

# The beamer-varbox package\*

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## Abstract

A package providing beamer boxes with variable size corners.

## 1 Usage

Loading the package provides the variable `rounded` predefined option for the beamer elements `block begin`, `block alerted begin`, `block example begin`, `block end`, `block alerted end`, and `block example end` and sets them as default. (It is assumed that if you include the package, you want the modified blocks)

## 2 Options

`cornerpercent` The package has one option, `cornerpercent`, that describes the scale of corner arc relative to the standard rounded predefined option provided by the beamer class. It is a keyword option that takes values between 0 and 1 (inclusive) and can be called either when including the package as

```
\usepackage [cornerpercent=value] {beamer-varbox}
```

or when setting the template manually as, e.g.,

```
\setbeamertemplate {(element name)} [variable rounded] [cornerpercent=value]
```

## 3 Implementation

```
1 % Check that beamer class is loaded
2 %
3 \@ifclassloaded{beamer}{}{%
4   \PackageError{beamer-varbox}{%
5     This package needs the beamer class.\MessageBreak
6     To use this package, load the beamer class.
7   }{%
8     The package could not be loaded, because it needs\MessageBreak
9     beamer class to function.
```

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\*This document corresponds to beamer-varbox A, dated 2025/09/11.

```

10     }%
11     \endinput
12 }
13
14
15 % Require xkeyval to do "modern" package keyval handling
16 \RequirePackage{xkeyval}
17
18 \DeclareOptionX{cornerpercent}[0.3]{\def\beamer@cornerpercentdefault{#1}}
19 \ExecuteOptionsX{cornerpercent=0.3}
20 \ProcessOptionsX\relax
21
22 % Define 0 to compare against
23 \def\bmb@zero{0}
24
25 %
26 % Define used keys
27 %
28 \define@key{beamerboxes}{scheme}{\def\bmb@upper{@scheme upper #1}\def\bmb@lower{@scheme lower #1}}
29 \define@key{beamerboxes}{upper}{\def\bmb@upper{#1}}
30 \define@key{beamerboxes}{lower}{\def\bmb@lower{#1}}
31 \define@key{beamerboxes}{width}{\edef\bmb@width{#1}}
32 \define@key{beamerboxes}{shadow}[true]{\csname bmb@shadow#1\endcsname}
33 \define@key{beamerboxes}{cornerpercent}{\def\bmb@cornerpercent{#1}}
34
35 % Define needed variables
36 \newif\ifbmb@shadow
37 \newbox\bmb@box
38 \newbox\bmb@colorbox
39 \newdimen\bmb@boxwidth
40 \newdimen\bmb@boxheight
41 \newdimen\bmb@prevheight
42 \newdimen\bmb@temp
43 \newdimen\bmb@dimA
44 \newdimen\bmb@dimB
45 \newdimen\bmb@dimC
46 \newdimen\bmb@prevheight
47 \newdimen\bmb@supportcorner
48 \newdimen\bmb@initstart
49 \newdimen\bmb@advance
50
51 %
52 % The below is adapted from the beamer package
53 % files beamerbaseboxes.sty and beamerbaseauxtemplates.sty.
54 % Authors of those files are:
55 % Till Tantau, Vedran Miletic, Joseph Wright,
56 % Louis Stuart, and samcarter.
57 % Thanks for the work!!
58 %
59 \newcommand\beamerboxesvariablerounded[2] [] {%
60   \global\let\beamer@firstlineitemizeunskip=\relax%
61   \vbox\bgroup%
62   \setkeys{beamerboxes}{upper=block title,lower=block body,width=\textwidth,shadow=false,cornerpercent=0.3}%
63   \setkeys{beamerboxes}{#1}%

```

```

64  {%
65    \usebeamercolor{\bmb@lower}%
66    \globalcolorstrue%
67    \colorlet{lower.bg}{bg}%
68  }%
69  {%
70    \usebeamercolor{\bmb@upper}%
71    \globalcolorstrue%
72    \colorlet{upper.bg}{bg}%
73  }%
74
75  %
76  % Typeset head
77  %
78  \vskip4bp
79  \setbox\bmb@box=\hbox{%
80    \begin{minipage}[b]{\bmb@width}%
81      \usebeamercolor[fg]{\bmb@upper}%
82      #2%
83    \end{minipage}}%
84  \ifdim\wd\bmb@box=0pt%
85    \setbox\bmb@box=\hbox{}%
86    \ht\bmb@box=1.5pt%
87    \bmb@prevheight=-4.5pt%
88  \else%
89    \wd\bmb@box=\bmb@width%
90    \bmb@temp=\dp\bmb@box%
91    \ifdim\bmb@temp<1.5pt%
92      \bmb@temp=1.5pt%
93    \fi%
94    \setbox\bmb@box=\hbox{\raise\bmb@temp\hbox{\box\bmb@box}}%
95    \dp\bmb@box=0pt%
96    \bmb@prevheight=\ht\bmb@box%
97  \fi%
98  %
99  %
100 %
101 \ifdim\bmb@cornerpercent pt >1pt
102 \PackageError{beamer-varbox}{%
103   The key cornerpercent is above 1.\MessageBreak
104   The key is allowed to take values in between 0 and 1 (inclusive)%
105 }{%
106   cornerpercent is allowed to be between 0 and 1 (inclusive)%
107 }%
108 \fi
109 %
110 % Check if the corners should be sharp
111 %
112 \if\bmb@cornerpercent\bmb@zero
113 \bmb@temp=\bmb@width%
114 \bmb@dima=\bmb@temp\advance\bmb@dima by8bp%
115 \bmb@dimc=-\ht\bmb@box\advance\bmb@dimc by-2pt%
116 \hbox{%
117   \begin{pgfpicture}{0bp}{+-\ht\bmb@box}{0bp}{+-\ht\bmb@box}

```

```

118     \ifdim\wd\bmb@box=0pt%
119         \color{lower.bg}%
120         \pgfsetfillopacity{0}
121     \else%
122         \color{upper.bg}%
123     \fi%
124     \pgfpathmoveto{-4bp}{\bmb@dimc}%
125     \pgfpathqlineto{-4bp}{3bp}%
126     \pgfpathqlineto{\bmb@dima}{3bp}%
127     \pgfpathqlineto{\bmb@dima}{\bmb@dimc}%
128     \pgfsetlinewidth{1.5pt}
129     \pgfusepath{fill,stroke}
130     \end{pgfpicture}%
131     \copy\bmb@box%
132 }%
133 \else
134 %
135 % Calculate dimensions for adjusted corner
136 %
137 \bmb@supportcorner=\dimexpr\bmb@cornerpercent\dimexpr1.8bp\relax\relax%
138 \bmb@initstart=\dimexpr 4bp-\bmb@cornerpercent\dimexpr4bp\relax\relax%
139 \bmb@advance=\dimexpr \bmb@initstart+\bmb@cornerpercent\dimexpr2.2bp\relax\relax%
140 % Calculate aux sizes
141 \bmb@temp=\bmb@width%
142 \bmb@dima=\bmb@temp\advance\bmb@dima by\bmb@advance%
143 \bmb@dimb=\bmb@temp\advance\bmb@dimb by4bp%
144 \bmb@dimc=-\ht\bmb@box\advance\bmb@dimc by-2pt%
145 \hbox{%
146     \begin{pgfpicture}{0bp}{+-\ht\bmb@box}{0bp}{+-\ht\bmb@box}
147         \ifdim\wd\bmb@box=0pt%
148             \color{lower.bg}%
149             \pgfsetfillopacity{0}
150         \else%
151             \color{upper.bg}%
152         \fi%
153         \pgfpathmoveto{-4bp}{\bmb@dimc}
154         \pgfpathlineto{\pgfpoint{-4bp}{-1bp+\bmb@initstart}}
155         \pgfpathcurveto% Upper left corner
156         {\pgfpoint{-4bp}{3bp-\bmb@supportcorner}}%
157         {\pgfpoint{-4bp+\bmb@supportcorner}{3bp}}%
158         {\pgfpoint{-\bmb@initstart}{3bp}}%
159         \pgfpathlineto{\pgfpoint{\bmb@temp+\bmb@initstart}{3bp}}
160         \pgfpathcurveto% Upper right corner
161         {\pgfpoint{\bmb@dima}{3bp}}%
162         {\pgfpoint{\bmb@dimb}{3bp-\bmb@supportcorner}}%
163         {\pgfpoint{\bmb@dimb}{-1bp+\bmb@initstart}}%
164         \pgfpathqlineto{\bmb@dimb}{-1bp}%
165         \pgfpathlineto{\pgfpoint{\bmb@dimb}{\bmb@dimc}}
166         \pgfsetlinewidth{1.5pt}
167         \pgfusepath{fill,stroke}
168     \end{pgfpicture}%
169     \copy\bmb@box%
170 }%
171 \fi % of sharp corner check

```

```

172 \nointerlineskip%
173 \vskip-1pt%
174 \ifdim\wd\bmb@box=0pt%
175 \else%
176   \vskip3pt%
177 \fi%
178 \setbox\bmb@colorbox=\hbox{\pgfpicturetrue\pgfsetcolor{lower.bg}}}%
179 \setbox\bmb@box=\hbox\bgroup\begin{minipage}[b]{\bmb@width}%
180   \vskip2pt%
181   \usebeamercolor[fg]{\bmb@lower}%
182   \colorlet{beamerstructure}{upper.bg}%
183   \colorlet{structure}{upper.bg}%
184 }
185
186
187
188 \def\endbeamerboxesvariablerounded{%
189   \end{minipage}\egroup%
190   \bmb@temp=\dp\bmb@box%
191   \advance\bmb@temp by.5pt%
192   \setbox\bmb@box=\hbox{\raise\bmb@temp\hbox{\box\bmb@box}}%
193   \dp\bmb@box=0pt%
194   \bmb@boxwidth=\bmb@width%
195   \bmb@boxheight=\ht\bmb@box%
196   \advance\bmb@boxheight by4bp%
197   \advance\bmb@boxheight by\bmb@prevheight%
198   \ifbmb@shadow%
199     \xdef\beamer@storecolorhook{\beamer@colorhook}
200     \xdef\beamer@colorhook{}
201     \pgfdeclareradialshading{bmb@shadowball}{\pgfpointorigin}
202     {%
203       color(0bp)=(pgftransparent!50);
204       color(4bp)=(pgftransparent!100)
205     }%
206     \pgfdeclareradialshading{bmb@shadowballlarge}{\pgfpointorigin}
207     {%
208       color(0bp)=(pgftransparent!0);
209       color(8bp)=(pgftransparent!100)
210     }%
211     \pgfdeclarehorizontalshading{bmb@shadowhorz\the\bmb@boxheight}{\bmb@boxheight-5.5bp}
212     {%
213       color(0bp)=(pgftransparent!0);
214       color(8bp)=(pgftransparent!100)
215     }%
216     \pgfdeclareverticalshading{bmb@shadowvert\the\bmb@boxwidth}{\bmb@boxwidth-4bp}
217     {%
218       color(0bp)=(pgftransparent!100);
219       color(8bp)=(pgftransparent!0)
220     }%
221   \begingroup%
222     \selectcolormodel{gray}
223     \pgfdeclarefading{bmb@shadowmask\the\bmb@boxwidth\the\bmb@boxheight}
224     {%
225       \begin{pgfpicture}

```

```

226     \pgftext[at=\pgfpoint{4bp}{4bp}]{\pgfuseshading{bmb@shadowball}}% bottom left shadow
227     \ifdim\bmb@boxheight>9.5bp%
228         \pgftext[at=\pgfpoint{\bmb@boxwidth}{8bp}]{\pgfuseshading{bmb@shadowballlarge}}%
229         \pgftext[at=\pgfpoint{\bmb@boxwidth+4bp}{\bmb@boxheight+2bp}]{\pgfuseshading{bmb@
230         \pgftext[base, at=\pgfpoint{\bmb@boxwidth+4bp}{7.5bp}]{\pgfuseshading{bmb@shadowball}}%
231     \else%
232         \pgftext[at=\pgfpoint{\bmb@boxwidth}{4bp}]{\pgfuseshading{bmb@shadowball}}% right shadow
233     \fi%
234     \pgftext[left, at=\pgfpoint{4bp}{4bp}]{\pgfuseshading{bmb@shadowvert}\the\bmb@boxwidth}%
235     %
236     % clipping is needed because shadow is typeset on top of box
237     \begin{pgfscope}
238         \pgfsetcolor{beamer@safeblack}
239         \pgfpathrectangle{\pgfpoint{4bp}{8.1bp}}{\pgfpoint{\bmb@boxwidth}{\bmb@boxheight}}
240         \pgfusepath{fill}
241     \end{pgfscope}
242     \end{pgfpicture}%
243     \hskip4bp%
244 }%
245 \endgroup%
246
247 \fi%
248 %
249 % Check if the corners should be sharp
250 %
251 \if\bmb@cornerpercent\bmb@zero
252 \bmb@temp=\bmb@width%
253 \bmb@dima=\bmb@temp\advance\bmb@dima by8bp%
254 \bmb@dimc=\ht\bmb@box
255 \hbox{%
256     \begin{pgfpicture}{0bp}{0bp}{0bp}{0bp}
257         \ifbmb@shadow%
258             \begin{pgfscope}
259                 \pgfpathrectangle{\pgfpoint{0bp}{-7bp}}
260                 {\pgfpoint{\bmb@boxwidth+8bp}{\bmb@boxheight+6bp}}
261                 \pgfsetfading{bmb@shadowmask\the\bmb@boxwidth\the\bmb@boxheight}{%
262                 \pgftransformshift{\pgfpoint{0.5\bmb@boxwidth+6bp}{0.5\bmb@boxheight-4bp}}}
263                 \pgfusepath{fill}
264             \end{pgfscope}
265         \fi%
266         \unhbox\bmb@colorbox%
267         \pgfpathmoveto{-4bp}{\bmb@dimc}%
268         \pgfpathqlineto{-4bp}{-3bp}%
269         \pgfpathqlineto{\bmb@dima}{-3bp}%
270         \pgfpathqlineto{\bmb@dima}{\bmb@dimc}%
271         \pgfsetlinewidth{1.5pt}
272         \pgfusepath{stroke}
273     \end{pgfpicture}%
274     \box\bmb@box%
275 }%
276 \else
277 \bmb@temp=\bmb@width%
278 \bmb@dima=\bmb@temp\advance\bmb@dima by\bmb@advance%
279 \bmb@dimb=\bmb@temp\advance\bmb@dimb by4bp%

```

```

280 \hbox{%
281   \begin{pgfpicture}{0bp}{0bp}{0bp}{0bp}
282     \ifbmb@shadow%
283       \begin{pgfscope}
284         \pgfpathrectangle{\pgfpoint{0bp}{-7bp}}
285           {\pgfpoint{\bmb@boxwidth+8bp}{\bmb@boxheight+6bp}}
286         \pgfsetfading{\bmb@shadowmask\the\bmb@boxwidth\the\bmb@boxheight}{%
287           \pgftransformshift{\pgfpoint{0.5\bmb@boxwidth+6bp}{0.5\bmb@boxheight-4bp}}}
288         \pgfusepath{fill}
289       \end{pgfscope}
290     \fi%
291     \unhbox\bmb@colorbox%
292     \bmb@dimc=\ht\bmb@box
293     \pgfpathmoveto{-4bp}{\bmb@dimc}
294     \pgfpathlineto{\pgfpoint{-4bp}{1bp-\bmb@initstart}}
295     \pgfpathcurveto% Lower left corner
296     {\pgfpoint{-4bp}{-3bp+\bmb@supportcorner}}%
297     {\pgfpoint{-4bp+\bmb@supportcorner}{-3bp}}%
298     {\pgfpoint{-\bmb@initstart}{-3bp}}%
299     \pgfpathlineto{\pgfpoint{\bmb@temp+\bmb@initstart}{-3bp}}
300     \pgfpathcurveto% Lower right corner
301     {\pgfpoint{\bmb@dima}{-3bp}}%
302     {\pgfpoint{\bmb@dimb}{-3bp+\bmb@supportcorner}}%
303     {\pgfpoint{\bmb@dimb}{1bp-\bmb@initstart}}%
304     \pgfpathqlineto{\bmb@dimb}{-1bp}%
305     \pgfpathlineto{\pgfpoint{\bmb@dimb}{\bmb@dimc}}
306     \pgfsetlinewidth{1.5pt}
307     \pgfusepath{stroke}
308   \end{pgfpicture}%
309   \box\bmb@box%
310 }%
311 \fi% of corner check
312 \ifbmb@shadow%
313   \vskip4bp minus 2bp%
314 \else%
315   \vskip2bp%
316 \fi%
317 \egroup% of \vbox\bgroup
318 \ifbmb@shadow%
319   \xdef\beamer@colorhook{\beamer@storecolorhook}
320 \fi
321 }
322
323
324 \defbeamerteremplate*{block begin}{variable rounded}[1][shadow=false]%
325 {%
326   \par\vskip\medskipamount%
327   \begin{beamerboxesvariablerounded}[upper=block title,lower=block body,#1]%
328     {\raggedright\usebeamerfont*{block title}\insertblocktitle}%
329     \raggedright%
330     \usebeamerfont{block body}%
331 }%
332
333 \defbeamerteremplate*{block end}{variable rounded}%

```

```

334 {%
335   \end{beamerboxesvariablerounded}\vskip\smallskipamount
336 }%
337
338 \defbeamertemplate*{block alerted begin}{variable rounded}[1][shadow=false]
339 {%
340   \par\vskip\medskipamount%
341   \begin{beamerboxesvariablerounded}[upper=block title alerted,lower=block body alerted,#1]%
342     {\raggedright\usebeamerfont*{block title alerted}\insertblocktitle}%
343     \raggedright%
344     \usebeamerfont{block body alerted}%
345 }%
346 \defbeamertemplate*{block alerted end}{variable rounded}[1][]
347 {
348   \end{beamerboxesvariablerounded}\vskip\smallskipamount
349 }
350
351 \defbeamertemplate*{block example begin}{variable rounded}[1][shadow=false]
352 {%
353   \par\vskip\medskipamount%
354   \begin{beamerboxesvariablerounded}[upper=block title example,lower=block body example,#1]%
355     {\raggedright\usebeamerfont*{block title example}\insertblocktitle}%
356     \raggedright%
357     \usebeamerfont{block body example}%
358 }%
359 \defbeamertemplate*{block example end}{variable rounded}[1][]
360 {\end{beamerboxesvariablerounded}\vskip\smallskipamount}

```