

Improving Package `float` Using KOMA-Script Package `tocbasic`

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Package `floatbytocbasic` has started as hack module of the KOMA-Script package `scrhack` years ago to fix an issue when using package `float` with KOMA-Script 3. This became necessary because package `float` still depends on an interface once proposed by the KOMA-Script author, but which has long since failed to meet requirements. Unfortunately, this problem could not be solved in dialog with the author of `float`. Although `floatbytocbasic` still loads the `float` package, it then changes some internal commands to use and optimally support the KOMA-Script package `tocbasic`. On the one hand, the user interface of `float` remains usable unchanged, but at the same time the package benefits from many possibilities of `tocbasic`.

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1 Why should I use this package instead of `float` only if I use a KOMA-Script class or KOMA-Script package `tocbasic`?

The main symptom of using a deprecated interface to KOMA-Script by package `float`, namely the use of `\float@listhead` and `\float@addtolists`, are corresponding warnings when using one of the KOMA-Script classes at the same time, for example:

```
Class scrbook Warning: \float@addtolists detected!
(scrbook)      Implementation of \float@addtolist became
(scrbook)      deprecated in KOMA-Script v3.01 2008/11/14 and
(scrbook)      has been replaced by several more flexible
(scrbook)      features of package 'tocbasic'.
(scrbook)      Since Version 3.12 support for deprecated
(scrbook)      \float@addtolist interface has been
(scrbook)      restricted to only some of the KOMA-Script
(scrbook)      features and been removed from others.
(scrbook)      Loading of package 'scrhack' may help to
(scrbook)      avoid this warning, if you are using a
(scrbook)      a package that still implements the
(scrbook)      deprecated \float@addtolist interface.
```

or

```
Class scrbook Warning: \float@listhead detected!
(scrbook)      Implementation of \float@listhead became
(scrbook)      deprecated in KOMA-Script v3.01 2008/11/14 and
(scrbook)      has been replaced by several more flexible
(scrbook)      features of package 'tocbasic'.
(scrbook)      Maybe implementation of \float@listhead will
(scrbook)      removed from KOMA-Script soon.
(scrbook)      Loading of package 'scrhack' may help to
(scrbook)      avoid this warning, if you are using a
(scrbook)      a package that still implements the
(scrbook)      deprecated \float@listhead interface.
```

If you know, that the issue is because of loading package `float` you can avoid it using `floatbytocbasic` as explained in [section 3](#).

2 Why should I use this package instead of `float` only if I don't use a KOMA-Script class or package?

Package `float` does not check if a file extension or environment already has been defined when using `\newfloat`. So several definitions of float environments either with the same name or the same file extension could happen by accident. Package `floatbytocbasic` adds test to avoid such issues. Alternatively you can force the definition or do the definition only if needed. See description of `\deffloat`, `\renewfloat` and `\providefloat` in [section 3](#) for more information.

Package `tocbasic` provides several additional features, e.g.:

- automatic handling of language switching using `babel`,
- optional numbered heading for a list/table of contents,
- optional adding an entry to the table of contents for a list/table of contents even if the heading is not numbered,
- easy configuration of entries to a list/table of contents.

Several more features can be added by the class or other packages. See section about `tocbasic` in the KOMA-Script manual, either [Koh23a] or [Koh23b].

3 How to use `floatbytocbasic`

In the document preamble of your document you just can replace

```
\usepackage{float}
```

by

```
\usepackage{floatbytocbasic}
```

to load package `floatbytocbasic`. This does still also load package `float` but additionally patches several commands of `float` to avoid the issues shown in section 1.

If you want you can alternatively also load both packages explicitly, either `float` before `floatbytocbasic` or—if you want—`floatbytocbasic` before `float`. This is also useful, if you use a package, that uses `float` itself. In this case, you always should load `floatbytocbasic` *before* the package, that uses `float`. Otherwise it is very likely that for some new float environments the enhancements of `floatbytocbasic` will not be used. Only if `floatbytocbasic` is loaded before the first use of `\newfloat` can it be ensured that the definition of the new sliding environments is really done with the help of `tocbasic` and thus its extended user interface is used.

When using a class that uses `float`, the correct operation can be ensured with

```
\AddToHook{package/float/after}{\RequirePackage{floatbytocbasic}}
```

even before `\documentclass`. This requires at least L^AT_EX 2020/10/01. For older versions of L^AT_EX you can use

```
\RequirePackage{scrfile}
\AfterPackage{float}{\RequirePackage{floatbytocbasic}}
```

also before `\documentclass`. This would require the KOMA-Script package `scrfile`.

Note: You *should not* load `float` after loading package `floatrow`. However, if you do, `floatrowbytocbasic` will be loaded automatically.

The user interface of `floatbytocbasic` is the same as of `float`, see [Lin01b]. Following we document only the differences.

<pre>\newfloat \providfloat \renewfloat \deffloat</pre>	<p>See [Lin01b, section 2] for the basic usage of <code>\newfloat</code>. The command takes three mandatory arguments and an optional one; it is of the form:</p> <pre>\newfloat{<type>}{<placement>}{<ext>}[<within>]</pre>
---	--

`floatbytocbasic` adds the registration of the file extension $\langle ext \rangle$, which is the third argument. The main problem here is to decide what to do, if $\langle ext \rangle$ already has been registered. Package `float` simply does not care for this case. It does neither report an error nor a warning, but just redefine the float $\langle type \rangle$ and reuses the auxiliary file extension $\langle ext \rangle$. Because of the “new” in the name of the command, we have decided to do it a little bit different. If the owner of the $\langle ext \rangle$ is `float`, it is assumed, that using the same auxiliary file is intended and only an info is written to the log-file. Otherwise an error is reported. But we also decided to define three new commands:

```

\deffloat{<type>}{<placement>}{<ext>}[<within>]
\providefloat{<type>}{<placement>}{<ext>}[<within>]
\renewfloat{<type>}{<placement>}{<ext>}[<within>]

```

`\deffloat` also does not care for already existing $\langle type \rangle$ environment or already registered $\langle ext \rangle$. `\providefloat` does not overwrite existing $\langle type \rangle$ environment or already registered $\langle ext \rangle$ for other owners but `float`. `\renewfloat` does overwrite only already existing $\langle type \rangle$ environment with registered $\langle ext \rangle$. There are also cases like defined $\langle type \rangle$ but not `\end<type>` or not defined environment $\langle type \rangle$ but registered $\langle ext \rangle$. But there are no special commands to handle these. If users need to take care for these cases, they can test for definition using the L^AT_EX kernel macro `\@ifundefined` and the `tocbasic` command `\Ifattoclist`, described in the KOMA-Script user manuals [Koh23a] resp. [Koh23b].

4 Implementation

`floatbytocbasic` depend on KOMA-Script package `tocbasic`. So we load it already before everything else. We use this package also to require at least KOMA-Script 3.41, which is one version before the intended spin-off.

```

1 \@ifpackageloaded{floatrow}{%
2   \PackageWarning{floatbytocbasic}{%
3     package incompatible with package floatrow.\MessageBreak
4     Automatically using floatrowbytocbasic%
5   }%
6   \RequirePackage{floatrowbytocbasic}%
7   \endinput
8 }{}
9 \RequirePackage{tocbasic}[2023/07/07]

```

We also load package `float`, because we reuse most of the code:

```
10 \RequirePackage{float}
```

As often as possible, we do not redefine macors of `float`, but patch them using `xpatch`:

```
11 \RequirePackage{xpatch}
```

We also use the new document command interface. So if the L^AT_EX kernel is too old, we require `xparse`:

```

12 \@ifundefined{NewDocumentCommand}{%
13   \RequirePackage{xparse}%
14 }{}

```

`\deffloat` Basically `\deffloat` is `\newfloat` of `float`:

```

15 \@ifundefined{NewCommandCopy}{\let\deffloat\newfloat}{%
16 \NewCommandCopy\deffloat\newfloat
17 }

```

But we also have to take care, that a not yet registered *<ext>* has to be registered.

Note: We do not need to setup feature `chapteratlist`, because classes like the KOMA-Script classes should use

```
\AtAddToTocList[float]{\setuptoc{\@current}{chapteratlist}}
```

to implement such features.

```

18 \xpretocmd\deffloat{%
19 \Ifattoclist{#3}{%
20 \let\reserved@a\relax
21 \owneroftoc[\def\reserved@a]{#3}\relax
22 \@ifundefined{reserved@a}{}{%
23 \Ifstr{\reserved@a}{float}{%
24 \PackageInfo{floatbytocbasic}{%
25 reusing file extension '#3' for\MessageBreak
26 float type '#1'%
27 }%
28 }{%
29 \PackageWarning{floatbytocbasic}{%
30 reusing file extension '#3' of owner\MessageBreak
31 '\reserved@a' for float '#1'\MessageBreak
32 not recommended%
33 }%
34 }%
35 }%
36 }{\addtotoclist[float]{#3}}%
37 }{}{%
38 \PackageError{floatbytocbasic}{incompatible definition of
39 \string\newfloat}{%
40 Package 'floatbytocbasic' depends on the original definition of package
41 'float'.\MessageBreak
42 Some changes to that definition are tolerated.\MessageBreak
43 \@ifundefined{deffloat}%
44 {But it seems the definition is completely missing!}%
45 {But the current definition is incompatible!}%
46 \MessageBreak
47 Make sure, you have installed the original package 'float' as referred
48 by\Messagebreak
49 section 'References' of the manual.%
50 }%
51 }

```

`\newfloat` `\newfloat` and `\renewfloat` similar to `\newcommand` and `\renewcommand` do some tests and maybe report an error, before (nevertheless) defining the float.

```

\renewfloat 52 \RenewDocumentCommand{\newfloat}{\mmm}{%
53 \@tempwattrue

```

```

54 \Ifattoclist{#3}{%
55   \let\reserved@a\relax
56   \owneroftoc[\def\reserved@a]{#3}\relax
57   \@ifundefined{reserved@a}{}{%
58     \Ifstr{\reserved@a}{float}{}{%
59       \PackageError{floatbytocbasic}{%
60         reusing '#3' of owner '\reserved@a' not allowed%
61       }{%
62         Each file extension should be used only once.\MessageBreak
63         Reusing is only allowed with the same owner/category.\MessageBreak
64         You, the class, or another package already uses '#3'.\MessageBreak
65         \@eha
66       }%
67     \@tempswafalse
68   }%
69 }%
70 }{}%
71 \if@tempswa
72   \expandafter\ifdefinable\csname #1\endcsname{%
73     \IfValueTF{#4}{%
74       \deffloat{#1}{#2}{#3}[#4]%
75     }{%
76       \deffloat{#1}{#2}{#3}%
77     }%
78   }%
79 \fi
80 }
81 \NewDocumentCommand{\providefloat}{mmmo}{%
82   \@ifundefined{#1}{%
83     \newfloat{#1}{#2}{#3}[#4]%
84   }{}%
85 }
86 \NewDocumentCommand{\renewfloat}{mmmo}{%
87   \@ifundefined{#1}{%
88     \@latex@error{Environment #1 undefined}\@ehc
89     \removefromtoclist{#3}%
90   }{%
91     \Ifattoclist{#3}{%
92       \removefromtoclist{#3}%
93     }{%
94       \PackageError{floatbytocbasic}{extension '#3' not yet registered}{%
95         I can only renew floats with already registered
96         extensions.\MessageBreak
97       }%
98     }%
99   }%
100 }%
101 \expandafter\let\csname #1\endcsname\relax
102 \expandafter\let\csname end#1\endcsname\relax
103 \newfloat{#1}{#2}{#3}[#4]%
104 }

```

`\listof` This command is redefined using a complete new definition using `tocbasic`'s `\listoftoc`.

```
105 \renewcommand*\listof[2]{%
106   \@ifundefined{ext@#1}{%
107     \PackageError{floatbytocbasic}{unknown float type ‘#1’}\@eha
108   }{%
109     \@ifundefined{l@#1}{\expandafter\let\csname l@#1\endcsname\l@figure
110     \@ifundefined{l@#1}{%
111       \DeclareTOCStyleEntry[level=1,numwidth=2.3em,indent=1.5em]
112       {default}{#1}%
113     }{}%
114   }{}%
115   \listoftoc[#{2}]{\csname ext@#1\endcsname}%
116 }%
117 }%
```

References

- [Gre20] Enrico Gregorio. *xpatch – Extending `etoolbox` patching commands*. Version 0.3. The package generalises the macro patching commands provided by Philipp Lehmann's `etoolbox`. Mar. 25, 2020. URL: <https://ctan.org/pkg/xpatch> (visited on 07/19/2023).
- [Koh23a] Markus Kohm. *KOMA-Script. The Guide*. June 16, 2023. URL: <http://mirrors.ctan.org/macros/latex/contrib/koma-script/scrguide-en.pdf> (visited on 07/14/2023).
- [Koh23b] Markus Kohm. *KOMA-Script. Die Anleitung*. June 16, 2023. URL: <http://mirrors.ctan.org/macros/latex/contrib/koma-script/scrguide-de.pdf> (visited on 07/04/2023).
- [Koh23c] Markus Kohm. *KOMA-Script — A bundle of versatile classes and packages*. Version 3.41. The KOMA-Script bundle provides replacements for the `article`, `report`, and `book` classes with emphasis on typography and versatility. There is also a letter class. July 7, 2023. URL: <https://ctan.org/pkg/koma-script> (visited on 07/14/2023).
- [Koh23d] Markus Kohm. *scrlfile – Installation control (not only) for KOMA-Script packages*. Version 3.41. The package provides hooks for the execution of commands before or after loading files, classes or packages independent from the L^AT_EX kernel version. July 7, 2023. URL: <https://ctan.org/pkg/scrlfile> (visited on 07/19/2023).
- [Koh23e] Markus Kohm. *tocbasic — Management of tables/lists of contents (and the like)*. Version 3.41. The package provides means to create specialised “table of contents”-like lists of features of a document. July 7, 2023. URL: <https://ctan.org/pkg/tocbasic> (visited on 07/14/2023).
- [Lin01a] Anselm Lingnau. *float — Improved interface for floating objects*. Version 1.3d. Improves the interface for defining floating objects such as figures and tables. Introduces the boxed float, the ruled float and the plaintop float. You can define your own floats and improve the behaviour of the old ones. Nov. 8, 2001. URL: <https://ctan.org/pkg/float> (visited on 07/14/2023).

[Lin01b] Anselm Lingnau. *An Improved Environment for Floats*. Nov. 8, 2001. URL: <http://mirrors.ctan.org/macros/latex/contrib/float/float.pdf> (visited on 07/14/2023).

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Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in *roman* refer to the code lines where the entry is used.

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Change History

v0.1 – 2023/06/01		v1.0 – 2023/08/19	
General: start of KOMA-Script spin-off	<i>1</i>	General: first package release <i>1</i>