

# 融合版本控制和区块链：CCS

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## Abstract

本文将讨论 CCS (*Collaborative Concurrent System*, 合作并行系统, 一个为 Fissure 项目打造的以新方式实现内容版本存储和分发的松散透明、鼓励能者多劳的分布式修订版本控制系统; 其主旨不在重建、保存过去的版本, 而在为一个最终的产品提供多个版本, 形成多个分叉。本文主要讨论 CCS 的一些目前和潜在应用; 最后总结讨论一些值得进一步研究的开放性问题。

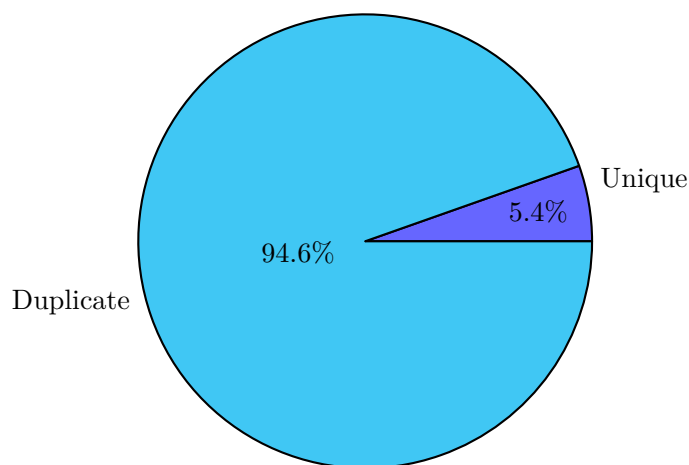
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## 1 绪论 | Introduction

CCS 将为每一个变更、更新贴上大量的附加上下文信息的标签, 从而让公众知道修改部分、修改时间、修改用户, 等等。这样可以帮助用户对内容演进过程中的事件产生有价值的见解。大多数软件开发组织都采用了某种其他形式的 CCS, 比如 git、SVN 等。因此, CCS 对很多软件项目都具有广泛的适用性。

## 2 再度使用数据 | Reusing Data

CCS 的一大特色是对数据的再度使用, 以免造成任何意义上的浪费。根据 *Analysis of Ethereum Smart Contracts - A Security Perspective*, 字节码数据集、Solidity 数据集中的重复内容分别高达 94.6% 以及 95.3%。



### 3 最长原则

故事的版本之间会有各种的冲突；为了解决这些冲突，我们决定参考区块链的最长链原则，当一个分支上接了六个新的片段后，我们将其设为默认分支，其他用户必须手动更换到其他分支。当然，可以合并在产生分裂问题的分支之后的内容到默认分支。

#### 3.1 Titles and authors' names

In the NLE style, the title of the article and the author's name (or authors' names) are used both at the beginning of the article for the main title and throughout the article as running headlines at the top of every page. The title is used on odd-numbered pages (rectos) and the author's name appears on even-numbered pages (versos). Although the main heading can run to several lines of text, the running head line must be a single line. Moreover, the main heading can also incorporate new line commands (*e.g.* `\\`) but these are not acceptable in a running headline. To enable you to specify an alternative short title and author's name, the standard `\title` and `\author` commands have been extended to take an optional argument to be used as the running headline:

```
\title[A short title]{The full title which can be as long
as necessary}
\author[Author's name]{The full author's name, followed by\\
the affiliation if necessary}
```

The following example is taken from Abadi et al. (1991) and shows several authors and their affiliations.

```
\title{Explicit substitutions}
\author[M. Abadi and others]
{M.\ns A\ls B\ls A\ls D\ls I,\ns
  L.\ns C\ls A\ls R\ls D\ls E\ls L\ls L\ls I\\
  Digital Equipment Corp., Systems Research Center,\\
  130 Lytton Avenue, Palo Alto, California, USA 94301
\and
  P.-L.\ns C\ls U\ls R\ls I\ls E\ls N\\
  Laboratoire d'Informatique, Ecole Normale Sup'erieure,
  45 Rue d'Ulm 75005, Paris, France
\and
  and\ns J.-J.\ns L\ls \ 'E\ls V\ls Y\\
  INRIA, Domaine de Voluceau, Roquencourt, B.P.105, 78153,
  Le Chesnay, Cedex, France.}
```

Notice the use of the predefined macros `\ls` and `\ns` to letter-space the author's name. As you can see from this example, when there are four or more authors, the short author name argument should contain the first authors name followed by the text 'and others'.

### 3.2 Abstract

The NLE style provides for an abstract which is produced by the following commands

```
\begin{abstract}
...
\end{abstract}
```

### 3.3 Lists

The NLE style provides the three standard list environments.

- Bulleted lists, created using the `itemize` environment.
- Numbered lists, created using the `enumerate` environment.
- Labelled lists, created using the `description` environment.

### ***3.4 Footnotes***

The NLE journal style uses superior numbers for footnote references.<sup>1</sup>

## **4 Some guidelines for using standard facilities**

The following notes may help you achieve the best effects with the NLE style file.

### ***4.1 Sections***

L<sup>A</sup>T<sub>E</sub>X provides five levels of section headings and they are all defined in the NLE style file:

- `\section.`
- `\subsection.`
- `\subsubsection.`
- `\paragraph.`
- `\subparagraph.`

Section numbers are given for sections, subsection and subsubsection headings.

### ***4.2 Running headlines***

As described above, the title of the article and the author's name (or authors' names) are used as running headlines at the top of every page. The title is used on odd-numbered pages (rectos) and the author's name appears on even-numbered pages (versos).

The `\pagestyle` and `\thispagestyle` commands should *not* be used. Similarly, the commands `\markright` and `\markboth` should not be necessary.

### ***4.3 Tables***

The `figure` and `table` environments are implemented as described in the L<sup>A</sup>T<sub>E</sub>X Manual to provide consecutively numbered floating inserts for illustrations and tables respectively. The standard inserts and their captions are formatted centred. Line breaks in captions can be inserted as required using `\\`.

<sup>1</sup> This shows how a footnote is typeset.

The NLE style file will cope with most positioning of your tables and you should not normally use the optional positional qualifiers on the `table` environment which would override these decisions. Normal journal style sets the table caption first, followed by a double rule, the table body and a double rule at the bottom. Single rules and spanner rules (`\cline`) can be used to separate headings from the columns. For example, Table 1 is produced using the following commands:

```
\begin{table}
  \caption{Results of Overloading for 3 Experimental Setups}
  \begin{minipage}{\textwidth}
    \begin{tabular}{lcr}
      \hline\hline
      Program& Expt.&
      CPU\footnote{Seconds of elapsed time on an unloaded Sun 3/50.}&
      RelCPU\footnote{CPU Time relative to experiment (a).}&
      GC& Mem\footnote{Bytes of heap used over the duration of the program.}&
      RelMem\footnote{Memory usage relative to experient (a).}\\
      \hline
      8 Queens& (a)& 2\hpt 88& 1\hpt 00& 6& 1\hpt 7M& 1\hpt 00\\
      & (b)& 32\hpt 51& 11\hpt 29& 193& 48\hpt 9M& 28\hpt 76\\
      & (c)& 7\hpt 90& 2\hpt 74& 42& 11\hpt 3M& 6\hpt 65\\
      \noalign{\vspace {.5cm}}
      Primes& (a)& 4\hpt 89& 1\hpt 00& 19& 5\hpt 3M& 1\hpt 00\\
      & (b)& 47\hpt 54& 9\hpt 72& 204& 54\hpt 5M& 10\hpt 28\\
      & (c)& 10\hpt 08& 2\hpt 06& 47& 13\hpt 0M& 2\hpt 45\\
      \noalign{\vspace {.5cm}}
      Nfib& (a)& 21\hpt 65& 1\hpt 00& 161& 40\hpt 4M& 1\hpt 00\\
      & (b)& 221\hpt 65& 10\hpt 24& 1382& 349\hpt 0M& 8\hpt 64\\
      & (c)& 21\hpt 30& 0\hpt 98& 161& 42\hpt 0M& 1\hpt 03\\
      \noalign{\vspace {.5cm}}
      KWIC& (a)& 7\hpt 07& 1\hpt 00& 15& 6\hpt 3M& 1\hpt 00\\
      & (b)& 34\hpt 55& 4\hpt 89& 109& 47\hpt 8M& 7\hpt 59\\
      & (c)& 31\hpt 62& 4\hpt 47& 53& 45\hpt 0M& 7\hpt 14\\
      \hline\hline
    \end{tabular}
    \vspace{-2\baselineskip}
  \end{minipage}
  \label{sample-table}
\end{table}
```

Table 1. *Results of Overloading for 3 Experimental Setups*

Program	Expt.	CPU <sup>a</sup>	RelCPU <sup>b</sup>	GC	Mem <sup>c</sup>	RelMem <sup>d</sup>
8 Queens	(a)	2.88	1.00	6	1.7M	1.00
	(b)	32.51	11.29	193	48.9M	28.76
	(c)	7.90	2.74	42	11.3M	6.65
Primes	(a)	4.89	1.00	19	5.3M	1.00
	(b)	47.54	9.72	204	54.5M	10.28
	(c)	10.08	2.06	47	13.0M	2.45
Nfib	(a)	21.65	1.00	161	40.4M	1.00
	(b)	221.65	10.24	1382	349.0M	8.64
	(c)	21.30	0.98	161	42.0M	1.03
KWIC	(a)	7.07	1.00	15	6.3M	1.00
	(b)	34.55	4.89	109	47.8M	7.59
	(c)	31.62	4.47	53	45.0M	7.14

<sup>a</sup> Seconds of elapsed time on an unloaded Sun 3/50.

<sup>b</sup> CPU Time relative to experiment (a).

<sup>c</sup> Bytes of heap used over the duration of the program.

<sup>d</sup> Memory usage relative to experient (a).

Notice the use of the `\hpt` macro to obtain the centered decimal points, inside the body of the table.

The `tabular` environment should be used to produce ruled tables; it has been modified for the NLE style in the following ways:

1. Additional vertical space is inserted above and below a horizontal rule (produced by `\hline`);
2. Tables are centred, and span the full width of the page; that is, they are similar to the tables that would be produced by `\begin{minipage}{\textwidth}`.

Because of this reformatting, vertical rules should not be used; furthermore, commands to redefine quantities such as `\arraystretch` should be omitted. If the old `tabular` facilities are needed, there is a new environment, `oldtabular`, which has none of the reformatting; it should be used in exactly the same way.

Fig. 1. An example figure with space for artwork.

#### 4.4 *Illustrations (or figures)*

The NLE style will cope with most positioning of your illustrations and you should not normally use the optional positional qualifiers on the `figure` environment which would override these decisions. Figure captions should be below the figure itself, therefore the `\caption` command should appear after the figure or space left for an illustration.

Figure 1 shows an example of space left above a caption for artwork to be pasted in. This was produced with the following commands:

```
\begin{figure}  
  \vspace{5cm} % the vertical depth of the artwork  
  \caption{An example figure with space for artwork.}  
  \label{sample-figure}  
\end{figure}
```

The vertical depth should correspond roughly to the artwork you will submit; it will be adjusted to fit the final artwork exactly.

#### 4.5 *Bibliography*

As with standard L<sup>A</sup>T<sub>E</sub>X, there are two ways of producing a bibliography; either by compiling a list of references by hand (using a `thebibliography` environment), or by using BibTeX with a suitable bibliographic database. However, contributors are encouraged to format their list of references in NLE style outlined in section 4.5.2 below.

#### 4.5.1 References in the Text

References in the text are given by author and date. Whichever method is used to produce the bibliography, the references in the text are done in the same way. Each bibliographical entry has a key, which is assigned by the author and used to refer to that entry in the text. There is one form of citation – `\cite{key}` – to produce the author and date, and another form – `\shortcite{key}` – which produces the date only. Thus, Akmajian and Lehrer (1976) is produced by

Akmajian and Lehrer `\shortcite{akm76}`

while (Salton *et al.* 1990) is produced by

`\cite{sal90}`.

#### 4.5.2 List of References

The following listing shows some references prepared in the style of the journal.

```
\begin{thebibliography}{}
  \bibitem[\protect\citename{Akmajian and Lehrer }1976]{akm76}
    Akmajian, A. and Lehrer, A. (1976) NP-like quantifiers and the
    problem of determining the head of an NP. {\it Linguistic
    Analysis\/} {\bf 2}: 295--313.
  \bibitem[\protect\citename{Huddleston }1984]{hud84}
    Huddleston, Rodney. (1984) {\it Introduction to the Grammar of
    English}. Cambridge: Cambridge University Press.
  \bibitem[\protect\citename{McCord }1990]{mcc90}
    McCord, Michael C. (1990) Slot grammar: a system for simpler
    construction of practical natural language grammars. In R.
    Studer (ed.), {\it Natural Language and Logic: International
    Scientific Symposium}, pp.~118--45. Lecture Notes in Computer
    Science. Berlin: Springer-Verlag.
  \bibitem[\protect\citename{Salton {\it et al.}\ }1990]{sal90}
    Salton, Gerald, Zhao, Zhongnan and Buckley, Chris. (1990)
    A simple syntactic approach for the generation of indexing
    phrases. Technical Report 90--1137, Department of Computer
    Science, Cornell University.
\end{thebibliography}
```



This list typesets as shown at the end of this guide. Each entry takes the form

```
\bibitem[\protect\citename{Author(s), }Date]{tag}
```

**Bibliography entry**

where **Author(s)** should be the author names as they are cited in the text, **Date** is the date to be cited in the text, and **tag** is the tag that is to be used as an argument for the `\cite{}` and `\shortcite{}` commands. **Bibliography entry** should be the material that is to appear in the bibliography, suitably formatted. This rather unwieldy scheme makes up for the lack of an author-date system in L<sup>A</sup>T<sub>E</sub>X.

## A Special commands in nle.sty

The following is a summary of the new commands, optional arguments and environments which have been added to the standard L<sup>A</sup>T<sub>E</sub>X user-interface in creating the NLE style file.

### *New commands*

<code>\hpt</code>	to typeset a centered decimal point ( <i>e.g.</i> 1.1). These are normally used inside the body of tables.
<code>\ls, \ns</code>	to letter space the author's name.
<code>\proofbox</code>	used with <code>\usebox</code> to place a proof-box in the text.

### *New optional arguments*

<code>[&lt;short title&gt;]</code>	in the <code>\title</code> command: to define a right running headline that is different from the article title.
<code>[&lt;short author&gt;]</code>	in the <code>\author</code> command: to define a left running headline with text that is different from the authors' names as typeset at the article opening.

### *New environments*

<code>proof</code>	to typeset mathematical proofs.
<code>proof*</code>	to typeset mathematical proofs without the terminating proof-box.

## References

Akmajian, A. and Lehrer, A. (1976) NP-like quantifiers and the problem of determining the head of an NP. *Linguistic Analysis* **2**: 295–313.

- Huddleston, Rodney. (1984) *Introduction to the Grammar of English*. Cambridge: Cambridge University Press.
- McCord, Michael C. (1990) Slot grammar: a system for simpler construction of practical natural language grammars. In R. Studer (ed.), *Natural Language and Logic: International Scientific Symposium*, pp. 118–45. Lecture Notes in Computer Science. Berlin: Springer-Verlag.
- Salton, Gerald, Zhao, Zhongnan and Buckley, Chris. (1990) A simple syntactic approach for the generation of indexing phrases. Technical Report 90–1137, Department of Computer Science, Cornell University.