Collaborative LaTeX writing with Google Docs

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Abstract

Working with LaTeX documents is not an easy task and doing it collaboratively is even harder. The writing of an article by several authors at the same time implies extra coordination tasks to avoid unsynchronised versions, text overlapping or even loss of information. Collaborative writing platforms (e.g., Google Docs) are trying to solve this issue by enabling synchronous online writing for regular documents. Nevertheless, to our knowledge, there is no easy way to use this platform with LaTeX papers. Here we tailor a template and set of functions to enable collaborative work in LaTeX using Google Docs.

1 Introduction

Collaborative working technologies are very efficient tools. They encourage and facilitate team work. In recent years collaborative working platforms have become popular and their efficiency is well-proven [1]. Moreover, there are some works on collaborative writing of LaTeX documents [2, 6] but none of them provide a working template that enables the use of Google Docs as a writing platform.

Against this background, we introduce a template that enables the writing of collaborative LaTeX documents. Our basic approach will be to use Google Docs for editing, with a Makefile to update local files and run TeX.

The remainder of this paper is structured as follows. Section 2 introduces the requirements to use this template. Section 3 describes the files that are included in the template. Section 4 presents the functions included in the Makefile. Section 5 gives a full example of a collaborative work detailing all the required steps. Section 6 concludes and describes avenues for future work.

The template and functions described in this paper are available at:
`http://paginaspersonales.deusto.es/igor.ira/ private$/collaborative-latex`.

2 Requirements

The use of this collaborative template requires some background in LaTeX [4], Google Docs [3], GNU Make [5] and GNU/Linux [7]. Nevertheless, this document aims to be self-contained and provide enough information to start creating collaborative documents using Google Docs. The reader will also need a user account on Google Docs.

3 Provided files

A description of the files provided in this collaborative LaTeX writing template:

- `template.pdf`: This paper itself.
- `CHANGELOG`: Tracking of the different versions, detailing the changes between them.
- `TODO`: Ideas for future improvements.
- `/template/`: A folder that contains an executable example of this template.
- `/template/Makefile`: A Makefile that contains all the executable commands to enable collaborative LaTeX writing. This file content will be detailed in Section 4.
- `/template/time-machine/`: A folder that contains a daily backup of the work.
- `/template/figures/`: A folder that contains the figures of this paper.
- `/template/src/`: A folder that contains the source code of this paper.
- `/template/template.tex`: The LaTeX source for this document.
- `/template/template.bib`: The BibTeX source for the references of this document.

4 Makefile description

Description of the Makefile configuration parameters:

- `FILE_TEX`: Name of the main TeX file.
- `DATESTAMP`: Syntax of date stamp for backups.
- `ACCOUNTTYPE`: Account type used to authenticate in Google Docs.
- `EMAIL`: Email account that identifies the author on Google Docs. It must have access to the shared document.
- `PASSWD`: The password associated to the previous user's email. If the user has the 2-step verification system enabled, an authorized application password is required.
- `SERVICE`: The type of service to use in Google Docs. It must be set to `writely`.
- `SOURCE`: Source domain of the request.
- `TEX_GOOGLE_DOCS`: TeX file resource identifier in Google Docs. In order to find the value of this resource, open the collaborative working document in Google Docs, copy and paste the document URL from your browser, and extract the resource id from the URL as in the following example:

  Sample document URL: `https://docs.google. com/document/d/123XX123XX/edit?hl=en_GB#`

  Resource id for this document: `123XX123XX`.

- `BIB_GOOGLE_DOCS`: BibTeX file resource identifier in Google Docs. This resource id is found in the same way as with `TEX_GOOGLE_DOCS`.

Next, we describe the Makefile functions (targets):

- `all`: Default execution function for the Makefile. Set to *latex*.
- `latex`: Compiles the document using *latex*, *bibtex* and *dvipdfm*. Performs a daily backup of the work. If working with indexes, a *makeindex* line can be uncommented.
- `pdflatex`: Compiles the document using *pdflatex* and *bibtex*. Otherwise like `latex`.
- `rtf`: Compiles the document using *latex*, *bibtex* and *latex2rtf*. Otherwise like `latex`.
- `view`: Opens the generated PDF file with the *evince* document viewer.
- `clean`: Cleans all the temporary working files generated in a compilation. It is used before each compilation in order to avoid possible errors from previous failed compilations.
- `update`: Update collaborative working documents, both TeX and BibTeX files, from the Google Docs version. This function overwrites your local files with the ones from Google Docs! Make sure you upload all your changes to the online version before executing it.

5 Collaborative working example

We are going to enumerate the steps required to perform a collaborative writing piece using this template:

1. Open a Google Docs document with extension `.tex`; we'll use `template.tex` for our example. Get the associated document resource as described in Section 4. Set the Makefile parameter `TEX_GOOGLE_DOCS` to this value. See Figure 1 for an example of editing in Google Docs.
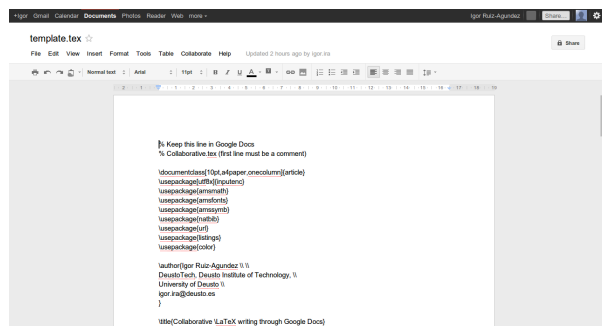

Figure 1: TeX file editing in Google Docs

2. Similarly, open a Google Docs document with extension `.bib`; we'll use `template.bib`. Get the associated document resource id as described in Section 4. Set the Makefile parameter `BIB_GOOGLE_DOCS` to this value.

3. Set the other Makefile parameters as detailed in Section 4 with your personal configuration.

4. Give some initial content to `template.tex` in Google Docs. It is worth mentioning that the document will require an extra line at the beginning of the text. This extra line aims to avoid character encoding problems that may occur when importing the document with the Makefile. This first line will be automatically cleaned. We recommend setting this line to '`%Keep this line in Google Docs`', to remind authors that they must not delete it.

5. Give some initial content to `template.bib` in Google Docs. As in the case of the TeX file, this document will require an extra line in the beginning on Google Docs for the same reason. We recommend the same convention.

6. From your shell, run *make update* in the template folder to get the TeX and BibTeX documents from Google Docs.

7. Run *make* to compile the document, or *make latex*, *make pdflatex*, or *make rtf* to perform different compilations and obtain the corresponding output file formats.

8. Run *make view* to open the generated *pdf* document with the *evince* document viewer.

It is important to edit the files as stored on Google Docs and not the local copies. Otherwise, there would not be any collaboration between the authors and you could lose your contributions to the documents when updating your local files from your colleagues' work.

If at some point you cannot access Google Docs (e.g., you do not have Internet access), however, we can only recommend working locally and committing your changes online as soon as possible.

6 Conclusions

This article aims to provide a collaborative LaTeX writing context in Google Docs. It describes the requirements to start creating collaborative documents using this template, the provided files, the parameters and functions, and gives a full execution example.

Future work will focus on supporting various TeX files seamlessly; that is, with no need to edit the Makefile. In this way, documents that are split among different Google Docs files would update and

compile automatically. If other collaborative writing platforms emerge, their support could also be included in this collaborative LaTeX template.

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[6] Wikibooks. LaTeX/Collaborative Writing of LaTeX Documents. http://en.wikibooks.org/wiki/LaTeX/Collaborative_Writing_of_LaTeX_Documents.

[7] Wikipedia. GNU/Linux naming controversy. http://en.wikipedia.org/wiki/GNU/Linux_naming_controversy.

A   Appendix: Makefile template

```
1  # Makefile
2  # Author: Igor Ruiz-Agundez
3  # Affiliation: DeustoTech, Deusto Institute of
       Technology, University of Deusto
4  # Version: v.1.0
5
6  ###
7  # TEX configuration
8  ###
9  # Name of the main TEX file to work with
10 FILE_TEX=template
11
12 ###
13 # Backup configuration
14 ###
15 # Syntax of the date stamp for the backups
16 DATESTAMP=`date +'%Y-%m-%d'`
17
18 ###
19 # Authentication parameters
20 ###
21 # Account type that is used to authenticate in
       Google Docs
22 ACCOUNTTYPE=GOOGLE
23
24 # Email account that identifies the author on Google
       Docs. Must have access to the collaborative
       document.
25 # EMAIL=your-email-with-google-account
26 EMAIL=your-email-with-google-account
27
28 # The password associated to the previous user's
       email. Note that if the 2-step verification
       system is enabled an authorized application
       password is required.
29 # PASSWD=your-password
30 PASSWD=your-password
31
32 # The type of service to use in Google Docs. It must
       be set to writely:
33 SERVICE=writely
34
35 # Source domain of the request
36 SOURCE=deusto.es
37
38 ###
39 # Google Docs resource ids
40 ###
41 # To get the resource ids:
42 # Open the document with Google Docs
43 # Copy and paste the document URL from your browser
44 # Example:
45 # https://docs.google.com/document/d/123XXX123XXX/
       edit?hl=en_GB#
46 # In this example, the resource id is:
47 # 123XXX123XXX
48
49 # .tex file resource id
50 TEX_GOOGLE_DOCS=123XXX123XXX
51
52 # .bib file resource id
53 BIB_GOOGLE_DOCS=123XXX123XXX
54
55
56 ###
57 # make execution functions
58 ###
59
60 all: latex
61
62 latex: clean
63   latex ${FILE_TEX}.tex
64   # Uncomment makeindex runs if needed:
65   # makeindex ${FILE_TEX}.nlo -s nomencl.ist -o ${
         FILE_TEX}.nls
66   # makeindex ${FILE_TEX}
67   bibtex ${FILE_TEX}
68   latex ${FILE_TEX}.tex
69   latex ${FILE_TEX}.tex
70   dvipdfm ${FILE_TEX}.dvi
71   # Backup tex, bib and generated pdf files
72   # There is one backup per day
```

```
 73   mkdir -p time-machine/${DATESTAMP}
 74   cp ${FILE_TEX}.tex time-machine/${DATESTAMP}/${
        FILE_TEX}.tex
 75   cp ${FILE_TEX}.bib time-machine/${DATESTAMP}/${
        FILE_TEX}.bib
 76   cp ${FILE_TEX}.pdf time-machine/${DATESTAMP}/${
        FILE_TEX}.pdf
 77
 78 pdflatex: clean
 79   pdflatex ${FILE_TEX}.tex
 80   # Uncomment makeindex runs if needed:
 81   # makeindex ${FILE_TEX}.nlo -s nomencl.ist -o ${
        FILE_TEX}.nls
 82   # makeindex ${FILE_TEX}
 83   bibtex ${FILE_TEX}
 84   pdflatex ${FILE_TEX}.tex
 85   pdflatex ${FILE_TEX}.tex
 86   pdflatex ${FILE_TEX}.tex
 87   # Backup tex, bib and generated pdf files
 88   # There is one backup per day
 89   mkdir -p time-machine/${DATESTAMP}
 90   cp ${FILE_TEX}.tex time-machine/${DATESTAMP}/${
        FILE_TEX}.tex
 91   cp ${FILE_TEX}.bib time-machine/${DATESTAMP}/${
        FILE_TEX}.bib
 92   cp ${FILE_TEX}.pdf time-machine/${DATESTAMP}/${
        FILE_TEX}.pdf
 93
 94 rtf: clean
 95   latex ${FILE_TEX}.tex
 96   # Uncomment makeindex runs if needed:
 97   # makeindex ${FILE_TEX}.nlo -s nomencl.ist -o ${
        FILE_TEX}.nls
 98   # makeindex ${FILE_TEX}
 99   bibtex ${FILE_TEX}
100   latex ${FILE_TEX}.tex
101   latex ${FILE_TEX}.tex
102   latex2rtf ${FILE_TEX}.tex
103   # Backup tex, bib and generated rtf files
104   # There is one backup per day
105   mkdir -p time-machine/${DATESTAMP}
106   cp ${FILE_TEX}.tex time-machine/${DATESTAMP}/${
        FILE_TEX}.tex
107   cp ${FILE_TEX}.bib time-machine/${DATESTAMP}/${
        FILE_TEX}.bib
108   cp ${FILE_TEX}.pdf time-machine/${DATESTAMP}/${
        FILE_TEX}.rtf
109
110 view:
111   # Open the pdf document with evince
112   evince ${FILE_TEX}.pdf &
113
114 clean:
115   # Cleaning ${FILE_TEX} related files...
116   ls ${FILE_TEX}.* | grep -v \.tex$ | grep -v \.bib$
        | grep -v \.ltx$ | xargs rm -fv
117   # Cleaning other tex related files if applicable...
118   rm -fv *log *aux *dvi *lof *lot *bit *idx *glo *bbl
        *ilg *toc *ind *blg *out *nlo *brf *nls *pdf
119   # Cleaning in subdirectories *.aux files...
120   find . -regex '.*.aux' -print0 | xargs -0 rm -rfv
121   # Cleaning in subdirectories *.log files...
122   find . -regex '.*.log' -print0 | xargs -0 rm -rfv
123   # Cleaning in subdirectories *.bbl files...
124   find . -regex '.*.bbl' -print0 | xargs -0 rm -rfv
125   # Cleaning in subdirectories *.blg files...
126   find . -regex '.*.blg' -print0 | xargs -0 rm -rfv
```

```
127   # If there are other generated files, add the
        previous command again with the proper
        extension
128
129
130 update:
131   # Create temporary file with the POST request
        configuration
132   # Uses the authentication parameters of this
        Makefile
133   echo "POST /accounts/ClientLogin HTTP/1.0\nContent-
        type: application/x-www-form-urlencoded\n\
        naccountType=${ACCOUNTTYPE}&Email=${EMAIL}&
        Passwd=${PASSWD}&service=${SERVICE}&source=${
        SOURCE}" > credentials.txt
134
135   # Perform the authentication
136   # Credentials are defined in Makefile
137   # and temporally store in updater/credentials.txt
138   wget -O clientLogin.txt --no-check-certificate --
        post-file=credentials.txt "https://www.google.
        com/accounts/ClientLogin" >/dev/null 2>&1
139
140   # Remove client login information (for security
        reasons)
141   rm credentials.txt
142
143   ##
144   # Get the TEX document
145   ##
146
147   # Get the document indicated by the first parameter
148   wget --header "Authorization: GoogleLogin auth=`cat
        clientLogin.txt | grep Auth | sed "s#Auth=##"
        | xargs echo -n`" "https://docs.google.com/
        feeds/download/documents/Export?docID=${
        TEX_GOOGLE_DOCS}&exportFormat=txt" -O temp.txt
149
150   # The first line of the downloaded line contains
        not valid characters
151   # Remove first line of the downloaded document
152   sed 1d temp.txt > ${FILE_TEX}.tex
153   # Remove the temp file
154   rm temp.txt
155
156   ##
157   # Get the BIB document
158   ##
159
160   # Get the document indicated by the first parameter
161   wget --header "Authorization: GoogleLogin auth=`cat
        clientLogin.txt | grep Auth | sed "s#Auth=##"
        | xargs echo -n`" "https://docs.google.com/
        feeds/download/documents/Export?docID=${
        BIB_GOOGLE_DOCS}&exportFormat=txt" -O temp.txt
162
163   # The first line of the downloaded line contains
        not valid characters
164   # Remove first line of the downloaded document
165   sed 1d temp.txt > ${FILE_TEX}.bib
166   # Remove the temp file
167   rm temp.txt
168
169   # Remove client login information (for security
        reasons)
170   rm clientLogin.txt
```

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