CROSSREFTOOLS

Expandable extraction of cleveref or cross reference data and label utilities

Documentation

Version 0.4

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Typographical conventions

Throughout this documentation following symbols and conventions are used:

- foo means a the class foo
- **☑** foo names a package foo
- **m foo** indicates a counter named foo
- **h** foo will indicate either a file named foo or a file extension foo
- 🖒 foo will indicate some files
- \$\ foo names a special feature or tag foo
- 4 foo deals with a command or package option named foo

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Part I

Introduction

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Preface

Whereas Cleveref provides \labelcref and other commands or \ref from standard LateX2e kernel none of those are expandable and can not be used in an \edef - approach.

Most times class and package authors will benefit of this package, but there might be usual documents that need the features of **□ crossreftools**

All macros from this package use the prefix $\crt...$, eg $\crtrefname^{\rightarrow P.9}$.

1 Requirements, loading and incompatibilities

1.1 Required packages and TEX engine

The package does not require features from Xelfz or Lualfz but can be run with those features as well as with LateX or pdflfz. The compilation documentation requires however pdflfz as of version 0.4.

No packages are loaded by \boxtimes crossreftools, this package does neither load \boxtimes hyperref nor \boxtimes cleveref itself.

1.2 Loading of the package

Loading is done with

\usepackage[options]{crossreftools}

As of version 0.4 crossreftools does have following option(s):

• draft

By default, unless specified as package or class option, crossreftools works in draft mode, i.e. List of Labels is enabled, see section Displaying label information for more on this.

• final

This disables the feature List of Labels, see section Displaying label information for more information about this feature – it is considered to be unnecessary having a List of Labels in a final version of document.

By default, the package works in draft - mode, unless the class option final is specified already. In this case, the package option final can be omitted.

There is no loading order required. The macros related to \square cleveref expand to [UNDEFINED] if \square cleveref is not loaded.

In order to ensure that the changes to the cross referencing system introduced by \square hyperref and \square cleveref it is recommened to load \square crossreftools after both packages.

1.3 Incompatibilities

• Plain T_FX:

As of 0.4 this package cannot be used with plain T_EX , since there is no real built-in support for cross-referencing in plain T_EX .

• Issue with \tcb@cs from the \textstyle tcolorbox and its documentation library regarding the \crtlistoflabels usage.

As of 0.4 this package cannot cope with labels produced from toolorbox for documented code – this inserts an unexpandable call of \tcb@cs in the label content which leaves unpleasant content in the List Of Labels (see Displaying label information). As long as no other solution is available, \tcb@cs is redefined to gobble its argument only and doing nothing inside the \crtlistoflabels \frac{P.14}{P.14} macro.

This is the cause for the special \refCom macro provided by the documentation library from tolorbox.

Similarly any unexpandable content written to the aux - file by redefinitions of \label or \@currentlabel etc. will cause problems.

Part II

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2 Indicating undefined references

□ crossreftools uses the content of the internal macro \crt@refundefined which defaults to [UNDEFINED]. Use \crtrefundefinedtext to change the output of \crt@refundefined.

\crtrefundefinedtext{\undefined reference indication text\}



This command sets the output of \crt@refundefined in the same manner like the standard macro \title would do for \@title.

\crtrefundefinedtext is a preamble-only macro.

3 Extracting information from regular labels

Depending on loading of \boxtimes hyperref there is some more information (properties) stored with a \label command. Common properties are reference and page, additions of \boxtimes hyperref are

name, anchor and the (yet) unused 5th argument of \newlabel, the property is called unused as of version 0.4.

All properties are extracted with $\crtextractref^{\rightarrow P.9}$.

Expandable

\crtextractref{\property\}{\langle label name\}}

v0.3 2017-10-

This command will extract one of the properties reference, page, anchor, name and unused from the label given as the 2nd mandatory argument.

29

For convenience, there are shortcuts to extract a specific property:

Expandable

 $\crtcrefpage{\langle label name \rangle}$

v0.3 2017-10-29

This extracts the page number that would be printed by \pageref.

Expandable

\crtrefnumber{\langle label name \rangle}

v0.3 2017-10-29

This extracts the reference value (or something that is stored by \@currentlabel belonging to a certain label name.

With $\[igsimes \]$ hyperref being loaded, following commands return non-empty label information, without $\[igsimes \]$ hyperref they are available, but expand to nothing.

Expandable

\crtrefname{\label name\range}}

v0.3 2017-10-

This extracts the name of the sectioning unit or counter as being specified with \nameref.

vnandahle

\crtrefanchor{\langle label name \rangle}

v0.3 2017-10-29

This extracts the hyper target anchor of the reference in order to be used with \hyperlink.

Expandable

\crtrefunused{\label name\range}

v0.3 2017-10-29

This extracts the yet unused 5th argument of labels generated after Myperref is loaded. As of version v6.85a of Myperref, this argument has no meaning yet. If this is going to be change in future, \crtrefunused will probably be removed and replaced by another macro that reflects the meaning of this 5th argument.

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Expandable

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\crtrefcounter{\langle label name \rangle}

This macro tries to extract the counter name related to the label assuming that the standard anchor type is used: X.Y where X stands for the counter name and Y is some alphanumerical value constructed from \theHX, e.g. \theHchapter. If this pattern fails, \crtrefcounter \to P. 10 will not compile.

4 Extracting information from cleveref

The cleveref package redefines the \label macro and stores another label with the same basic name and a suffix @cref, so

\label{foo}

would generate both the labels foo and foo@cref. The \square cleveref - version of a label saves basically five properties to the \blacksquare .aux - file.

• counter

This property holds the name of the counter that was used in \refstepcounter.

• number

This property holds the value of label, this is usually the value of a counter

Please note that this property does not mean the reference value that is displayed with \cref or \Cref.

- result
- reference This property holds the reference that is to be typeset, i.e. the content displayed with \cref or \Cref, however, without hyperlinks.
- page This property stores the page number of the \label usage.

□ crossreftools extracts those properties with \crtextractcref.

Expandabl

\crtextractcref{\langle property\rangle} \{\langle label name\rangle\}

v0.1 2017-10-08

This command will extract one of the properties counter, number, result, reference and page from the label given as the 2nd mandatory argument.

For convenience, there are shortcuts to extract a specific property:

Expandable

 $\crtcrefcounter{\langle label name \rangle}$

v0.1 2017-10-

This extracts the counter belonging to a certain label name.

xpandable

 $\crtcrefnumber{\langle label name \rangle}$

v0.1 2017-10-08

This extracts the counter value (or something that is stored by \cref@currentlabel belonging to a certain label name.

 $\crtcrefresult{\langle label name \rangle}$

v0.1 2017-10-08

This extracts the result of the splitting of a counter belonging to a certain label name.

Expandable

\crtcrefreference{\langle label name \rangle}

v0.1 2017-10-08

This extracts the reference that would be printed by \cref or \Cref, without hyperlinks.

Expandable

\crtcrefpage{\langle label name \rangle}

v0.1 2017-10-08

This extracts the page number that would be printed by \pageref.

5 Additional macros and utilities

5.1 Expandable Commands

Crossreftools provides some expandable helper macros in order to query the cross reference names that are stored with \crefname and \Crefname from ✓ cleveref.

Expandable

\crtcrefname{\counter name\}

v0.1 2017-10-08

This extracts the lower case cross reference name of a given counter.

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\crtCrefname{\counter name\}

This extracts the upper case cross reference name of a given counter.

v0.1 2017-10-

\crtcrefpluralname{\langle counter name \rangle}

This extracts the lower case cross reference plural name of a given counter.

v0.1 2017-10-08

\crtCrefpluralname{\counter name\}

This extracts the upper case cross reference plural name of a given counter.

v0.1 2017-10-08

\crtcrefnamebylabel{\lambda label name\range}

This extracts the lower case cross reference name of a given label.

v0.1 2017-10-08 v0.2 2017-10-

 $\crtCrefnamebylabel{(label name)}$

This extracts the upper case cross reference name of a given label.

v0.1 2017-10-08 v0.2 2017-10-Expandable

> v0.3 2017-10-

> > 29

 $\crtcref{\langle label name \rangle}$

This displays the reference in the same way as \cref from \colon cleveref would do in a setup without using \crefformat etc. The hyperlink is not displayed, however. This command is expandable.

For the upper case version see \crtCref.

vnandahla

\crtCref {\langle label name \rangle}

This displays the reference in the same way as \Cref from \(\subseteq \) cleveref would do in a setup without using \Crefformat etc. The hyperlink is not displayed, however. This command is expandable.

For the lower case version see \crtcref.

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5.2 Nonexpandable Commands

\crthyperlink{\(\lanchor\rangle\)} \{\(\lanchor\rangle\)}

v0.3 2017-10-

This is a wrapper to the \hyperlink macro from \square hyperref to the given $\{\langle anchor \rangle\}$, displaying the $\{\langle link \ text \rangle\}$. If \square hyperref is not loaded, only the link text is displayed.

29

\crthypercref{\label name\range}

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This generates a linked reference to a given label like \cref{cref} would do. If \cref{cref} is not loaded, no link but only the reference text is displayed.

For the upper case version see \crthyperCref.

\crthyperCref{\label name\range}

v0.3 2017-10-

This generates a linked reference to a given label like \Cref would do. If \(\subseteq \text{hyperref} \) is not loaded, no link but only the reference text is displayed.

For the lower case version see \crthypercref.

6 Placing more generic labels

Sometimes it is necessary to refer to content that is not connected to a counter and \refstepcounter. In this case the macros \crtprovidecurrentlabel, \crtprovidecurrentlabelname, \crtprovidecurrentlabelinfo and \crtcrossreflabel^P.14 may be useful.

None of the macros placing 'arbitrary' labels described in this section is expandable!

\crtprovidecurrentlabel{\(\lambda\) usual label content\(\rangle\)}

v0.4 2017-12-06

This sets \@currentlabel which is later on stored to be the label content with \label and being displayed with the various variants of \ref or \cref etc. from \colon cleveref.

\crtprovidecurrentlabelname{\nameref label content\}

v0.4 2017-12-06

This sets \@currentlabelname which is later on stored to be the label content with \label and being displayed with the various variants of \nameref from \subseteq hyperref.

 $\verb|\crtprovidecurrentlabelinfo| \{ \textit{usual label content} \} \} \{ \textit{\langle nameref label content} \} \}$

v0.4 2017-12-06

This is a convenience macro in order to provide both \@currentlabel and \@currentlabelname at once. If \subseteq hyperref is loaded, a \phantomsection call is used before calling \crtprovidecurrentlabel and \crtprovidecurrentlabelname.

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 $\crtcrossreflabel[\langle nameref | label | content \rangle] {\langle usual | label | content \rangle} [\langle label | name \rangle]$

v0.4 2017-12-06

This macro is an even more convenient wrapper for \crtprovidecurrentlabelinfo by using the 2nd (mandatory) argument both for the usual label and the nameref label content if the 1st optional argument is not specified. This resembles the \caption[]{} or e.g. \section[]{} mechanism where the first optional argument is used for the ToC - related entries. The 2nd optional argument is placing the \label with the relevant label name.

Please note that depending on the presence of the 1st optional argument either the 2nd or der 1st argument is displayed in the input stream, i.e. in the document text. If this is not requested, use the starred form $\crtcrossreflabel*^{P.14}$.

 $\crtcrossreflabel*[\langle nameref | label | content \rangle] {\langle usual | label | content \rangle} [\langle label | name \rangle]$

v0.4 2017-12-

This behaves like \crtcrossreflabel but suppresses the output of the 2nd or 1st argument explicitly. Use this to place hidden labels and anchors.

7 Displaying label information

For some reason it might be useful to have a list of all defined labels available. Currently, the support from crossreftools for this limited, however.

crossreftools redefines \label at the beginning of the document body. It takes care about a potential optional argument of \label as is introduced by cleveref.

7.1 Useful macros for the list of labels

\crtlistoflabels

v0.4 2017-12-06

This displays a list of all cross-reference labels in the order of their definition, the heading has the title List of labels, in order to change the title redefine \listoflabelsname \(^{\text{P.15}}\).

An ordinary entry to the list - of - labels file (default extension \(^{\text{labels}}\) lia) is written with \addcontentsline

```
\addcontentsline{\crt@listoflabelsfileextension}
{\crt@listoflabelsstructurelevel}
{\protect\numberline{\crtrefnumber{#1}}#1}
```

where $\crt@listoflabelsfileextension^{P.15}$ and $\crt@listoflabelsstructurelevel^{P.15}$ are internal versions of $\crtlistoflabelsfileextension^{P.15}$ and $\crtlistoflabelsstructurelevel^{P.15}$.

This command does add an entry into the table of contents (toc - file) either on chapter or on section level, depending whether the class is book or not.

If no ToC - entry should be made, use $\crtlistoflabels*^{P.15}$.

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If the package (or class) option final is enabled, the List of Labels feature is disabled and \crtlistoflabels expands to nothing.

\crtlistoflabels*

This behaves like \crtlistoflabels → P.14 but does not generate an entry in the table of contents

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\crtlistoflabelsfileextension{\(\langle extension \rangle \)}

This changes the extention of the list of labels file. The value is stored internally in \crt@listoflabelsfileextension which defaults to lla

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\crt@listoflabelsfileextension

This holds the extension (without a dot in the name) of the list of labels file. Do not change this macro directly, but use \crtlistoflabelsfileextension instead.

v0.4 2017-12-06

\listoflabelsname

This is the title of the list of labels heading, it defaults to List of labels. It can be changed with \renewcommand.

v0.4 2017-12-06

\crtlistoflabelsstructurelevel{\counter name\}

This changes the level of the label entries in the list of labels. The value is stored internally in \crt@listoflabelsstructurelevel which defaults to section

v0.4 2017-12-06

This is a preamble - only macro.

v0.4 2017-12-06

\crt@listoflabelsstructurelevel

This holds the structure level of the list of labels entries. Do not change this macro directly, but use \crtlistoflabelsstructurelevel instead.

7.2 Useful macros for the label command

crossreftools provides two hook macros to be usable inside of the \label command

\crtprelabelhook{\langument\rangle}

This hook is executed before the internally stored \label is called, the argument can be 'anything'.

By default, this macro expands to nothing, but can be redefined with \renewcommand.

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\crtpostlabelhook{\argument\}

This hook is executed after the internally stored \label is called, the argument can be 'anything'. By default, this macro expands to nothing, but can be redefined with \renewcommand.

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Part III

Examples

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8 Driver example

```
%% LaTeX package crossreftools - version 0.4 (2017/12/26 -- 17:55:15)
%% Driver file for crossreftools.sty
%%
%%
%%
%% Copyright (c) 2017 by Dr. Christian Hupfer <typography dot with dot latex
   at gmail dot com>
%%
%% This work may be distributed and/or modified under the
%% of this license or (at your option) any later version.
%% The latest version of this license is in
    http://www.latex-project.org/lppl.txt
%% and version 1.3 or later is part of all distributions of LaTeX
%% version 2005/12/01 or later.
%%
%%
%% This work has the LPPL maintenance status 'author-maintained'
%%
\documentclass{book}
\usepackage{hyperref}
```

```
\usepackage{cleveref}
\usepackage{crossreftools}
\setlength{\parindent}{0em}
\def\labeltoshow{foochapterlabel}
\def\equationlabeltoshow{fooequationlabel}
\crtlistoflabelsstructurelevel{section}
\begin{document}
\tableofcontents
\crtlistoflabels*
\clearpage
\chapter{Some easy usages of crossreftools}
%\setcounter{chapter}{16}% Just for checking
Let us refer the usual way: \Cref{\labeltoshow}
\edef\foocntr{\crtcrefcounter{\labeltoshow}}
The counter for \fbox{\labeltoshow} is \foocntr\ or
   \crtcrefcounter{\labeltoshow}. It is used on page
   \crtcrefpage{\labeltoshow}. The value for the misspelled label name is
   \crtcrefnumber{labeltoshowstuff}, whereas the correct value is
   \crtcrefnumber{\labeltoshow}.
The result is \fbox{\crtcrefresult{\labeltoshow}}
\edef\labeltoshowname{\crtcrefname{chapter}}
\section{Extracting usual reference information}
```

```
Extracting content with \verb!\crtextractref!
  \begin{itemize}
  \item reference: \crtextractcref{reference}{\labeltoshow}
  \item page: \crtextractcref{page}{\labeltoshow}
\end{itemize}
If the \fbox{hyperref} package is loaded, further properties are retrievable:
\begin{itemize}
               \crtextractref{name}{\labeltoshow}
  \item name:
  \item hyperanchor: \crtextractref{anchor}{\labeltoshow}
  \item unused: \crtextractref{unused}{\labeltoshow}
  \end{itemize}
The 5th (and usually empty) label property introduced by hyperref is unused as
   of version v6.85a of that package -- \crtextractref{unused}{labelname} will
   return nothing here, i.e. the expansion is empty.
This works only if there is usual hyper anchor for the counter:
   \crtrefcounter{fooequationlabel}.
\section{Extracting the cleveref names}
\begin{itemize}
\item The lower case cross reference name for \fbox{\equationlabeltoshow} is
   \crtcrefnamebylabel{\equationlabeltoshow}, this time using
   \verb!\crtcrefnamebylabel!; the upper case name is
   \crtCrefnamebylabel{\equationlabeltoshow}.
\item Extracting content with \verb!\crtextractcref!
  \begin{itemize}
  \item counter: \crtextractcref{counter}{\labeltoshow}
  \item number: \crtextractcref{number}{\labeltoshow}
  \item result: \crtextractcref{result}{\labeltoshow}
  \item reference: \crtextractcref{reference}{\labeltoshow}
               \crtextractcref{page}{\labeltoshow}
  \item page:
  \end{itemize}
\end{itemize}
The macro \verb!\crtextractcref! is
   expandable!\edef\counterof{\crtextractcref{counter}{\labeltoshow}} Using
```

```
the stored value for counter: \counterof!
See \crthyperCref{fooequationlabel} and \cref{pythagoreantheorem}.
\chapter{Placing more generic labels}
\clearpage
\crtcrossreflabel[Let us place a label without a counter] {Let us plant a label
   not being connected to a counter:}[somelabel]
\clearpage
See \ref{somelabel} or \nameref{somelabel} on \cpageref{somelabel}
\chapter{This is foo}\label{foochapterlabel}
\setcounter{section}{5}
\section{Foo}\label{foosectionlabel}
\begin{equation}
  E=mc^{2}\label{first equation label}
\end{equation}
\begin{equation}
  E=mc^{2}\label{fooequationlabel}
\end{equation}
\clearpage
\section{Another foo bar section}
\begin{equation}
  a^{2} + b^{2}=c^{2}\label[section]{pythagoreantheorem}% Explicitly use a
   wrong counter type here for testing
\end{equation}
\end{document}
```

Part IV

Meta information

9 Version history

- Version v0.4 2017-12-06
 - Corrected typos in this documentation
 - Added the ► List of Labels feature and the relevant macros from section 7.
 - Added the final and draft package options.
 - Introduced more generic label content macros.
- Version v0.3 2017-10-29

Added the extraction macros for regular labels (i.e. not the **cleveref** - related ones) and convenience wrappers for generating links.

- Version v0.2 2017-10-25
 - Introduced a check in $\crtcrefnamebylabel^{\to P.12}$ and $\crtCrefnamebylabel^{\to P.12}$ whether given label exists
- Version v0.1 2017-10-08

First version

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