-time rendering of Markdown files as they are being written. To install, follow the instructions in the README.md.

Google Firebase is only necessary for uploading via the export-all and export-force targets. Binaries are included in the repository, but do not seem to work with all versions of their respective operating systems. If the included binary fails, use `__update—firebase—tools` to build a local version (see `__update-*`).

The versions of the integrated repositories can be changed, if desired (see Repository Versions).

---



## Chapter 2

# Composer Operation

### 2.1 Recommended Workflow

#### 2.1.1 Directory Tree

The ideal workflow is to put Composer in a top-level `.Composer` for each directory tree you want to manage, creating a structure similar to this:

```
.../.Composer
.../
.../tld/
.../tld/sub/
```

To save on disk space, using a central Composer install for multiple directory trees, the `init` target can be used to create a linked `.Composer` directory:

```
make -f ../Makefile init
```

The directory tree can then be converted to a Composer documentation archive (Quick Start example):

```
make -f .Composer/Makefile install-all
make all-all
```

#### 2.1.2 Customization

If specific settings need to be used, either globally or per-directory, `.composer.mk` and `.composer.yml` files can be created (see Configuration Settings, Quick Start example):

```
make template >.composer.mk      && $EDITOR .composer.mk
make template.yml >.composer.yml  && $EDITOR .composer.yml
```

Custom targets can also be defined, using standard GNU Make syntax (see Custom Targets).

#### 2.1.3 Important Notes

GNU Make does not support file and directory names with spaces in them, and neither does Composer. Documentation archives which have such files or directories will produce unexpected results.

It is fully supported for input files to be symbolic links to files that reside outside the documentation archive:

```
cd ../tld
ln -rs ../README.md ./
make README.html
```

Similarly to source code, GNU Make is meant to only run one instance within the directory at a time, and Composer shares this requirement. It should be run as a single user, to avoid duplication and conflicts. Concurrent runs will produce unexpected results. It is highly recommended to set MAKEJOBS to a value greater than the default, to speed up processing.

It is best practice to install-force after every Composer upgrade, in case there are any changes to the Makefile template (see Templates). Everything in Composer sources from the main Makefile, so that is the only file which requires review to see what changes have been made between versions.

### 2.1.4 Next Steps

The archive is ready, and each directory is both a part of the collective and its own individual instance. Targets can be run per-file, per-directory, or recursively through an entire directory tree. The most commonly used targets are in Primary Targets.

**Welcome to Composer. *Happy Making!***

## 2.2 Document Formatting

```
#WORKING:DOCS#####  
.../artifacts/pandoc/template.*  
.../artifacts/pandoc/reference.*  
.../artifacts/composer/composer-site.css  
.../artifacts/composer/composer-html.css
```

As outlined in Overview and Principles, a primary goal of Composer is to produce beautiful and professional output. Pandoc does reasonably well at this, and yet its primary focus is document conversion, not document formatting. Composer fills this gap by specifically tuning a select list of the most commonly used document formats.

The input Markdown format used by Composer is the Pandoc default. However, the Pandoc Extensions list has been modified slightly. See that section and the Pandoc Markdown documentation for the exact list and details for each.

Further options for each document type are in Formatting Variables. All improvements not exposed as variables will apply to all documents created with a given instance of Composer.

Note that all the files referenced below are embedded in the ‘Embedded Files’ section of the Makefile. They are exported by the `__release` target (using `__setup`), and will be overwritten whenever it is run.

### 2.2.1 Static Websites

Bootstrap is a leading web development framework, capable of building static webpages that behave dynamically. Static sites are very easy and inexpensive to host, and are extremely responsive compared to truly dynamic webpages.

Composer uses this framework to transform an archive of simple text files into a modern website, with the appearance and behavior of dynamically indexed pages.

```
#WORKING:DOCS#####  
.../artifacts/bootstrap/bootstrap.js  
.../artifacts/bootstrap/bootstrap.css  
.../artifacts/composer/composer.site.css  
.../artifacts/composer/composer.site.overlay.light.css  
.../artifacts/composer/composer.site.overlay.dark.css  
.../artifacts/images/logo.img  
.../artifacts/images/icon.img
```

Bootlint Bootswatch

```
.../bootswatch/docs/index.html
```

- Examples: Example Website / README.site.html

### 2.2.2 HTML

In addition to being a helpful real-time rendering tool, Markdown Viewer includes several CSS stylesheets that are much more visually appealing than the Pandoc default, and which behave like normal webpages, so Composer uses them for all HTML-based document types, including EPUB.

Information on installing Markdown Viewer for use as a Markdown rendering tool is in Requirements.

- Example: README.html

### 2.2.3 PDF

The default formatting for PDF is geared towards academic papers and the typesetting of printed books, instead of documents that are intended to be purely digital.

Internally, Pandoc first converts to LaTeX, and then uses TeX Live to convert into the final PDF. Composer inserts customized LaTeX to modify the final output:

```
.../artifacts/composer/composer-pdf.header
```

```
#WORK # .../artifacts/composer/composer.pdf.latex
```

- Example: README.pdf

### 2.2.4 EPUB

The EPUB format is essentially packaged HTML, so Composer uses the same Markdown Viewer CSS stylesheets for it.

- Example: README.epub

### 2.2.5 Reveal.js Presentations

The CSS for Reveal.js presentations has been modified to create a more traditional and readable end result. The customized version is at:

```
.../artifacts/composer/composer-revealjs.css
```

```
#WORK # .../artifacts/composer/composer.revealjs.css
```

```
#WORK # rework this
```

It links in a default theme from the `.../reveal.js/dist/theme` directory. Edit the location in the file, or use `c_css` to select a different theme.

It is set up so that a logo can be placed in the upper right hand corner on each slide, for presentations that need to be branded. Simply copy an image file to the logo location:

```
.../artifacts/images/logo.img
```

To have different logos for different directories (using Recommended Workflow, Configuration Settings and Precedence Rules):

```
#WORK # no longer the best way to do this... cd .../presentations cp .../logo.img ./ ln -rs
.../.Composer/artifacts/composer/composer.revealjs.css ./composer-revealjs.css echo 'override c_type :=
revealjs' »./composer.mk make all
```

- Example: README.revealjs.html

## 2.2.6 Microsoft Word & PowerPoint

The internal Pandoc templates for these are exported by Composer, so they are available for customization:

```
.../artifacts/pandoc/reference.docx
.../artifacts/pandoc/reference.pptx
```

They are not currently modified by Composer.

– Example: README.docx

## 2.2.7 Plain Text

This output format is still parsable by Pandoc as valid Markdown, but is formatted to read as pure plain text that is only 80 columns wide. There are cases where this conversion is desirable, such as technical documentation, where it is easier to write and format as Pandoc Markdown but the output needs to be in a universally accepted text layout and presentation.

Composer currently does not modify this format, other than using the `--columns=80` and `--wrap=auto` options to Pandoc.

## 2.2.8 Pandoc Markdown

Output Markdown that is specific to Pandoc. This is for linting or creating standardized versions of source files for shared archives.

Due to the expressed purposes of this format, Composer will never modify it.

## 2.3 Configuration Settings

```
#WORKING:DOCS#####
```

### 2.3.1 GNU Make (.composer.mk)

### 2.3.2 Pandoc & Bootstrap (.composer.yml)

Composer uses .composer.mk files for persistent settings and definition of Custom Targets. By default, they are chained together across their Makefile tree (see `COMPOSER_INCLUDE` in Control Variables). A .composer.mk in the main Composer directory will be global to all directories. The targets and settings in the most local file override all others (see Precedence Rules).

The easiest way to create new .composer.mk and .composer.yml files is with the `template` and `template.yml` targets (Quick Start example):

```
make template >.composer.mk      && $EDITOR .composer.mk
make template.yml >.composer.yml  && $EDITOR .composer.yml
```

All variable definitions must be in the override `[variable] := [value]` format from the `template` target. Doing otherwise will result in unexpected behavior, and is not supported. The regular expression that is used to detect them:

```
override \[[:space:]]+(\^[[:space:]]+)[[:space:]]+[[:]]=[
```

Variables can also be specified per-target, using GNU Make syntax:

```
README.%.override c_toc := 0
README.revealjs.html.override c_toc :=
```

In this case, there are multiple definitions that could apply to `README.revealjs.html`, due to the `%` wildcard. Since the most specific target match is used, the final value for `c_toc` would be empty.

Example configuration files:

```
.../.composer.mk
.../artifacts/.composer.yml
.../artifacts/README.site.yml
.../README.site.html.yml
```

## 2.4 Precedence Rules

All processing in Composer is done in global-to-local order, so that the most local file or value always takes precedence.

### 2.4.1 Configuration Files

Both `.composer.mk` and `.composer.yml` files follow the model illustrated in `COMPOSER_INCLUDE` under Control Variables. This means that the values in the most local file override all others.

```
#WORKING:DOCS#####
```

All values in `.composer.mk` take precedence over everything else, including environment variables.

### 2.4.2 Header & CSS Files

```
#WORK # the same for all...
```

```
.../artifacts/composer/composer-pdf.header
.../.composer-pdf.header
./README.pdf.header
```

```
#WORK # the same for all...
```

```
.../artifacts/composer/composer-html.css
.../.composer-html.css
./README.html.css
```

```
#WORK # the c_css layering...
```

1. `c_site` » Bootstrap
2. `c_css` #WORK # comment 1. `COMPOSER_DIR/artifacts/composer/composer-c_type.css`
3. `COMPOSER_ART/composer/composer-c_type.css`
4. `COMPOSER_INCLUDE` » `.../.composer-c_type.css`
5. `CURDIR/c_base.<extension>.css`
6. `c_site` » `.composer.yml :: [site-config].[css_overlay]`

The first four are core to Composer, and are always included. `COMPOSER_INCLUDE` and `CURDIR` files are optional, and only used if they exist.

### 2.4.3 Variables & Aliases

Variable aliases, such as `COMPOSER_DEBUGIT/c_debug/V` are prioritized in the order shown, with `COMPOSER_*` taking precedence over `c_*`, over the short alias.

Full `COMPOSER_*` variable names should always be used in `.composer.mk` files, to avoid being overwritten by recursive environment persistence.

### 2.4.4 Pandoc Options

```
#WORK # does not seem to be documented anywhere... test it, with examples here, regardless... # seems to be:
yaml_metadata, -defaults, -metadata*, etc.
```

## 2.5 Specifying Dependencies

If there are files or directories that have dependencies on other files or directories being processed first, this can be done simply using GNU Make syntax in `.composer.mk`:

```
LICENSE.html: README.html
subdirs-all-artifacts: subdirs-all-pandoc
```

This would require `README.html` to be completed before `LICENSE.html`, and for `pandoc` to be processed before `artifacts`. Directories need to be specified with the `subdirs-all-*` syntax in order to avoid conflicts with target names (see Custom Targets).

Chaining of dependencies can be as complex and layered as GNU Make will support. Note that if a file or directory is set to depend on a target, that target will be run whenever the file or directory is called.

## 2.6 Custom Targets

If needed, custom targets can be defined inside a `.composer.mk` file (see Configuration Settings), using standard GNU Make syntax. Naming them as `*-export`, `*-clean` or `*-all` will include them in runs of the respective targets. Targets with any other names will need to be run manually, or included in `COMPOSER_TARGETS`.

`#WORK # ...or, via Specifying Dependencies`

There are a few limitations when naming custom targets. Targets starting with the regular expression `[_.]` are hidden, and are skipped by auto-detection. Additionally, there is a list of reserved targets in `Reserved`, along with a list of reserved variables.

Any included `.composer.mk` files are sourced early in the main Composer Makefile, so matching targets and most variables will be overridden. In the case of conflicting targets, GNU Make will produce warning messages. Variables will have their values changed silently. Changing the values of internal Composer variables is not recommended or supported.

A final note is that `*-export`, `*-clean` and `*-all` targets are stripped from `COMPOSER_TARGETS`. In cases where this results in an empty `COMPOSER_TARGETS`, there will be a message and no actions will be taken.

## 2.7 Repository Versions

There are a few internal variables used by `__update` to select the repository and binary versions of integrated components (see Requirements). These are exposed for configuration, but only within `.composer.mk`:

- `PANDOC_VER` (must be a binary version number)
- `PANDOC_CMT` (defaults to `PANDOC_VER`)
- `YQ_VER` (must be a binary version number)
- `YQ_CMT` (defaults to `YQ_VER`)
- `BOOTSTRAP_CMT`
- `BOOTLINT_CMT`
- `BOOTSWATCH_CMT`
- `FONTAWES_CMT`
- `WATERCSS_CMT`
- `MDVIEWER_CMT`
- `MDTHEMES_CMT`
- `REVEALJS_CMT`
- `FIREBASE_VER` (must be a binary version number)
- `FIREBASE_CMT` (defaults to `FIREBASE_VER`)

Binaries for Pandoc, YQ and Google Firebase are installed in their respective directories. By moving or removing them, or changing the version numbers and foregoing all relevant variations of `__update`, the system versions will be used instead. This will work as long as the commit versions match, so that supporting files are in alignment, particularly for Pandoc.



It is possible that changing the versions will introduce incompatibilities with Composer, which are usually impacts to the prettification of output files (see Document Formatting). Command-line options may also be affected.

---



## Chapter 3

# Composer Variables

### 3.1 Formatting Variables

Variable	Purpose	Value
c_site ~ S	Enable Static Websites	
c_type ~ T	Desired output format	html
c_base ~ B	Base of output file	
c_list ~ L	List of input files(s)	
c_lang ~ a	Language for document headers	en-US
c_logo ~ g	Logo image (HTML formats)	logo.img
c_icon ~ i	Icon image (HTML formats)	icon.img
c_css ~ c	Location of CSS file	theme.html-default.css
c_toc ~ t	Table of contents depth	
c_level ~ l	Chapter/slide header level	2
c_margin ~ m	Size of margins (PDF)	0.8in
c_options ~ o	Custom Pandoc options	

Values (c_type)	Format	Extension
html	HyperText Markup Language	*.html
pdf	Portable Document Format	*.pdf
epub	Electronic Publication	*.epub
revealjs	Reveal.js Presentation	*.revealjs.html
docx	Microsoft Word	*.docx
pptx	Microsoft PowerPoint	*.pptx
text	Plain Text (well-formatted)	*.txt
markdown	Markdown (for testing)	*.md.txt

- Other *c\_type* values will be passed directly to Pandoc
- Special *c\_css* values:
  - *css\_alt* = Use the alternate default stylesheet
  - 0 = Revert to the Pandoc default
- Special *c\_toc* value: 0 = List all headers, and number sections
- Special *c\_level* value: 0 = Varies by *c\_type* (see *c\_level*)
- An empty *c\_margin* value enables individual margins:
  - *c\_margin\_top* ~ *mt*
  - *c\_margin\_bottom* ~ *mb*
  - *c\_margin\_left* ~ *ml*

– `c_margin_right` ~ `mr`

### 3.1.1 `c_site`

#WORK

### 3.1.2 `c_type` / `c_base` / `c_list`

The compose target uses these variables to decide what to build and how. The output file is `[c_base].<extension>`, and is constructed from the `c_list` input files, in order. The `<extension>` is selected based on the `c_type` table above. Generally, it is not required to use the compose target directly for supported `c_type` files, since it is run automatically based on what output file `<extension>` is specified.

The automatic input file detection works by matching one of the following (Quick Start example):

<code>make README.html</code>	<code>~ README (empty [COMPOSER_EXT])</code>
<code>make README.html</code>	<code>~ README.md</code>
<code>make README.md.html</code>	<code>~ README.md</code>
<code>make Composer-v3.1.Manual.html</code>	<code>c_list="README.md LICENSE.md"</code>

Other values for `c_type`, such as `json` or `man`, for example, can be passed through to Pandoc manually:

```
make compose c_type="json" c_base="README" c_list="README.md"
make compose c_type="man" c_base="Composer-v3.1.Manual" c_list="README.md"
```

Any of the file types supported by Pandoc can be created this way. The only limitation is that the input files must be in Markdown format.

### 3.1.3 `c_lang`

- Primarily for PDF, this specifies the language that the table of contents (`c_toc`) and chapter headings (`c_level`) will use.

### 3.1.4 `c_logo`

#WORK # # revealjs

#WORK # document /.g/\_data/zactive/coding/composer/artifacts/images

.../ artifacts /images

### 3.1.5 `c_icon`

#WORK # html # revealjs

### 3.1.6 `c_css`

#WORK # document /.g/\_data/zactive/coding/composer/artifacts/theme

.../ artifacts /themes

- By default, a CSS stylesheet from Markdown Viewer is used for HTML and EPUB, and one of the Reveal.js themes is used for Reveal.js Presentations. This variable allows for selection of a different file in all cases.
- The special value `css_alt` selects the alternate default stylesheet. Using 0 reverts to the Pandoc default.
- Composer includes several different CSS files, depending on the `c_type` of the file being built. See Header & CSS Files under Precedence Rules for details on how they are layered together.

### 3.1.7 `c_toc`

- Setting this to a value of [1–6] creates a table of contents at the beginning of the document. The numerical value is how many header levels deep the table should go. A value of 6 lists all header levels.
- Using a value of 0 lists all header levels, and additionally numbers all the sections, for reference.

### 3.1.8 `c_level`

- This value has different effects, depending on the `c_type` of the output document.
- For HTML, any value enables section—divs, which wraps headings and their section content in `<section>` tags and attaches identifiers to them instead of the headings themselves. This is for CSS styling, and is generally desired.
- For PDF, there are 3 top-level division types: part, chapter, and section. This sets the top-level header to the specified type, which changes the way the document is presented. Using part divides the document into “Parts”, each starting with a stand-alone title page. With this division type, each second-level heading starts a new “Chapter”. A chapter simply starts a new section on a new page, and lower-level headings continue as running portions within it. Finally, section creates one long running document with no blank pages or section breaks (like a HTML page). To set the desired value:
  - part ~ 0
  - chapter ~ 2
  - section ~ Any other value
- For EPUB, this creates chapter breaks at the specified level, starting the section on a new page. The special 0 simply sets it to the default value of 2.
- For Reveal.js Presentations, the top-level headings can persist on the screen when moving through slides in their sections, or they can rotate out as their own individual slides. Setting to 0 enables persistent headings, and all other values use the default.
- An empty value defers to the Pandoc defaults in all cases.

### 3.1.9 `c_margin`

- The default margins for PDF are formatted for typesetting of printed books, where there is a large amount of open space around the edges and the text on each page is shifted away from where the binding would be. This is generally not what is desired in a purely digital PDF document.
- This is one value for all the margins. Setting it to an empty value exposes variables for each of the individual margins: `c_margin_top`, `c_margin_bottom`, `c_margin_left` and `c_margin_right`.

### 3.1.10 `c_options`

- In some cases, it may be desirable to add additional Pandoc options. Anything put in this variable will be passed directly to Pandoc as additional command-line arguments.

## 3.2 Control Variables

Variable	Purpose	Value
MAKEJOBS	Parallel processing threads	1 (makejobs)
COMPOSER_DOCOLOR	Enable title/color sequences	(boolean)
COMPOSER_DEBUGIT	Use verbose output	(debugit)
COMPOSER_INCLUDE	Include all: .composer.mk	1 (boolean)
COMPOSER_DEPENDS	Sub-directories first: all	(boolean)
COMPOSER_KEEPING	Log entries / cache files	100 (keeping)
COMPOSER_LOG	Timestamped command log	.composer.log
COMPOSER_EXT	Markdown file extension	.md
COMPOSER_TARGETS	See: all/clean	config/targets
COMPOSER_SUBDIRS	See: all/clean/install	config/targets
COMPOSER_EXPORTS	See also: <code>c_site/export</code>	config
COMPOSER_IGNORES	See also: <code>c_site/export</code>	config

- `MAKEJOBS` ~ `c_jobs` ~ `J`
- `COMPOSER_DOCOLOR` ~ `c_color` ~ `C`
- `COMPOSER_DEBUGIT` ~ `c_debug` ~ `V`
- *(makejobs) = empty is disabled / number of threads / 0 is no limit*
- *(debugit) = empty is disabled / any value enables / 0 is full tracing*
- *(keeping) = empty is no limit / number to keep / 0 is none*
- *(boolean) = empty is disabled / any value enables*

### 3.2.1 MAKEJOBS

`#WORK` # a small number of large directories will process faster than a large number of small ones, especially with site # windows subsystem for linux (increase memory...): `/mnt/c/Users/*/wslconfig` # `[wsl2]` # `processors=2` # `memory=2GB` # `swap=0`

- By default, Composer progresses linearly, doing one task at a time. If there are dependencies between items, this can be beneficial, since it ensures things will happen in a particular order. The downside, however, is that it is very slow.
- Composer supports GNU Make parallel execution, where multiple threads can be working through tasks independently. Experiment with lower values first. When recursing through large directories, each make that instantiates into a sub-directory has it's own jobs server, so the total number of threads running can proliferate rapidly.
- This can drastically speed up execution, processing thousands of files and directories in minutes. However, values that are too high can exhaust system resources. With great power comes great responsibility.
- A value of 0 does parallel execution with no thread limit.

### 3.2.2 COMPOSER\_DOCOLOR

- Composer uses colors to make all output and help text easier to read. The escape sequences used to accomplish this can create mixed results when reading in an output file or a `$PAGER`, or just make it harder to read for some.
- This is also used internally for targets like `__debug-file` and `template`, where plain text is required.

### 3.2.3 COMPOSER\_DEBUGIT

- Provides more explicit details about what is happening at each step. It generates a lot more output, and can be slower. It will also be hard to read unless `MAKEJOBS` is set to 1.
- Full tracing using 0 outputs complete GNU Make and GNU Bash debugging information. This is extraordinarily verbose, and it is recommended to pipe it to a file for review.
- This variable is repurposed in `__debug` to pass a list of targets to test.

### 3.2.4 COMPOSER\_INCLUDE

- On every run, Composer walks through the `MAKEFILE_LIST`, all the way back to the main Makefile, looking for `.composer.mk` files in each directory. By default, it reads all of them in order starting from the main Composer directory. When this option is disabled, only Composer and the current directory will be used.
- In the example directory tree below, normally the `.composer.mk` in `.Composer` is read first, and then `tld/sub/.composer.mk`. With this enabled, it will read all of them in order from top to bottom: `.Composer/.composer.mk`, `.composer.mk`, `tld/.composer.mk`, and finally `tld/sub/.composer.mk`.
- This is why it is best practice to have a `.Composer` directory at the top level for each documentation archive (see Recommended Workflow). Not only does it allow for strict version control of Composer per-archive, it also provides a mechanism for setting Composer Variables globally.
- This option is enabled by default, so care should be taken with variables that are generally specific to a particular directory or file, and are not meant to be applicable globally. They will be propagated down the tree, which is generally not desired except in very specific cases. Using `COMPOSER_CURDIR` to limit their scope is highly recommended, similar to `template` (see Templates).
- This setting also causes `.composer.yml` and `.composer-*` files to be processed in an identical manner (see Configuration Files and Header & CSS Files under Precedence Rules).

Example directory tree (see Recommended Workflow):

```
.../.Composer/Makefile
.../.Composer/.composer.mk
.../Makefile
.../.composer.mk
.../tld/Makefile
.../tld/.composer.mk
.../tld/sub/Makefile
.../tld/sub/.composer.mk
```

### 3.2.5 COMPOSER\_DEPENDS

- When doing all-all, Composer will process the current directory before recursing into sub-directories. This reverses that, and sub-directories will be processed first.
- In the example directory tree in COMPOSER\_INCLUDE above, the default would be: .../ , .../ tld, and then .../ tld/sub. If the higher-level directories have dependencies on the sub-directories being run first, this will support that by doing them in reverse order, processing them from bottom to top.
- This has no effect on install or clean.

### 3.2.6 COMPOSER\_KEEPING

#WORK # 0 deletes all... # COMPOSER\_KEEPING test & document # clean-clean test & document # clean-clean only runs on all, so single files could go forever...?

### 3.2.7 COMPOSER\_LOG

- Composer appends to a .composer.log log file in the current directory whenever it executes Pandoc. This provides some accounting, and is used by list to determine which \*.md files have been updated since the last time Composer was run.
- This setting can change the name of the log file, or disable it completely (empty value).
- It is removed each time clean is run.

### 3.2.8 COMPOSER\_EXT

- The Markdown file extension Composer uses: \*.md. This is for auto-detection of files to add to COMPOSER\_TARGETS, files to output for list, and other tasks. This is a widely used standard, including GitHub. Another commonly used extension is: \*.markdown.
- In some cases, they do not have any extension, such as README and LICENSE in source code directories. Setting this to an empty value causes them to be detected and output. It also causes all other files to be processed, because it becomes the wildcard \*, so use with care. It is likely best to use COMPOSER\_TARGETS to explicitly set the targets list in these situations.

#WORK # add a note that a per-target “override README.html :=” is probably best... # come to think of it, probably should just go back to not allowing an empty value...

#WORK # document! # .targets # COMPOSER\_TARGETS # COMPOSER\_SUBDIRS # COMPOSER\_EXPORTS # COMPOSER\_IGNORES

### 3.2.9 COMPOSER\_TARGETS

#WORK # does not pick up .\* files/directories

- The list of output files to create or delete with clean and all. Composer does auto-detection using c\_type and COMPOSER\_EXT, so this does not usually need to be set. Hidden files that start with . are skipped.
- Setting this manually disables auto-detection. It can also include non-file targets added into a .composer.mk file (see Custom Targets).

- The `.null` target is special, and when used as a value for `COMPOSER_TARGETS` or `COMPOSER_SUBDIRS` it will display a message and do nothing. A side-effect of this target is that an actual file or directory named `.null` will never be created or removed by Composer.
- An empty value triggers auto-detection.
- Use `config` or `targets` to check the current value.

### 3.2.10 COMPOSER\_SUBDIRS

- The list of sub-directories to recurse into with `install`, `clean`, and `all`. The behavior and configuration is identical to `COMPOSER_TARGETS` above, including auto-detection and the `.null` target. Hidden directories that start with `.` are skipped.
- An empty value triggers auto-detection.
- Use `config` or `targets` to check the current value.

### 3.2.11 COMPOSER\_EXPORTS

```
#WORK # this one will be complicated... maybe? # has, effectively, the same .null behavior as above...
# also overridden by COMPOSER_IGNORES # document .targets token... # hidden variables... #
./g/_data/zactive/coding/composer/+Composer # # #
```

### 3.2.12 COMPOSER\_IGNORES

```
#WORK # either remove site here, or add it to the ones above... # also, there are also implications for
site-library...
```

- The list of `COMPOSER_TARGETS`, `COMPOSER_SUBDIRS` and `COMPOSER_EXPORTS` to skip with `export`, `site`, `install`, `clean`, and `all`. This allows for selective auto-detection, when the list of items to process is larger than those to leave alone.
- Use `config` to check the current value.

## 3.3 Helper Variables

Variable	Purpose	Value
<code>CURDIR</code>	GNU Make current directory	<code>\$PWD :: make</code>
<code>COMPOSER_CURDIR</code>	Detects <code>COMPOSER_INCLUDE</code>	<code>CURDIR :: .composer.mk</code>
<code>COMPOSER_DIR</code>	Location of Composer	<code>.../composer</code>
<code>COMPOSER_ROOT</code>	Topmost level of current tree	<code>.../composer</code>
<code>COMPOSER_EXPORT</code>	Target: <code>export</code>	<code>COMPOSER_ROOT/+Composer</code> <code>(mk)</code>
<code>COMPOSER_LIBRARY</code>	Target: <code>site/site-library</code>	<code>(yaml)</code>
<code>COMPOSER_SRC</code>	Repositories and downloads	<code>COMPOSER_DIR/.sources</code>
<code>COMPOSER_ART</code>	Composer supporting files	<code>COMPOSER_DIR/artifacts</code>
<code>COMPOSER_DAT</code>	Pandoc supporting files	<code>COMPOSER_ART/pandoc</code>
<code>COMPOSER_TMP</code>	Cache and working directory	<code>CURDIR/.composer.tmp</code>

- `(mk)` = configurable in `.composer.mk`
- `(yaml)` = configurable in `.composer.yaml`

*These are internal variables only exposed within `.composer.mk` files. See [Configuration Settings and Custom Targets](#) for more details.*

### 3.3.1 CURDIR

```
#WORK
```



### 3.3.2 COMPOSER\_CURDIR

#WORK # can also be used to detect first pass, using “ifeq”, to prevent “warning: overriding recipe for target” warnings...

- This is set to CURDIR when reading in a .composer.mk file in the GNU Make running directory, and is empty otherwise. This provides a way to limit particular portions of the file to the local directory, regardless of whether COMPOSER\_INCLUDE is set or not.
- Uses for this are to limit the availability of targets to the local directory, or to prevent variable values from recursing down to sub-directories.
- Generally speaking, it is best practice to completely encapsulate all .composer.mk files with this, except for the specific portions that need to be passed down, similar to template (see Templates).

Example usage in a .composer.mk file:

```
ifndef $(COMPOSER_CURDIR),
    ...
endif
```

### 3.3.3 COMPOSER\_DIR

#WORK

### 3.3.4 COMPOSER\_ROOT

#WORK

### 3.3.5 COMPOSER\_EXPORT

#WORK # hidden variables...

- [\_EXPORT\_DIRECTORY]
- [\_EXPORT\_GIT\_REPO]
- [\_EXPORT\_GIT\_BNCH]
- [\_EXPORT\_FIRE\_ACCT]
- [\_EXPORT\_FIRE\_PROJ]

### 3.3.6 COMPOSER\_LIBRARY

#WORK

### 3.3.7 COMPOSER\_SRC

#WORK

### 3.3.8 COMPOSER\_ART

#WORK

### 3.3.9 COMPOSER\_DAT

#WORK

### 3.3.10 COMPOSER\_TMP

#WORK

---



# Chapter 4

## Composer Targets

### 4.1 Primary Targets

Target	Purpose
help	Basic help overview (default)
help-all	Console version of README.md (no reference sections)
template	Print settings template: .composer.mk
template.yml	Print settings template: .composer.yml
template.md	Print markdown file template
compose	Document creation engine (see <code>c_type</code> )
site	Build HTML files as Static Websites (see <code>c_site</code> )
site-all	Do site recursively: <code>COMPOSER_SUBDIRS</code>
site-force	Do site recursively: including <code>COMPOSER_LIBRARY</code>
site-clean	Remove <code>c_site</code> only: <code>COMPOSER_LIBRARY/COMPOSER_TMP</code>
install	Current directory initialization: Makefile
install-all	Do install recursively (no overwrite)
install-force	Recursively force overwrite of Makefile files
clean	Remove output files: <code>COMPOSER_TARGETS :: *-clean</code>
clean-all	Do clean recursively: <code>COMPOSER_SUBDIRS</code>
*-clean	Any targets named this way will also be run by clean
all	Create output files: <code>COMPOSER_TARGETS :: *-all</code>
all-all	Do all recursively: <code>COMPOSER_SUBDIRS</code>
*-all	Any targets named this way will also be run by all
list	Show updated files: <code>*COMPOSER_EXT » COMPOSER_LOG</code>

#### 4.1.1 help / help-all

- Outputs all of the documentation for Composer. The README.md has a few extra sections covering internal targets, along with reserved target and variable names, but is otherwise identical to the help-all output.

#### 4.1.2 template / template.yml / template.md

- Prints useful templates for creating new files (see Templates):
  - Composer .composer.mk (see Configuration Settings)
  - Composer `c_site` and Pandoc .composer.yml (see Static Websites and Configuration Settings)
  - Pandoc markdown

### 4.1.3 **compose**

- This is the very core of Composer, and does the actual work of the Pandoc conversion. Details are in the `c_type` / `c_base` / `c_list` section of Formatting Variables.

### 4.1.4 **site** / **site-all** / **site-force**

#WORK # site rebuilds indexes, force recursively

### 4.1.5 **site-clean**

#WORK

### 4.1.6 **install** / **install-all** / **install-force**

- Creates the necessary Makefile files to set up a directory or a directory tree as a Composer archive. By default, it will not overwrite any existing files.
- Doing a simple install will only create a file in the current directory, whereas install-all will recurse through the entire directory tree. A full install-force is the same as install-all, with the exception that it will overwrite all Makefile files.
- The topmost directory will have the Makefile created for it modified to point to Composer.

### 4.1.7 **clean** / **clean-all** / **\*-clean**

- Deletes all COMPOSER\_TARGETS output files in the current directory, after first running all \*-clean targets.
- Doing clean-all does the same thing recursively, through all the COMPOSER\_SUBDIRS.

### 4.1.8 **all** / **all-all** / **\*-all**

- Creates all COMPOSER\_TARGETS output files in the current directory, after first running all \*-all targets.
- Doing all-all does the same thing recursively, through all the COMPOSER\_SUBDIRS.

### 4.1.9 **list**

- Outputs all the COMPOSER\_EXT files that have been modified since COMPOSER\_LOG was last updated. Acts as a quick reference to see if anything has changed.
- Since the COMPOSER\_LOG file is updated whenever Pandoc is executed, this target will primarily be useful when all is the only target used to create files in the directory.

## 4.2 Additional Targets

Target	Purpose
<code>_release</code>	Upgrade all tools and supporting files to next versions
<code>_release-all</code>	Also make README.* files and Static Websites
<code>_update</code>	Update all included components (see Requirements)
<code>_update-all</code>	Additionally perform all source code builds
<code>_update-list</code>	Show changes made to each (see Repository Versions)
<code>_update-*</code>	Complete fetch and build for a specific component
<code>_debug</code>	Diagnostics, tests targets list in COMPOSER_DEBUGIT
<code>_debug-file</code>	Export _debug results to a plain text file
<code>check</code>	List system packages and versions (see Requirements)
<code>check-all</code>	Complete check package list, and system information
<code>config</code>	Show values of all Composer Variables
<code>config-all</code>	Complete config, including environment variables
<code>config.*</code>	Export individual Composer Variables values
<code>config.yml</code>	JSON export of .composer.yml configuration

Target	Purpose
targets	List all available targets for the current directory
init	Create and link a .Composer in current directory
init-force	Completely reset and relink an existing .Composer
commit	Timestamped Git commit of the current directory tree
commit-all	Automatic commit, without \$EDITOR step
commit-list	Use c_list to select and commit only specific files
export	Synchronize +Composer export of COMPOSER_ROOT
export-all	Also publish to upstream hosting providers
export-force	Publish only, without synchronizing first
*-export	Any targets named this way will also be run by export
site-library	Build or update the COMPOSER_LIBRARY
site-list	Show COMPOSER_LIBRARY metadata for current directory
site-list-all	Do site-list for entire directory tree
site-list-list	Output existing metadata fields and values
site-list-null	List files which are missing metadata fields
site-list.*	Find and export all files named * in the tree

#### 4.2.1 \_\_release / \_\_release-all / \_\_update / \_\_update-all / \_\_update-list / \_\_update-\*

#WORK break this up into two sections...

- Using the repository configuration (see Repository Versions), these fetch and build all external components.
- Simply doing \_\_update will fetch all source repositories and pre-built binaries.
- The \_\_update-all target additionally performs all relevant source code builds. For some repositories, this is necessary to create the final output files used by Composer, and in other cases this builds local binaries which replace the included ones. Additional external tools may be required to perform these steps (see check-all).
- To review the resulting differences between upstream sources and the local directories, use \_\_update-list.
- Each component directory has a corresponding \_\_update-\* target which performs the equivalent of \_\_update-all for only that component.
- Finally, \_\_release runs \_\_update-all and \_\_setup, which together turn the current directory into a functional clone of Composer, including overwriting all supporting files.
- Beyond this, \_\_release-all also uses \_\_setup-all and site-template to build the README.\* files and create an example Static Websites in the \_\_site directory.
- One of the unique features of Composer is that everything needed to compose itself is embedded in the Makefile, so it is fully self-contained.

Creating a development clone:

#WORK # should create a “development/contributing/support” section, and reference this... # also:  
<https://github.com/garybgenett/gary-os/blob/main/.vimrc>

```
mkdir .../composer
cd .../composer
make -f .../.Composer/Makefile __release
```

Note that some additional external tools may be required to perform the builds, such as NPM (see check-all).

#### 4.2.2 \_\_debug / \_\_debug-file

- This is the tool to use for any support issues. Submit the output file to: [composer@garybgenett.net](mailto:composer@garybgenett.net)
- Internally, it also runs:
  - \_\_test
  - check-all
  - config-all
  - targets
- If issues are occurring when running a particular set of targets, list them in COMPOSER\_DEBUGIT.

- For general issues, run in the top-level directory (see Recommended Workflow). For specific issues, run in the directory where the issue is occurring.

For example:

```
make COMPOSER_DEBUGIT="README.html Composer-v3.1.Manual.html" _debug-file
```

### 4.2.3 check / check-all

- Use check to see the minimum list of required external components and their versions, in relation to the system installed versions.
- Doing check-all will show the complete list of tools that are used by Composer, along with which targets they are needed by.

### 4.2.4 config / config-all / config.\* / config.yml / targets

#WORK break this up into two sections...

- The current values of all Composer Variables is output by config, and config-all will additionally output all environment variables.
- Individual Composer Variables can be exported with config.\*. This is useful for scripting in .composer.mk (see Custom Targets).
- A JSON version of the .composer.yml configuration is exported with config.yml. This is available for any external scripting, such as in .composer.mk (see Custom Targets), and is parsable with YQ.
- A structured list of detected targets, \*-export, \*-clean and \*-all targets, COMPOSER\_TARGETS, and COMPOSER\_SUBDIRS is printed by targets.
- Together, config and targets reveal the entire internal state of Composer.

### 4.2.5 init / init-force

#WORK

### 4.2.6 commit / commit-all / commit-list

- Using the directory structure in Recommended Workflow, .../ is considered the top-level directory. Meaning, it is the last directory before linking to Composer.
- If the top-level directory is a Git repository (it has <directory>.git or <directory>/git), this target creates a commit of the current directory tree with the title format below.
- For example, if it is run in the .../ tld directory, that entire tree would be in the commit, including .../ tld/sub. The purpose of this is to create quick and easy checkpoints when working on documentation that does not necessarily fit in a process where there are specific atomic steps being accomplished.
- When this target is run in a Composer directory, it uses itself as the top-level directory. When calling Composer directly using -f, the current directory is used.
- Using commit-all automatically does the commit instead of opening the text editor in the \$EDITOR variable.
- For the commit-list target specifically, c\_list is repurposed to select the limited list of files and/or directories that should be committed. All selected files and directories must exist in the current directory or somewhere in the subdirectory tree below it. There is no option to skip the \$EDITOR with this target.

Commit title format:

```
[Composer CMS v3.1 :: 2023-12-24T06:31:33-08:00]
```

Example using commit-list with c\_list:

```
make commit-list c_list="Makefile artifacts "
```

### 4.2.7 export / export-all / export-force / \*-export

```
#WORK # ... and then runs all *-export targets. # hidden variables... # ./_data/zactive/coding/composer/+Composer  
# # #
```

### 4.2.8 site-library

#WORK

### 4.2.9 site-list / site-list-all / site-list-list / site-list-null / site-list.\*

#WORK

## 4.3 Internal Targets

Target	Purpose
help-help	Complete README.md content (similar to help-all)
.template-install	The Makefile used by install (see Templates)
.template	The .composer.mk used by template (see Templates)
.headers	Series of targets that handle all informational output
.headers-template	For testing default .headers output
.headers-template-all	For testing complete .headers output
.make_database	Complete contents of GNU Make internal state
.all_targets	Extracted list of all targets from .make_database
.null	Placeholder to specify or detect empty values
_setup	Extracts embedded files from Makefile
_setup-all	Also builds all README.* output files
_test	Test suite, validates all supported features
_test-file	Export _test results to a plain text file
_test-dir	Only create directory structure, and do _release
_test-list	Output available test cases, for running directly
check-help	Minimized check output (used for Requirements)
site-.composer.mk	COMPOSER_LIBRARY configured template: .composer.mk
site-.composer.yml	COMPOSER_LIBRARY configured template: .composer.yml
site-template	Static Websites example _site in COMPOSER_DIR
site-template-_test	Version configured to test specific variations
site-template-config	Only create directory structure and source files
subdirs	Expands COMPOSER_SUBDIRS into subdirs--* targets
list-list	Same as list, but only lists the files (no headers)

*None of these are intended to be run directly during normal use. They are only listed here for completeness.*

---





# Chapter 5

## Reference

### 5.1 Configuration

#### 5.1.1 Pandoc Extensions

Composer uses the markdown input format, with these extensions:

```
ascii_identifiers
auto_identifiers
emoji
fancy_lists
fenced_divs
footnotes
gfm_auto_identifiers
header_attributes
implicit_figures
implicit_header_references
inline_notes
intraword_underscores
line_blocks
link_attributes
markdown_in_html_blocks
pandoc_title_block
pipe_tables
raw_html
raw_tex
shortcut_reference_links
smart
strikeout
superscript
task_lists
yaml_metadata_block
```

#### 5.1.2 Templates

The install target Makefile template (for reference only):

```
override COMPOSER_MY_PATH := $(abspath $(dir $(lastword $(MAKEFILE_LIST))))
override COMPOSER_TEACHER := $(abspath $(dir $(COMPOSER_MY_PATH)))/Makefile
include $(COMPOSER_TEACHER)
```

Use the template target to create .composer.mk files:

```
# override MAKEJOBS := 1
# override COMPOSER_DOCOLOR :=
# override COMPOSER_DEBUGIT :=
# override COMPOSER_INCLUDE := 1
# override COMPOSER_DEPENDS :=
# override COMPOSER_KEEPING := 100
# override COMPOSER_LOG := .composer.log
# override COMPOSER_EXT := .md
# override c_site :=
# override c_type := html
# override c_lang := en-US
# override c_logo := $(COMPOSER_DIR)/artifacts/images/logo.img
# override c_icon := $(COMPOSER_DIR)/artifacts/images/icon.img
# override c_css := $(COMPOSER_DIR)/artifacts/themes/theme.html-default.css

ifneq ($(COMPOSER_CURDIR),)

# override COMPOSER_TARGETS := README.site.html README.html README.pdf README.epub README.
# override COMPOSER_SUBDIRS := .null
# override COMPOSER_EXPORTS := *.html *.pdf *.epub *.revealjs.html *.docx *.pptx *.txt *.m
# override COMPOSER_IGNORES := +Composer
# override c_base :=
# override c_list :=
# override c_toc :=
# override c_level := 2
# override c_margin := 0.8in
# override c_margin_top :=
# override c_margin_bottom :=
# override c_margin_left :=
# override c_margin_right :=
# override c_options :=

endif
```

Use the template.yml target to create .composer.yml files:

```
# variables:
#   title-prefix: null
#   site-config:
#     homepage: null
#     brand: null
#     copyright: null
#     composer: 1
#     search_name: null
#     search_site: null
#     search_call: null
#     search_form: null
#     header: null
#     footer: null
#     css_overlay: dark
#     copy_protect: null
#     cols_break: lg
#     cols_scroll: 1
#     cols_order:
#       - 1
#       - 2
#       - 3
```

```
#      cols_reorder:
#      - 1
#      - 3
#      - 2
#      cols_size:
#      - 3
#      - 7
#      - 2
#      cols_resize:
#      - 6
#      - 12
#      - 6
#      metainfo: '<date> :: <title><|> — <author|; >'
#      metainfo_null: '*(none)*'
#      metalist:
#      author:
#      title: Author
#      display: '*Authors: <|>, <|>*'
#      tags:
#      title: Tag
#      display: '*Tags: <|>, <|>*'
#      readtime: '*Reading time: <word> words, <time> minutes*'
#      readtime_wpm: 220
#      site-library:
#      folder: null
#      auto_update: null
#      append: null
#      digest_title: Latest Updates
#      digest_continue: '[...]'
#      digest_permalink: '*(permalink to full text)*'
#      digest_chars: 1024
#      digest_count: 10
#      digest_expanded: 0
#      digest_spacer: 1
#      lists_expanded: 0
#      lists_spacer: 1
#      sitemap_title: Site Map
#      sitemap_expanded: 0
#      sitemap_spacer: 1
#      site-nav-top: null
#      site-nav-bottom: null
#      site-nav-left: null
#      site-nav-right: null
#      site-info-top: null
#      site-info-bottom: null
```

Use the template.md target to create new markdown files:

```
—
title: "Composer CMS: Content Make System"
date: 2023-12-24
author:
  - Gary B. Genett
tags:
  - Composer
—
*Happy Making!*
```

### 5.1.3 Defaults

The default `.composer.mk` in the Composer directory:

```
#####
# Composer CMS :: GNU Make Configuration
#####
ifneq ($(COMPOSER_CURDIR),)
#####

#####
# Settings

override COMPOSER_SUBDIRS := .null

#####
# Defaults

README.%: override c_logo := artifacts/images/logo-v1.0.png
README.%: override c_icon := artifacts/images/icon-v1.0.png
README.%: override c_toc := 0

#####
# Files

override README.site.html := artifacts/README.site.md
README.site.html: override c_site := 1
README.site.html: override c_toc :=

override README.pdf := README.md LICENSE.md

override README.revealjs.html := artifacts/README.revealjs.md
README.revealjs.html: override c_toc :=

#####
endif
#####
# End Of File
#####
```

The template `.composer.yml` in the artifacts directory:

```
#####
# Composer CMS :: YAML Configuration
#####

variables:

#####
# site

  title-prefix: EXAMPLE SITE

#####
  site-config:

    homepage: http://www.garybgenett.net/projects/composer
    brand: LOGO / BRAND
```

```
#>> copyright: COPYRIGHT
copyright: |
  <!-- composer >> icon gpl -->
  <!-- composer >> icon cc-by-nc-nd -->
  <!-- composer >> icon copyright -->
  COPYRIGHT
#>> composer: 1

#>> search_name: SEARCH
search_name: |
  <!-- composer >> icon search -->
search_site: https://duckduckgo.com
search_call: q
search_form: |
  <!-- composer >> form sites garybgenett.net -->
  <!-- composer >> form ia web -->
  <!-- composer >> form kae d -->
  <!-- composer >> form ko 1 -->
  <!-- composer >> form kp -1 -->
  <!-- composer >> form kv 1 -->
  <!-- composer >> form kz -1 -->

#>> header: null
#>> footer: null

#>> css_overlay: dark
#>> copy_protect: null

#>> cols_break: lg
#>> cols_scroll: 1
#>> cols_order: [ 1, 2, 3 ]
#>> cols_reorder: [ 1, 3, 2 ]
#>> cols_size: [ 3, 7, 2 ]
#>> cols_resize: [ 6, 12, 6 ]

#>> metainfo: "<date> :: <title><|> — <author|; >"
#>> metainfo_null: "*(none)*"
#>> metalist:
#>>   author:
#>>     title: "Author"
#>>     display: "*Authors: <|>, <|>*"
#>>   tags:
#>>     title: "Tag"
#>>     display: "*Tags: <|>, <|>*"

#>> readtime: "*Reading time: <word> words, <time> minutes*"
#>> readtime_wpm: 220

#####
site-library:

  folder: #>> null
#>> auto_update: null

#>> append: null
```

```
#>> digest_title: "Latest Updates"
#>> digest_continue: "[...]"
#>> digest_permalink: "*(permalink to full text)*"
#>> digest_chars: 1024
#>> digest_count: 10
#>> digest_expanded: 0
#>> digest_spacer: 1

#>> lists_expanded: 0
#>> lists_spacer: 1

#>> sitemap_title: "Site Map"
#>> sitemap_expanded: 0
#>> sitemap_spacer: 1

#####
site-nav-top:

MENU:
- MAIN: <composer_root>/index.html
- PAGES:
- Composer README: <composer_root>/../index.html
- spacer
- Introduction:
- _: <composer_root>/index.html
- Default Site: <composer_root>/null/index.html
- Configured Site: <composer_root>/config/index.html
- Pandoc Markdown: <composer_root>/pandoc/MANUAL.html
- Bootstrap Default: <composer_root>/bootstrap/site/content/docs/5.1/getting-sta
- Layout & Elements:
- _: <composer_root>/examples.html
- Metainfo Page: <composer_root>/config/pages.html
- Metainfo File: <composer_root>/config/pages/2020-01-01+template_00.html
- Themes & Overlays: <composer_root>/themes/index.html
- Default Library Page:
- _: <composer_root>/_library/index.html
- Configured Library Page: <composer_root>/config/_library-config/index.html
#>> - Default Digest Page: <composer_root>/index-digest.html
#>> - Configured Digest Page: <composer_root>/config/index-digest.html

CONTENTS:
- CONTENTS:
- contents
#>> - contents 6
#>> - contents 0

SPACE:
- spacer
LIBRARY:
- DATES:
- library date
- AUTHORS:
- library author
- TAGS:
- library tags

#####
site-nav-bottom:
```

```
PATH:
- SITEMAP: <composer_root>/_library/sitemap.html
INFO:
- metalist author
- metalist tags

#####
site-nav-left:

BEGIN:
MENU:
- fold-begin 0 . 0 LEFT FOLD
- _: |
  * ITEM 1
  * ITEM 2
  * ITEM 3
- fold-end
MIDDLE:
- spacer
TEXT:
- box-begin 0 LEFT BOX
- _: |
  LEFT TEXT
- box-end
SPACE:
- spacer
CONTENTS:
- box-begin 0 CONTENTS
- metainfo
- contents
#>> - contents 6
#>> - contents 0
- metalist author
- metalist tags
- readtime
- box-end
END:

#####
site-nav-right:

BEGIN:
MENU:
- fold-begin 0 . 0 RIGHT FOLD
- _: |
  * ITEM 1
  * ITEM 2
  * ITEM 3
- fold-end
MIDDLE:
- spacer
TEXT:
- box-begin 0 RIGHT BOX
- _: |
  RIGHT TEXT
```

```
    - box-end
SPACE:
    - spacer
LIBRARY:
    - fold-begin group library
    - fold-begin 0 0 library DATES
    - library date
    - fold-end
    - fold-begin 0 0 library AUTHORS
    - library author
    - fold-end
    - fold-begin 0 . library TAGS
    - library tags
    - fold-end
    - fold-end group
END:

#####
site-info-top:

TEXT:
    - _: |
        TOP TEXT
INFO:
#>> - metainfo
#>> - metalist author
#>> - metalist tags
#>> - readtime
ICON:
    - icon github https://github.com/garybgenett/composer Composer CMS
#>> - _: |
#>>     <!-- composer >> icon gpl -->
#>>     <!-- composer >> icon cc-by-nc-nd -->
#>>     <!-- composer >> icon copyright -->

#####
site-info-bottom:

TEXT:
    - _: |
        BOTTOM TEXT
INFO:
#>> - metainfo
#>> - metalist author
#>> - metalist tags
    - readtime
ICON:

#####
# End Of File
#####
```

## 5.2 Reserved



### 5.2.1 Target Names

Do not create targets which match these, or use them as prefixes:

```
.all_targets
.headers
.make_database
.null
_debug
_release
_setup
_test
_update
all
check
clean
commit
compose
config
export
help
init
install
list
site
subdirs
targets
template
```

### 5.2.2 Variable Names

Do not create variables which match these, and avoid similar names:

```
.headers
.headers-action
.headers-compose
.headers-compose-PANDOC_OPTIONS
.headers-dir
.headers-file
.headers-note
.headers-path-dir
.headers-path-list
.headers-path-root
.headers-rm
.headers-run
.headers-skip
.headers-subdirs
7Z
7Z_VER
ASPELL
ASPELL_DIR
BASE64
BASH
BASH_VER
BOOTLINT_CMT
BOOTLINT_DIR
BOOTLINT_HOME
BOOTLINT_LIC
```

BOOTLINT\_NAME  
BOOTLINT\_SRC  
BOOTSTRAP\_ART\_CSS  
BOOTSTRAP\_ART\_JS  
BOOTSTRAP\_CMT  
BOOTSTRAP\_DEF\_CSS  
BOOTSTRAP\_DEF\_JS  
BOOTSTRAP\_DIR  
BOOTSTRAP\_DIR\_CSS  
BOOTSTRAP\_DIR\_JS  
BOOTSTRAP\_DOC\_VER  
BOOTSTRAP\_HOME  
BOOTSTRAP\_LIC  
BOOTSTRAP\_NAME  
BOOTSTRAP\_SRC  
BOOTSWATCH\_CMT  
BOOTSWATCH\_CSS\_ALT  
BOOTSWATCH\_CSS\_DARK  
BOOTSWATCH\_CSS\_LIGHT  
BOOTSWATCH\_CSS\_SOLAR\_DARK  
BOOTSWATCH\_CSS\_SOLAR\_LIGHT  
BOOTSWATCH\_DIR  
BOOTSWATCH\_HOME  
BOOTSWATCH\_LIC  
BOOTSWATCH\_NAME  
BOOTSWATCH\_SRC  
CAT  
CHECKIT  
CHMOD  
CLEANER  
CODEBLOCK  
COLUMNS  
COLUMN\_2  
COMMENTED  
COMPOSER  
COMPOSER\_ART  
COMPOSER\_BASENAME  
COMPOSER\_BIN  
COMPOSER\_CLOSING  
COMPOSER\_CNAME  
COMPOSER\_COLOR  
COMPOSER\_COMPOSER  
COMPOSER\_CONTENTS  
COMPOSER\_CONTENTS\_DIRS  
COMPOSER\_CONTENTS\_EXT  
COMPOSER\_CONTENTS\_FILES  
COMPOSER\_CONV  
COMPOSER\_CSS  
COMPOSER\_CSS\_PUBLISH  
COMPOSER\_CURDIR  
COMPOSER\_CUSTOM  
COMPOSER\_DAT  
COMPOSER\_DEBUGIT  
COMPOSER\_DEBUGIT\_ALL  
COMPOSER\_DEPENDS  
COMPOSER\_DIR

COMPOSER\_DOCOLOR  
COMPOSER\_DOSETUP\_DIR  
COMPOSER\_EXPORT  
COMPOSER\_EXPORTS  
COMPOSER\_EXPORTS\_DEFAULT  
COMPOSER\_EXPORT\_DEFAULT  
COMPOSER\_EXPORT\_REGEX  
COMPOSER\_EXT  
COMPOSER\_EXT\_DEFAULT  
COMPOSER\_EXT\_SPECIAL  
COMPOSER\_FILENAME  
COMPOSER\_FIND  
COMPOSER\_FULLNAME  
COMPOSER\_HEADLINE  
COMPOSER\_HOMEPAGE  
COMPOSER\_ICON  
COMPOSER\_ICON\_VER  
COMPOSER\_IGNORES  
COMPOSER\_IMAGES  
COMPOSER\_INCLUDE  
COMPOSER\_INCLUDES  
COMPOSER\_INCLUDES\_LIST  
COMPOSER\_INCLUDES\_TREE  
COMPOSER\_KEEPING  
COMPOSER\_LIBRARY  
COMPOSER\_LIBRARY\_AUTO\_UPDATE  
COMPOSER\_LIBRARY\_DIR  
COMPOSER\_LIBRARY\_PATH  
COMPOSER\_LIBRARY\_ROOT  
COMPOSER\_LIBRARY\_ROOT\_REGEX  
COMPOSER\_LICENSE  
COMPOSER\_LOG  
COMPOSER\_LOGO  
COMPOSER\_LOGO\_VER  
COMPOSER\_LOG\_DEFAULT  
COMPOSER\_MY\_PATH  
COMPOSER\_NOCOLOR  
COMPOSER\_OPTIONS  
COMPOSER\_OPTIONS\_EXPORT  
COMPOSER\_OPTIONS\_GLOBAL  
COMPOSER\_OPTIONS\_LOCAL  
COMPOSER\_OPTIONS\_MAKE  
COMPOSER\_OPTIONS\_PANDOC  
COMPOSER\_OPTIONS\_PUBLISH  
COMPOSER\_OPTIONS\_PUBLISH\_ENV  
COMPOSER\_PANDOC  
COMPOSER\_REGEX  
COMPOSER\_REGEX\_DEFINE  
COMPOSER\_REGEX\_OVERRIDE  
COMPOSER\_REGEX\_PREFIX  
COMPOSER\_RELEASE  
COMPOSER\_REPOPAGE  
COMPOSER\_RESERVED  
COMPOSER\_RESERVED\_DOITALL  
COMPOSER\_RESERVED\_SKIP  
COMPOSER\_ROOT

COMPOSER\_ROOT\_PATH  
COMPOSER\_ROOT\_REGEX  
COMPOSER\_SETTINGS  
COMPOSER\_SRC  
COMPOSER\_SUBDIRS  
COMPOSER\_TAGLINE  
COMPOSER\_TARGETS  
COMPOSER\_TARGETS\_AUTO  
COMPOSER\_TEACHER  
COMPOSER\_TECHNAME  
COMPOSER\_TIMESTAMP  
COMPOSER\_TINYNAME  
COMPOSER\_TMP  
COMPOSER\_TMP\_FILE  
COMPOSER\_VERSION  
COMPOSER\_YML  
COMPOSER\_YML\_DATA  
COMPOSER\_YML\_DATA\_METALIST  
COMPOSER\_YML\_DATA\_METALIST\_SKEL  
COMPOSER\_YML\_DATA\_SKEL  
COMPOSER\_YML\_DATA\_VAL  
COMPOSER\_YML\_LIST  
COMPOSER\_YML\_LIST\_FILE  
CONFIGS  
CONVICT  
COPYRIGHT\_FULL  
COPYRIGHT\_SHORT  
COREUTILS\_VER  
CP  
CREATED\_TAGLINE  
CREATOR  
CSS\_ALT  
CSS\_ICONS  
CSS\_ICON\_ARROW\_D  
CSS\_ICON\_ARROW\_L  
CSS\_ICON\_ARROW\_R  
CSS\_ICON\_ARROW\_U  
CSS\_ICON\_COPYRIGHT  
CSS\_ICON\_GITHUB  
CSS\_ICON\_MENU  
CSS\_ICON\_SEARCH  
CSS\_THEME  
CSS\_THEMES  
CURL  
CURL\_VER  
CUSTOM\_HTML\_CSS  
CUSTOM\_PDF\_LATEX  
CUSTOM\_PUBLISH\_CSS  
CUSTOM\_PUBLISH\_CSS\_OVERLAY  
CUSTOM\_PUBLISH\_SH  
CUSTOM\_REVEALJS\_CSS  
DATE  
DATEMARK  
DATENAME  
DATESTAMP  
DEBUGIT

DEPTH\_DEFAULT  
DEPTH\_MAX  
DESC\_DOCX  
DESC\_EPUB  
DESC\_HTML  
DESC\_LINT  
DESC\_LPDF  
DESC\_PPTX  
DESC\_PRES  
DESC\_TEXT  
DIFF  
DIFFUTILS\_VER  
DISTRIB  
DIST\_ICON\_v1.0  
DIST\_LOGO\_v1.0  
DIST\_SCREENSHOT\_v1.0  
DIST\_SCREENSHOT\_v3.0  
DIST\_SCREENSHOT\_v4.0  
DIVIDE  
DOFORCE  
DOITALL  
DOMAKE  
DOSETUP  
DO\_HEREDOC  
ECHO  
ENDOLINE  
ENV  
ENV\_MAKE  
EOL  
EXAMPLE  
EXPAND  
EXPORTS  
EXPR  
EXTN\_DEFAULT  
EXTN\_DOCX  
EXTN\_EPUB  
EXTN\_HTML  
EXTN\_LINT  
EXTN\_LPDF  
EXTN\_OUTPUT  
EXTN\_PPTX  
EXTN\_PRES  
EXTN\_TEXT  
EXT\_ICON\_CC  
EXT\_ICON\_GPL  
FIND  
FINDUTILS\_VER  
FIND\_ALL  
FIREBASE  
FIREBASE\_BIN  
FIREBASE\_BIN\_BLD  
FIREBASE\_CMT  
FIREBASE\_DIR  
FIREBASE\_HOME  
FIREBASE\_IGNORE  
FIREBASE\_LIC

FIREBASE\_LNX\_BIN  
FIREBASE\_LNX\_DST  
FIREBASE\_LNX\_SRC  
FIREBASE\_LNX\_ZIP  
FIREBASE\_MAC\_BIN  
FIREBASE\_MAC\_DST  
FIREBASE\_MAC\_SRC  
FIREBASE\_MAC\_ZIP  
FIREBASE\_NAME  
FIREBASE\_RUN  
FIREBASE\_SRC  
FIREBASE\_URL  
FIREBASE\_VER  
FIREBASE\_VER\_COMPOSER  
FIREBASE\_WIN\_BIN  
FIREBASE\_WIN\_DST  
FIREBASE\_WIN\_SRC  
FIREBASE\_WIN\_ZIP  
FONTAWES\_CMT  
FONTAWES\_DIR  
FONTAWES\_HOME  
FONTAWES\_LIC  
FONTAWES\_NAME  
FONTAWES\_SRC  
GIT  
GIT\_LOG\_COUNT  
GIT\_LOG\_FORMAT  
GIT\_OPTS\_CONVICT  
GIT\_REPO  
GIT\_REPO\_DO  
GIT\_RUN  
GIT\_RUN\_COMPOSER  
GIT\_RUN\_REPO  
GIT\_VER  
GZIP\_BIN  
GZIP\_VER  
HEAD  
HEADERS  
HEADER\_L  
HEAD\_MAIN  
HELPOUT  
HEREDOC\_COMPOSER\_MK  
HEREDOC\_COMPOSER\_MK\_PUBLISH  
HEREDOC\_COMPOSER\_MK\_PUBLISH\_BOOTSTRAP\_DIR  
HEREDOC\_COMPOSER\_MK\_PUBLISH\_BOOTSTRAP\_TREE  
HEREDOC\_COMPOSER\_MK\_PUBLISH\_CONFIGS  
HEREDOC\_COMPOSER\_MK\_PUBLISH\_EXAMPLE  
HEREDOC\_COMPOSER\_MK\_PUBLISH\_NOTHING  
HEREDOC\_COMPOSER\_MK\_PUBLISH\_PAGEDIR  
HEREDOC\_COMPOSER\_MK\_PUBLISH\_PANDOC\_DIR  
HEREDOC\_COMPOSER\_MK\_PUBLISH\_SHOWDIR  
HEREDOC\_COMPOSER\_MK\_PUBLISH\_SHOWDIR\_TARGET  
HEREDOC\_COMPOSER\_YML  
HEREDOC\_COMPOSER\_YML\_PUBLISH\_BOOTSTRAP\_DIR  
HEREDOC\_COMPOSER\_YML\_PUBLISH\_BOOTSTRAP\_TREE  
HEREDOC\_COMPOSER\_YML\_PUBLISH\_CONFIGS

HEREDOC\_COMPOSER\_YML\_PUBLISH\_EXAMPLE  
HEREDOC\_COMPOSER\_YML\_PUBLISH\_LIBRARY  
HEREDOC\_COMPOSER\_YML\_PUBLISH\_NOTHING  
HEREDOC\_COMPOSER\_YML\_PUBLISH\_PAGEDIR  
HEREDOC\_COMPOSER\_YML\_PUBLISH\_PANDOC\_DIR  
HEREDOC\_COMPOSER\_YML\_PUBLISH\_SHOWDIR  
HEREDOC\_COMPOSER\_YML\_PUBLISH\_TESTING  
HEREDOC\_COMPOSER\_YML\_README  
HEREDOC\_CUSTOM\_HTML\_CSS  
HEREDOC\_CUSTOM\_HTML\_CSS\_SOLARIZED  
HEREDOC\_CUSTOM\_HTML\_CSS\_WATER\_CSS\_HACK  
HEREDOC\_CUSTOM\_HTML\_CSS\_WATER\_SRC\_SOLAR  
HEREDOC\_CUSTOM\_HTML\_CSS\_WATER\_VAR\_OVERLAY  
HEREDOC\_CUSTOM\_HTML\_CSS\_WATER\_VAR\_SOLAR  
HEREDOC\_CUSTOM\_PDF\_LATEX  
HEREDOC\_CUSTOM\_PUBLISH\_CSS  
HEREDOC\_CUSTOM\_PUBLISH\_CSS\_HACK  
HEREDOC\_CUSTOM\_PUBLISH\_CSS\_OVERLAY  
HEREDOC\_CUSTOM\_PUBLISH\_CSS\_POST  
HEREDOC\_CUSTOM\_PUBLISH\_CSS\_PRE  
HEREDOC\_CUSTOM\_PUBLISH\_CSS\_TESTING  
HEREDOC\_CUSTOM\_PUBLISH\_CSS\_THEME  
HEREDOC\_CUSTOM\_PUBLISH\_JS\_POST  
HEREDOC\_CUSTOM\_PUBLISH\_JS\_PRE  
HEREDOC\_CUSTOM\_PUBLISH\_SH  
HEREDOC\_CUSTOM\_REVEALJS\_CSS  
HEREDOC\_CUSTOM\_REVEALJS\_CSS\_HACK  
HEREDOC\_GITATTRIBUTES  
HEREDOC\_GITIGNORE  
HEREDOC\_LICENSE  
HEREDOC\_SPELL\_WORDLIST  
HTML\_BREAK  
HTML\_HIDE  
HTML\_SPACE  
INCLUDE\_FILE\_APPEND  
INCLUDE\_FILE\_FOOTER  
INCLUDE\_FILE\_HEADER  
INPUT  
INSTALL  
LIBRARY\_APPEND  
LIBRARY\_APPEND\_ALT  
LIBRARY\_AUTO\_UPDATE  
LIBRARY\_AUTO\_UPDATE\_ALT  
LIBRARY\_DIGEST\_CHARS  
LIBRARY\_DIGEST\_CHARS\_ALT  
LIBRARY\_DIGEST\_CONTINUE  
LIBRARY\_DIGEST\_CONTINUE\_ALT  
LIBRARY\_DIGEST\_COUNT  
LIBRARY\_DIGEST\_COUNT\_ALT  
LIBRARY\_DIGEST\_EXPANDED  
LIBRARY\_DIGEST\_EXPANDED\_ALT  
LIBRARY\_DIGEST\_EXPANDED\_MOD  
LIBRARY\_DIGEST\_PERMALINK  
LIBRARY\_DIGEST\_PERMALINK\_ALT  
LIBRARY\_DIGEST\_SPACER  
LIBRARY\_DIGEST\_SPACER\_ALT

LIBRARY\_DIGEST\_TITLE  
LIBRARY\_DIGEST\_TITLE\_ALT  
LIBRARY\_FOLDER  
LIBRARY\_FOLDER\_ALT  
LIBRARY\_LISTS\_EXPANDED  
LIBRARY\_LISTS\_EXPANDED\_ALT  
LIBRARY\_LISTS\_EXPANDED\_MOD  
LIBRARY\_LISTS\_SPACER  
LIBRARY\_LISTS\_SPACER\_ALT  
LIBRARY\_SITEMAP\_EXPANDED  
LIBRARY\_SITEMAP\_EXPANDED\_ALT  
LIBRARY\_SITEMAP\_EXPANDED\_MOD  
LIBRARY\_SITEMAP\_SPACER  
LIBRARY\_SITEMAP\_SPACER\_ALT  
LIBRARY\_SITEMAP\_TITLE  
LIBRARY\_SITEMAP\_TITLE\_ALT  
LINERULE  
LISTING  
LN  
LS  
LS\_TIME  
MAKEFILE  
MAKEFILE\_LIST  
MAKEFLAGS  
MAKEFLAGS\_ENV  
MAKEJOBS  
MAKEJOBS\_DEFAULT  
MAKEJOBS\_OPTS  
MAKE\_DB  
MAKE\_VER  
MARKER  
MDTHEMES\_CMT  
MDTHEMES\_DIR  
MDTHEMES\_HOME  
MDTHEMES\_LIC  
MDTHEMES\_NAME  
MDTHEMES\_SRC  
MDVIEWER\_CMT  
MDVIEWER\_CSS\_ALT  
MDVIEWER\_CSS\_DARK  
MDVIEWER\_CSS\_DIR  
MDVIEWER\_CSS\_LIGHT  
MDVIEWER\_CSS\_SOLAR\_DARK  
MDVIEWER\_CSS\_SOLAR\_LIGHT  
MDVIEWER\_DIR  
MDVIEWER\_FIX\_SASS\_VER  
MDVIEWER\_HOME  
MDVIEWER\_LIC  
MDVIEWER\_MANIFEST  
MDVIEWER\_MODULES  
MDVIEWER\_NAME  
MDVIEWER\_SRC  
MENU\_SELF  
MKDIR  
MV  
NEWLINE



NOFAIL  
NOTHING  
NOTHING\_IGNORES  
NPM  
NPM\_BUILD  
NPM\_INSTALL  
NPM\_NAME  
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*Happy Making!*



# Chapter 6

## Composer CMS License

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### 6.1 Copyright

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### 6.2 License

Source: <https://www.gnu.org/licenses/gpl-3.0.html>

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#### 6.2.1 Preamble

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Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.

Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

The precise terms and conditions for copying, distribution and modification follow.

## **6.2.2 TERMS AND CONDITIONS**

### **6.2.2.1 0. Definitions.**

"This License" refers to version 3 of the GNU General Public License.

"Copyright" also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

"The Program" refers to any copyrightable work licensed under this License. Each licensee is addressed as "you". "Licensees" and "recipients" may be individuals or organizations.

To "modify" a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a "modified version" of the earlier work or a work "based on" the earlier work.

A "covered work" means either the unmodified Program or a work based on the Program.

To "propagate" a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To "convey" a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays "Appropriate Legal Notices" to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

### **6.2.2.2 1. Source Code.**

The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

A "Standard Interface" means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

The "System Libraries" of an executable work include anything, other than the work as a whole, that (a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and (b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A "Major Component", in this context, means a

major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

The “Corresponding Source” for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work’s System Libraries, or general-purpose tools or generally available free programs which are used unmodified in performing those activities but which are not part of the work. For example, Corresponding Source includes interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require, such as by intimate data communication or control flow between those subprograms and other parts of the work.

The Corresponding Source need not include anything that users can regenerate automatically from other parts of the Corresponding Source.

The Corresponding Source for a work in source code form is that same work.

#### **6.2.2.3 2. Basic Permissions.**

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#### **6.2.2.4 3. Protecting Users’ Legal Rights From Anti-Circumvention Law.**

No covered work shall be deemed part of an effective technological measure under any applicable law fulfilling obligations under article 11 of the WIPO copyright treaty adopted on 20 December 1996, or similar laws prohibiting or restricting circumvention of such measures.

When you convey a covered work, you waive any legal power to forbid circumvention of technological measures to the extent such circumvention is effected by exercising rights under this License with respect to the covered work, and you disclaim any intention to limit operation or modification of the work as a means of enforcing, against the work’s users, your or third parties’ legal rights to forbid circumvention of technological measures.

#### **6.2.2.5 4. Conveying Verbatim Copies.**

You may convey verbatim copies of the Program’s source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice; keep intact all notices stating that this License and any non-permissive terms added in accord with section 7 apply to the code; keep intact all notices of the absence of any warranty; and give all recipients a copy of this License along with the Program.

You may charge any price or no price for each copy that you convey, and you may offer support or warranty protection for a fee.

#### **6.2.2.6 5. Conveying Modified Source Versions.**

You may convey a work based on the Program, or the modifications to produce it from the Program, in the form of source code under the terms of section 4, provided that you also meet all of these conditions:

- a) The work must carry prominent notices stating that you modified it, and giving a relevant date.

- b) The work must carry prominent notices stating that it is released under this License and any conditions added under section
- 7. This requirement modifies the requirement in section 4 to “keep intact all notices”.
- c) You must license the entire work, as a whole, under this License to anyone who comes into possession of a copy. This License will therefore apply, along with any applicable section 7 additional terms, to the whole of the work, and all its parts, regardless of how they are packaged. This License gives no permission to license the work in any other way, but it does not invalidate such permission if you have separately received it.
- d) If the work has interactive user interfaces, each must display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.

A compilation of a covered work with other separate and independent works, which are not by their nature extensions of the covered work, and which are not combined with it such as to form a larger program, in or on a volume of a storage or distribution medium, is called an “aggregate” if the compilation and its resulting copyright are not used to limit the access or legal rights of the compilation’s users beyond what the individual works permit. Inclusion of a covered work in an aggregate does not cause this License to apply to the other parts of the aggregate.

#### **6.2.2.7 6. Conveying Non-Source Forms.**

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

- a) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.
- b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.
- c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.
- d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.
- e) Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.

A “User Product” is either (1) a “consumer product”, which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product, doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, “normally used” refers to a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has

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