

# Modern Beamer Presentations with the **METROPOLIS** package

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v0.x.x

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## 1 Introduction

Beamer is an awesome way to make presentations with LaTeX, but its theme selection is surprisingly sparse. The stock themes share an aesthetic that is now overused and can be a little cluttered, and the few distinctive custom themes available are often specialized for a particular corporate or institutional brand.

The goal of **METROPOLIS** is to provide a simple, modern Beamer theme suitable for anyone to use. It tries to minimize noise and maximize space for content; the only visual flourish it offers is an (optional) progress bar added to each slide or to the section slides.

By default, **METROPOLIS** uses [Fira Sans](#), a gorgeous typeface commissioned by Mozilla and designed by [Carrois](#). For best results, you will need the Fira typeface installed and use Xe $\LaTeX$  to typeset your slides. However, **METROPOLIS** can also be used with other typefaces and  $\LaTeX$  build systems.

**METROPOLIS**'s codebase is maintained on [GitHub](#). If you have issues, find mistakes in the manual or want to help make the theme even better, please get in touch there. The [full list of contributors](#) already contains over a dozen names!

## 2 Getting Started

### 2.1 Installing from GitHub

Installing **METROPOLIS**, like any Beamer theme, involves four easy steps:

**Download the source** with a `git clone` of the [METROPOLIS repository](#) or as a [zip archive](#) of the latest development version.

**Compile the style files** by running `make sty` inside the downloaded directory. (Or run  $\LaTeX$  directly on `source/metropolistheme.ins`.)

**Move the resulting `*.sty` files** to the folder containing your presentation. To use **METROPOLIS** with many presentations, run `make install` or move the `*.sty` files to a folder in your  $\TeX$  path instead.

**Use the theme for your presentation** by declaring `\usetheme{m}` in the preamble of your Beamer document.

**METROPOLIS** uses the Make build system to offer the following installation options for advanced users:

`make sty` builds the theme style files.

`make doc` builds this documentation manual.

`make demo` builds a demo presentation to test the features of **METROPOLIS**.

`make all` builds the theme, manual, and demo presentation.  
`make clean` removes the files generated by `make all`.  
`make install` installs the theme into your local texmf folder.  
`make uninstall` removes the theme from your local texmf folder.  
`make ctan` creates a package for CTAN distribution.

## 2.2 Installing the Debian Package

As an alternative users of Debian or Ubuntu can also install this [.deb package](#) containing the theme files as well as the Fira Sans font files.

## 2.3 A Minimal Example

The following code shows a minimal example of a Beamer presentation using METROPOLIS.

```
\documentclass{beamer}
\usetheme{metropolis}      % Use metropolis theme
\title{A minimal example}
\date{\today}
\author{Matthias Vogelgesang}
\institute{Centre for Modern Beamer Themes}
\begin{document}
  \maketitle
  \section{First Section}
  \begin{frame}{First Frame}
    Hello, world!
  \end{frame}
\end{document}
```

## 2.4 Dependencies

- XeLaTeX

- **Fira Sans** and Mono font
- TikZ

The **Fira Sans** font is not a hard dependency. **METROPOLIS** will try to load the font and use it if it is installed, but if not it will just use the standard font. Depending on the Linux distribution, the packaged name of **Fira Sans** might be **Fira Sans OT** instead of **Fira Sans**. **METROPOLIS** will check for this name too.

## 2.5 Pandoc

To use this theme with **Pandoc**-based presentations, you can run the following command

```
$ pandoc -t beamer --latex-engine=xelatex -V theme:m -o  
output.pdf input.md
```

# 3 Customization

## 3.1 Package options

The theme provides a number of options. The options use a key=value interface. So every option is controlled by a key its value. To use an option you can either provide a comma separated list of options when invoking **METROPOLIS** in the preamble of the presentation.

```
\usetheme[<key=value list>]{metropolis}
```

Or you can set them at any time with the `\metroset` macro.

```
\metroset{<key=value list>}
```

To set an option on a specific sub-package only you have to add the corresponding prefix (inner, outer, color), e.g.

```
\metroset{inner/block=fill}
```

The list of options is structured as shown in the following example.

key *list of possible values* . . . . . default value  
A short description of the option.

Although the options are grouped into the corresponding packages every option can and in most cases should be set on the main theme directly. If an option is listed in multiple sub-packages, setting it on the main theme will set the option on every sub-package accordingly.

### 3.1.1 Main theme

everytitleformat *regular, lowercase, uppercase* . . . . . lowercase  
Shortcut option to change the case style of all titles together.

plaintitleformat *regular, lowercase, uppercase* . . . . . lowercase  
Control the case style of the plain title.

### 3.1.2 Inner theme

block *transparent, fill* . . . . . transparent  
This option controls the block background. It can either be filled with a light grey or be transparent.

sectionpage *none, simple, progressbar* . . . . . progressbar  
Disable section pages at all, typeset centered section title or add a thin progress bar below the centered section title.

titleformat *regular, lowercase, uppercase* . . . . . lowercase  
Control the case style of the title.

sectiontitleformat *regular, lowercase, uppercase* . . . . . lowercase  
Control the case style of the section title.

### 3.1.3 Outer theme

numbering	<i>none, counter, fraction</i> . . . . .	counter
	In the bottom right corner of each frame the current frame number is displayed. This can be disabled or the total framenummer can be added additionally.	
progressbar	<i>none, head, frametitle, foot</i> . . . . .	none
	Adds a progress bar to the top of each frame ( <b>head</b> ), the bottom of each frame ( <b>foot</b> ), or directly below each frame title ( <b>frametitle</b> ).	
frametitleformat	<i>regular, lowercase, uppercase</i> . . . . .	lowercase
	Control the case style of the frame title.	

### 3.1.4 Color theme

block	<i>transparent, fill</i> . . . . .	transparent
	This option controls the block background. It can either be filled with a light grey or be transparent.	
background	<i>dark, light</i> . . . . .	light
	This option defines whether the background shall be dark and the foreground be light or vice versa.	

## 3.2 Color Customization

The included **METROPOLIS** color theme is used by default, but its colors can be easily changed to suit your tastes. All of the theme's styles are defined in terms of three beamer colors:

- **normal text** (dark fg, light bg)
- **alerted text** (colored fg, should be visible against dark or light)
- **example text** (colored fg, should be visible against dark or light)

An easy way to customize the theme is to redefine these colors using

```
\setbeamercolor{ ... }{ fg= ... , bg= ... }
```

in your preamble. For greater customization, you can redefine any of the other stock beamer colors. In addition to the stock colors the theme defines a number of **METROPOLIS** specific colors, which can also be redefined to your liking.

```
\setbeamercolor{progress bar}{ ... }  
\setbeamercolor{title separator}{ ... }  
\setbeamercolor{progress bar in head/foot}{ ... }  
\setbeamercolor{progress bar in section page}{ ... }
```

### 3.3 Font Customization

The default font for **METROPOLIS** is **Fira**. Yet this can be easily changed using the standard font selection commands of the **fontspec** package. So if you for example prefer the **Ubuntu** font family just add the following two commands after loading the **METROPOLIS** theme.

```
\setsansfont{Ubuntu}  
\setmonofont{Ubuntu Mono}
```

### 3.4 Commands

The `\plain{title=[]}{<body>}` command sets a slide in plain dark colors which can be useful to focus attention on a single sentence or image.

### 3.5 Paul Tol's colors: a **pgfplots** theme

A good presentation uses colors that are

- distinct from each other as much as possible, and
- distinct from black and white,
- under many different lighting and display environments, and
- to color-blind viewers,
- all while matching well together.



In a [technical note](#) for SRON, Paul Tol proposed a palette of colors satisfying these constraints. The sub-package `pgfplotsmetol` defines palettes for `pgfplots` charts based on Tol's work. Use the `mlineplot` key to plot line data and `mbarplot` or horizontal `mbarplot` to plot bar charts.

## 4 Known Issues

The `\plain` command does not work if you override the METROPOLIS color theme with the default beamer color theme `fly`.

## 5 License

The theme itself is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](#). This means that if you change the theme and re-distribute it, you must retain the copyright notice header and license it under the same CC-BY-SA license. This does not affect the presentation that you create with the theme.

## 6 Implementation

### 6.1 METROPOLIS main theme

The primary job of this package is to load the component sub-packages of the METROPOLIS theme and route the theme options accordingly. It also provides some custom commands and environments for the user.

Load the required packages.

```
1 \RequirePackage{etoolbox}
2 \RequirePackage{pgfopts}
```

## 6.1.1 Options

`\metroset` First of all we define a macro for the user to set options.

```
3 \newcommand{\metroset}[1]{\pgfkeys{/metropolis/.cd,#1}}
```

Then we need to pass the unknown options to the sub-packages.

```
4 \pgfkeys{/metropolis/.cd,  
5   .search also={  
6     /metropolis/inner,  
7     /metropolis/outer,  
8     /metropolis/color,  
9   },
```

We have to forward keys that affect multiple sub-packages manually.

```
10  block/.code=\pgfkeysalso{  
11    inner/block=#1,  
12    color/block=#1,  
13  },  
14 }
```

`plaintitleformat` Control the case style of the plain title

```
15 \pgfkeys{  
16   /metropolis/plaintitleformat/.cd,  
17   .is choice,  
18   regular/.code=\renewcommand{\@metropolis@plaintitleformat}{#1},  
19   lowercase/.code={%  
20     \renewcommand{\@metropolis@plaintitleformat}{\MakeLowercase{#1}}  
21   },  
22   uppercase/.code={%  
23     \renewcommand{\@metropolis@plaintitleformat}{\MakeUppercase{#1}}  
24   },  
25 }
```

`everytitleformat` Control the case style of the every title

```
26 \pgfkeys{  
27   /metropolis/everytitleformat/.code=\pgfkeysalso{  
28     inner/titleformat=#1,
```

```

29     inner/sectiontitleformat=#1,
30     outer/frametitleformat=#1,
31     plaintitleformat=#1,
32   }
33 }

```

For backwards compatibility with earlier betas of the theme, we implement deprecated option names as aliases to the corresponding **key=value** options.

```

34 \pgfkeys{/metropolis/.cd,
35   usetitleprogressbar/.code=\pgfkeysalso{outer/progressbar=frametitle},
36   noslidenumbers/.code=\pgfkeysalso{outer/numbering=none},
37   usetotalslideindicator/.code=\pgfkeysalso{outer/numbering=fraction},
38   nosectionslide/.code=\pgfkeysalso{inner/sectionpage=none},
39   darkcolors/.code=\pgfkeysalso{color/background=dark},
40   blockbg/.code=\pgfkeysalso{color/block=fill, inner/block=fill},
41 }

```

Set default values for options.

```

42 \newcommand{\@metropolis@setdefaults}{
43   \pgfkeys{/metropolis/.cd,
44     plaintitleformat=lowercase,
45   }
46 }

```

## 6.1.2 Component sub-packages

Having processed the options, we can now load the component sub-packages of the theme.

```

47 \useinnertheme{metropolis}
48 \useoutertheme{metropolis}
49 \usecolortheme{metropolis}
50 \usefonttheme{metropolis}

```

The **tol** theme for **pgfplots** is only loaded if **pgfplots** is used.

```

51 \AtEndPreamble{%
52   \@ifpackageloaded{pgfplots}{%
53     \RequirePackage{pgfplotsthemetol}

```

```

54   }}
55 }

```

### 6.1.3 Custom commands

We define custom commands in this package as their proper usage may depend on multiple sub-packages.

`\metropolis@plaintitleformat` Define a hook to change the case format of the plain title.

```

56 \def\@metropolis@plaintitleformat#1{#1}

```

`\plain` Creates a plain frame with dark background, suitable for displaying images or a few words.

```

57 \newcommand{\plain}[2][[]]{%
58   \begingroup
59     \setbeamercolor{background canvas}{
60       use=palette primary,
61       parent=palette primary
62     }
63     \begin{frame}[c]{#1}
64       \begin{center}
65         \usebeamercolor[fg]{palette primary}
66         \usebeamerfont{section title}
67         \@metropolis@plaintitleformat{#2}
68       \end{center}
69     \end{frame}
70   \endgroup
71 }

```

`\mreducelistspacing`

```

72 \newcommand{\mreducelistspacing}{\vspace{-\topsep}}

```

Process package options

```

73 \@metropolis@setdefaults
74 \ProcessPgfOptions{/metropolis}

```

## 6.2 METROPOLIS inner theme

A **beamer** inner theme dictates the style of the frame elements traditionally set in the “body” of each slide. These include:

- title, part, and section pages;
- itemize, enumerate, and description environments;
- block environments including theorems and proofs;
- figures and tables; and
- footnotes and plain text.

Load required packages.

```
75 \RequirePackage{etoolbox}
76 \RequirePackage{calc}
77 \RequirePackage{pgfopts}
78 \RequirePackage{tikz}
```

### 6.2.1 Options

**block** This option controls the block style.

```
79 \pgfkeys{
80   /metropolis/inner/block/.cd,
81   .is choice,
82   transparent/.code=\setlength{\@metropolis@blockskip}{0ex},
83   fill/.code=\setlength{\@metropolis@blockskip}{1ex},
84 }
```

**titleformat** Control the case style of the title

```
85 \pgfkeys{
86   /metropolis/inner/titleformat/.cd,
87   .is choice,
88   regular/.code=\renewcommand{\@metropolis@titleformat}{},
89   lowercase/.code={%
90     \renewcommand{\@metropolis@titleformat}{\MakeLowercase}
91   },
92   uppercase/.code={%
93     \renewcommand{\@metropolis@titleformat}{\MakeUppercase}
```

```
94     },
95 }
```

**sectiontitleformat** Control the case style of the section title

```
96 \pgfkeys{
97   /metropolis/inner/sectiontitleformat/.cd,
98   .is choice,
99   regular/.code=\renewcommand{\@metropolis@sectiontitleformat}{},
100  lowercase/.code={%
101    \renewcommand{\@metropolis@sectiontitleformat}{\MakeLowercase}
102  },
103  uppercase/.code={%
104    \renewcommand{\@metropolis@sectiontitleformat}{\MakeUppercase}
105  },
106 }
```

**sectionpage** The `sectionpage` option defines the behaviour of the `sectionpage`.

```
107 \pgfkeys{
108   /metropolis/inner/sectionpage/.cd,
109   .is choice,
110   none/.code=\@metropolis@sectionpage@none,
111   simple/.code=\@metropolis@sectionpage@simple,
112   progressbar/.code=\@metropolis@sectionpage@progressbar,
113 }
```

**metropolis@inner@setdefaults** Set default values for inner theme options.

```
114 \newcommand{\@metropolis@inner@setdefaults}{
115   \pgfkeys{/metropolis/inner/.cd,
116     sectionpage=progressbar,
117     block=transparent,
118     titleformat=lowercase,
119     sectiontitleformat=lowercase,
120   }
121 }
```

## 6.2.2 Title page

`\@metropolis@titleformat` Define hooks to change the case format of the titles.

```
122 \def\@metropolis@titleformat#1{#1}
123 \def\@metropolis@sectiontitleformat#1{#1}
```

To make the `\MakeLowercase` and `\MakeUppercase` macros work in the `sectiontitle` we have to patch `\sectionentry` and `\beamer@section`. This solution was suggested by Enrico Gregorio in an answer to [this StackExchange question](#).

```
124 \patchcmd{\sectionentry}
125   {\def\insertsectionhead{#2}}
126   {\def\insertsectionhead{\@metropolis@sectiontitleformat{#2}}}
127   {}
128   {\PackageError{beamerinnerthememetropolis}{Patching section ti-
129     tle failed.}}
129 \patchcmd{\beamer@section}
130   {\def\insertsectionhead{\hyperlink{Navigation\the\c@page}{#1}}}
131   {\def\insertsectionhead{\hyperlink{Navigation\the\c@page}{\@metropolis@sectiontit
132     }}
133   {\PackageError{beamerinnerthememetropolis}{Patching section ti-
134     tle failed.}}
```

`title page` Template for the title page. Each element is only typset if it is defined by the user. If `\subtitle` is empty, for example, it won't leave a blank space on the title slide.

```
134 \setbeamertemplate{title page}{
135   \begin{minipage}[b][\paperheight]{\textwidth}
136     \ifx\inserttitlegraphic\@empty\else\usebeamertemplate*{title graphic}\fi
137     \vfill%
138     \ifx\inserttitle\@empty\else\usebeamertemplate*{title}\fi
139     \ifx\insertsubtitle\@empty\else\usebeamertemplate*{subtitle}\fi
140     \usebeamertemplate*{title separator}
```

Beamer's definition of `\insertauthor` is always nonempty, so we have to test another macro initialized by `\author{...}` to see if the user has defined an

author. This solution was suggested by Enrico Gregorio in an answer to [this Stack Exchange question](#).

```
141 \ifx\beamer@shortauthor\@empty\else\usebeamertemplate*{author}\fi
142 \ifx\insertdate\@empty\else\usebeamertemplate*{date}\fi
143 \ifx\insertinstitute\@empty\else\usebeamertemplate*{institute}\fi
144 \vfill
145 \vspace*{1mm}
146 \end{minipage}
147 }
```

Normal people should use `\maketitle` or `\titlepage` instead of using the `title page` beamer template directly. Beamer already defines these macros, but we patch them here to make the title page `[plain]` by default, remove `\@thanks`, and ensure the title frame number doesn't count.

`\maketitle` Inserts the title frame, or causes the current frame to use the `title page` template.  
`\titlepage`

```
148 \def\maketitle{%
149 \ifbeamer@inframe
150 \titlepage
151 \else
152 \frame[plain]{\titlepage}
153 \fi
154 }
155 \def\titlepage{%
156 \usebeamertemplate{title page}
157 }
```

`title graphic` Set the title graphic in a zero-height box, so it doesn't change the position of other elements.

```
158 \setbeamertemplate{title graphic}{
159 \vbox to 0pt {
160 \vspace*{2em}
161 \inserttitlegraphic%
162 }%
163 \nointerlineskip%
164 }
```



**title** Set the title on the title page.

```
165 \setbeamertemplate{title}{
166   \raggedright%
167   \linespread{1.0}%
168   \@metropolis@titleformat{\inserttitle}%
169   \par%
170   \vspace*{0.5em}
171 }
```

**subtitle** Set the subtitle on the title page.

```
172 \setbeamertemplate{subtitle}{
173   \insertsubtitle%
174   \par%
175   \vspace*{0.5em}
176 }
```

**title separator** Template to set the title graphic in a zero-height box. (It won't change the position of other elements.)

```
177 \setbeamertemplate{title separator}{
178   \begin{tikzpicture}
179     \draw[fg, fill=fg] (0,0) rectangle (\textwidth, 0.4pt);
180   \end{tikzpicture}%
181   \par%
182 }
```

**author** Set the author on the title page.

```
183 \setbeamertemplate{author}{
184   \vspace*{2em}
185   \insertauthor%
186   \par%
187   \vspace*{0.25em}
188 }
```

**date** Set the date on the title page.

```
189 \setbeamertemplate{date}{
190   \insertdate%
191   \par%
```

```
192 }
```

**institute** Set the institute on the title page.

```
193 \setbeamertemplate{institute}{
194   \vspace*{3mm}
195   \insertinstitute%
196   \par%
197 }
```

### 6.2.3 Section page

**section page** Template for the section title slide at the beginning of each section.

```
198 \newcommand{\@metropolis@sectionpage@none}{
199   \AtBeginSection{
200     % intenionally empty
201   }
202 }
203 \defbeamertemplate{section page}{simple}{
204   \centering
205   \usebeamercolor[fg]{section title}
206   \usebeamerfont{section title}
207   \insertsectionhead\
208 }
209 \newcommand{\@metropolis@sectionpage@simple}{
210   \setbeamertemplate{section page}[simple]
211   \AtBeginSection{
212     \ifbeamer@inframe
213       \sectionpage
214     \else
215       \frame[plain,c]{\sectionpage}
216     \fi
217   }
218 }
219 \defbeamertemplate{section page}{progressbar}{
220   \centering
221   \begin{minipage}{22em}
222     \usebeamercolor[fg]{section title}
223     \usebeamerfont{section title}
```

```

224 \insertsectionhead\[-1ex]
225 \usebeamertemplate*{progress bar in section page}
226 \end{minipage}
227 \par
228 }
229 \newcommand{\@metropolis@sectionpage@progressbar}{
230 \setbeamertemplate{section page}[progressbar]
231 \AtBeginSection{
232 \ifbeamer@inframe
233 \sectionpage
234 \else
235 \frame[plain,c]{\sectionpage}
236 \fi
237 }
238 }

```

progress bar in section page

Template for the progress bar displayed by default on the section page. This code is duplicated in large part in the outer theme's template `progress bar in head- /foot`.

```

239 \newlength{\metropolis@progressonsectionpage}
240 \setbeamertemplate{progress bar in section page}{
241 \setlength{\metropolis@progressonsectionpage}{%
242 \textwidth * \ratio{\insertframenum pt}{\inserttotalframenum pt}}%
243 }%
244 \begin{tikzpicture}
245 \draw[bg, fill=bg] (0,0) rectangle (\textwidth, 0.4pt);
246 \draw[fg, fill=fg] (0,0) rectangle (\metropolis@progressonsectionpage, 0.4pt);
247 \end{tikzpicture}%
248 }

```

The above code assumes that `\insertframenum` is less than or equal to `\inserttotalframenum`. However, this is not true on the first compile; in the absence of an `.aux` file, `\inserttotalframenum` defaults to 1. This behaviour could cause fatal errors for long presentations, as `\metropolis@progressonsectionpage` would exceed  $\TeX$ 's maximum length (16383.99999pt, roughly 5.75 metres or 18.9 feet). To avoid this, we increase the default value for `\inserttotalframenum`; presentations with over 4000 slides will still break on first compile, but users in that situation likely have deeper problems to solve.

```
249 \def\inserttotalframenum{100}
```

## 6.2.4 Block environments

Regular block environment

```
250 \newlength{\@metropolis@blockskip}
251 \setbeamertemplate{block begin}{%
252   \vspace*{1ex}
253   \begin{beamercolorbox}[%
254     ht=2.4ex,
255     dp=1ex,
256     leftskip=\@metropolis@blockskip,
257     rightskip=\@metropolis@blockskip]{block title}
258     \usebeamerfont*{block title}\insertblocktitle%
259   \end{beamercolorbox}%
260   \vspace*{-1pt}
261   \usebeamerfont{block body}%
262   \begin{beamercolorbox}[%
263     dp=1ex,
264     leftskip=\@metropolis@blockskip,
265     rightskip=\@metropolis@blockskip,
266     vmode]{block body}%
267 }
268 \setbeamertemplate{block end}{%
269   \end{beamercolorbox}
270   \vspace*{0.2ex}
271 }
```

Alerted block environment

```
272 \setbeamertemplate{block alerted begin}{%
273   \vspace*{1ex}
274   \begin{beamercolorbox}[%
275     ht=2.4ex,
276     dp=1ex,
277     leftskip=\@metropolis@blockskip,
278     rightskip=\@metropolis@blockskip]{block title alerted}
279     \usebeamerfont*{block title alerted}\insertblocktitle%
280   \end{beamercolorbox}%
```

```

281 \vspace*{-1pt}
282 \usebeamerfont{block body alerted}%
283 \begin{beamercolorbox}[%
284     dp=1ex,
285     leftskip=\@metropolis@blockskip,
286     rightskip=\@metropolis@blockskip,
287     vmode]{block body alerted}%
288 }
289 \setbeamertemplate{block alerted end}{%
290     \end{beamercolorbox}
291     \vspace*{0.2ex}
292 }

```

Example block environment

```

293 \setbeamertemplate{block example begin}{%
294     \vspace*{1ex}
295     \begin{beamercolorbox}[%
296         ht=2.4ex,
297         dp=1ex,
298         leftskip=\@metropolis@blockskip,
299         rightskip=\@metropolis@blockskip]{block title example}
300         \usebeamerfont*{block title example}\insertblocktitle%
301     \end{beamercolorbox}%
302     \vspace*{-1pt}
303     \usebeamerfont{block body example}%
304     \begin{beamercolorbox}[%
305         dp=1ex,
306         leftskip=\@metropolis@blockskip,
307         rightskip=\@metropolis@blockskip,
308         vmode]{block body example}%
309     }
310 \setbeamertemplate{block example end}{%
311     \end{beamercolorbox}
312     \vspace*{0.2ex}
313 }

```

## 6.2.5 Lists and floats

```

314 \setbeamertemplate{itemize items}{\textbullet}

```

```

315 \setbeamertemplate{caption label separator}{: }
316 \setbeamertemplate{caption}[numbered]

```

## 6.2.6 Footnotes

```

317 \setbeamertemplate{footnote}{%
318   \parindent 0em\noindent%
319   \raggedright
320   \usebeamercolor{footnote}\hbox to 0.8em{\hfil\insertfootnotemark}\insertfootnotetext
321 }

```

## 6.2.7 Text and spacing settings

```

322 \setlength{\parskip}{0.5em}
323 \linespread{1.15}

```

By default, Beamer frames offer the `c` option to *almost* vertically center the text, but the placement is a little too high. To fix this, we redefine the `c` option to equalize `\beamer@frametopskip` and `\beamer@framebottomskip`. This solution was suggested by Enrico Gregorio in an answer to [this Stack Exchange question](#).

```

324 \define@key{beamerframe}{c}[true]{% centered
325   \beamer@frametopskip=0pt plus 1fill\relax%
326   \beamer@framebottomskip=0pt plus 1fill\relax%
327   \beamer@frametopskipautobreak=0pt plus .4\paperheight\relax%
328   \beamer@framebottomskipautobreak=0pt plus .6\paperheight\relax%
329   \def\beamer@initfirstlineunskip{}}%
330 }

```

Process package options

```

331 \@metropolis@inner@setdefaults
332 \ProcessPgfPackageOptions{/metropolis/inner}

```

## 6.3 METROPOLIS outer theme

A `beamer` outer theme dictates the style of the frame elements traditionally set outside the body of each slide: the head, footline, and frame title.

Load required packages.

```

333 \RequirePackage{etoolbox}

```

```

334 \RequirePackage{calc}
335 \RequirePackage{pgfopts}

```

### 6.3.1 Options

**numbering** This option controls the page numbering.

```

336 \pgfkeys{
337   /metropolis/outer/numbering/.cd,
338   .is choice,
339   none/.code=\setbeamertemplate{frame numbering}[none],
340   counter/.code=\setbeamertemplate{frame numbering}[counter],
341   fraction/.code=\setbeamertemplate{frame numbering}[fraction],
342 }

```

**progressbar** This option controls the progressbar.

```

343 \pgfkeys{
344   /metropolis/outer/progressbar/.cd,
345   .is choice,
346   none/.code={%
347     \setbeamertemplate{headline}[plain]
348     \setbeamertemplate{frametitle}[plain]
349     \setbeamertemplate{footline}[plain]
350   },
351   head/.code={\pgfkeys{/metropolis/outer/progressbar=none}
352     \addtobeamertemplate{headline}{}{\usebeamertemplate*{progress bar in head-
353     /foot}}}
354   frametitle/.code={\pgfkeys{/metropolis/outer/progressbar=none}
355     \addtobeamertemplate{frametitle}{}{\usebeamertemplate*{progress bar in head-
356     /foot}}}
357   foot/.code={\pgfkeys{/metropolis/outer/progressbar=none}
358     \addtobeamertemplate{footline}{}{\usebeamertemplate*{progress bar in head-
359     /foot}}}
360 }

```

`frametitleformat` Control the case style of the frame title

```
361 \pgfkeys{
362   /metropolis/outer/frametitleformat/.cd,
363   .is choice,
364   regular/.code={%
365     \renewcommand{\@metropolis@frametitleformat}{}%
366     \renewcommand{\@metropolis@frametitlestrut}{%
367       \vphantom{ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz}%
368     }
369   },
370   lowercase/.code={%
371     \renewcommand{\@metropolis@frametitleformat}{\MakeLowercase}%
372     \renewcommand{\@metropolis@frametitlestrut}{%
373       \vphantom{abcdefghijklmnopqrstuvwxyz}%
374     }
375   },
376   uppercase/.code={%
377     \renewcommand{\@metropolis@frametitleformat}{\MakeUppercase}%
378     \renewcommand{\@metropolis@frametitlestrut}{%
379       \vphantom{ABCDEFGHIJKLMNOPQRSTUVWXYZ}%
380     }
381   },
382 }
```

`metropolis@outer@setdefaults` Set default values for outer theme options.

```
383 \newcommand{\@metropolis@outer@setdefaults}{
384   \pgfkeys{/metropolis/outer/.cd,
385     numbering=counter,
386     progressbar=none,
387     frametitleformat=lowercase,
388   }
389 }
```

### 6.3.2 Head and footline

All good `beamer` presentations should already remove the navigation symbols, but `METROPOLIS` removes them automatically (just in case).



```
390 \setbeamertemplate{navigation symbols}{}
```

Templates for the frame number. Can be omitted, shown or displayed as a fraction of the total frames.

```
391 \defbeamertemplate{frame numbering}{none}{}
392 \defbeamertemplate{frame numbering}{counter}{\insertframenumbers}
393 \defbeamertemplate{frame numbering}{fraction}{
394   \insertframenumbers/\inserttotalframenumbers}
395 }
```

```
396 \defbeamertemplate{headline}{plain}{}
397 \defbeamertemplate{footline}{plain}{%
398   \begin{beamercolorbox}[wd=\textwidth, sep=3ex]{footline}%
399     \hfill%
400     \usebeamerfont{page number in head/foot}%
401     \usebeamertemplate*{frame numbering}
402   \end{beamercolorbox}%
403 }
```

### 6.3.3 Frametitle

`metropolis@frametitleformat` Define a hook to change the case format of the frame title.

```
404 \def\@metropolis@frametitleformat#1{#1}
```

To make the `\MakeLowercase` and `\MakeUppercase` macros work in the frame title we have to patch `\beamer@@frametitle`. This solution was suggested by Enrico Gregorio in an answer to [this StackExchange question](#).

```
405 \patchcmd{\beamer@@frametitle}
406   {\beamer@ifempty{#2}}{}{%
407     \gdef\insertframetitle{#2\ifnum\beamer@autobreakcount>0\relax}\space\usebeamerfont{page number in head/foot}%
408     \gdef\beamer@frametitle{#2}%
409     \gdef\beamer@shortframetitle{#1}%
410   }}
411   {\beamer@ifempty{#2}}{}{%
412     \gdef\insertframetitle{\@metropolis@frametitleformat{#2}\ifnum\beamer@autobreakcount>0\relax}\space\usebeamerfont{page number in head/foot}%
413     \gdef\beamer@frametitle{#2}%
414     \gdef\beamer@shortframetitle{#1}%
415   }}
```

```

413 \gdef\beamer@frametitle{#2}%
414 \gdef\beamer@shortframetitle{#1}%
415 }}
416 {}
417 {\PackageError{beamerouterthememetropolis}{Patching frame title failed.}}

```

**frametitle** Templates for the frame title, which is optionally underlined with a progress bar.

```

418 \newlength{\@metropolis@frametitlestrut}
419 \defbeamer@template{frametitle}{plain}{%
420 \nointerlineskip%
421 \begin{beamer@colorbox}[%
422 wd=\paperwidth,%
423 sep=1.5ex,%
424 ]{frametitle}%
425 \@metropolis@frametitlestrut\insertframetitle\@metropolis@frametitlestrut%
426 \end{beamer@colorbox}%
427 }

```

**progress bar in head/foot** Template for the progress bar optionally displayed below the frame title on each page. Much of this code is duplicated in the inner theme's template **progress bar in section page**.

```

428 \newlength{\metropolis@progressinheadfoot}
429 \setbeamer@template{progress bar in head/foot}{
430 \nointerlineskip
431 \setlength{\metropolis@progressinheadfoot}{%
432 \paperwidth * \ratio{\insertframenum pt}{\inserttotalframenum pt}%
433 }%
434 \begin{beamer@colorbox}[wd=\paperwidth]{progress bar in head/foot}
435 \begin{tikzpicture}
436 \draw[bg, fill=bg] (0,0) rectangle (\paperwidth, 0.4pt);
437 \draw[fg, fill=fg] (0,0) rectangle (\metropolis@progressinheadfoot, 0.4pt);
438 \end{tikzpicture}%
439 \end{beamer@colorbox}
440 }

```

Process package options

```

441 \@metropolis@outer@setdefaults
442 \ProcessPgfPackageOptions{/metropolis/outer}

```

## 6.4 METROPOLIS font theme

Load required packages.

```
443 \RequirePackage{etoolbox}
444 \RequirePackage{ifxetex}
445 \RequirePackage{ifluatex}
```

### 6.4.1 Load Fira font

If the presentation is compiled with XeLaTeX or LuaLaTeX the fontspec package will be loaded.

```
446 \ifboolexpr{bool {xetex} or bool {luatex}}{
447   \RequirePackage[no-math]{fontspec}
```

To simplify the check whether the **Fira** fonts are installed, a set macros is defined.

`\checkfont` Checks if a font is installed and increases `fontsnofound` counter if not.

```
448   \newcounter{fontsnofound}
449   \newcommand{\checkfont}[1]{%
450     \suppressfontnotfounderror=1%
451     \font\x = "#1" at 10pt
452     \selectfont
453     \ifx\x\nullfont%
454       \stepcounter{fontsnofound}%
455     \fi%
456     \suppressfontnotfounderror=0%
457   }
458
```

`\iffontexists` Resets the `fontsnofound` counter and calls `\checkfont` for each font in the comma separated list in the first argument.

```
459   \newcommand{\iffontsexist}[3]{%
460     \setcounter{fontsnofound}{0}%
461     \expandafter\forcsvlist\expandafter%
462     \checkfont\expandafter{#1}%
```

```

463 \ifnum\value{fontsnofound}=0%
464   #2%
465 \else%
466   #3%
467 \fi%
468 }

```

Using the previously defined macros it is tried to load the **Fira** fonts. First the default **Fira** name will be tried. Second the **Fira** fonts with the suffix **OT** – used by some Linux distributions – will be tried. If this also fails a warning will be displayed and the standard fonts will be used.

```

469 \iffontsexist{Fira Sans Light,%
470             Fira Sans Light Italic,%
471             Fira Sans,%
472             Fira Sans Italic}{%
473   \setsansfont[BoldFont={Fira Sans}]{Fira Sans Light}%
474 }{%
475   \iffontsexist{Fira Sans Light OT,%
476               Fira Sans Light Italic OT,%
477               Fira Sans OT,%
478               Fira Sans Italic OT}{%
479     \setsansfont[BoldFont={Fira Sans OT}]{Fira Sans Light OT}%
480 }{%
481   \PackageWarning{beamerthememetropolis}{%
482     Could not find Fira Sans fonts.%
483   }
484 }
485 }
486 \iffontsexist{Fira Mono, Fira Mono Bold}{%
487   \setmonofont{Fira Mono}%
488 }{%
489   \iffontsexist{Fira Mono OT, Fira Mono Bold OT}{%
490     \setmonofont{Fira Mono OT}%
491   }{%
492     \PackageWarning{beamerthememetropolis}{%
493       Could not find Fira Mono fonts.%
494     }
495   }
496 }

```

```

497 \AtBeginEnvironment{tabular}{%
498   \addfontfeature{Numbers={Monospaced}}%
499 }
500 }{%
501 \PackageWarning{beamerthememetropolis}{%
502   You need to compile with XeLaTeX or LuaLaTeX to use the Fira fonts.%
503 }
504 }

```

## 6.4.2 General font definitions

```

505 \setbeamerfont{title}{size=\Large,%
506                series=\bfseries,%
507                shape=\scshape}
508 \setbeamerfont{author}{size=\small}
509 \setbeamerfont{date}{size=\small}
510 \setbeamerfont{section title}{size=\Large,%
511                series=\bfseries,%
512                shape=\scshape}
513 \setbeamerfont{block title}{size=\normalsize,%
514                series=\bfseries}
515 \setbeamerfont{block title alerted}{size=\normalsize,%
516                series=\bfseries}
517 \setbeamerfont*{subtitle}{size=\large,%
518                shape=\scshape}
519 \setbeamerfont{frametitle}{size=\large,%
520                series=\bfseries,%
521                shape=\scshape}
522 \setbeamerfont{caption}{size=\small}
523 \setbeamerfont{caption name}{series=\bfseries}
524 \setbeamerfont{description item}{series=\bfseries}
525 \setbeamerfont{page number in head/foot}{size=\scriptsize}
526 \setbeamerfont{bibliography entry author}{size=\normalsize,%
527                series=\normalfont}
528 \setbeamerfont{bibliography entry title}{size=\normalsize,%
529                series=\bfseries}
530 \setbeamerfont{bibliography entry location}{size=\normalsize,%
531                series=\normalfont}
532 \setbeamerfont{bibliography entry note}{size=\small,%
533                series=\normalfont}

```

```
534 \linespread{1.15}
```

## 6.5 METROPOLIS color theme

Load required packages.

```
535 \RequirePackage{pgfopts}
```

### 6.5.1 Options

**block** This option controls whether the blocks are filled or transparent.

```
536 \pgfkeys{
537   /metropolis/color/block/.cd,
538   .is choice,
539   transparent/.code=\@metropolis@block@transparent,
540   fill/.code=\@metropolis@block@fill,
541 }
```

**colors** Defines whether the background shall be dark and the foreground be light or vice versa

```
542 \pgfkeys{
543   /metropolis/color/background/.cd,
544   .is choice,
545   dark/.code=\@metropolis@colors@dark,
546   light/.code=\@metropolis@colors@light,
547 }
```

**metropolis@color@setdefaults** Set default values for color theme options.

```
548 \newcommand{\@metropolis@color@setdefaults}{
549   \pgfkeys{/metropolis/color/.cd,
550     background=light,
551     block=transparent,
552   }
553 }
```

## 6.5.2 Base colors

```
554 \definecolor{mDarkBrown}{HTML}{604c38}
555 \definecolor{mDarkTeal}{HTML}{23373b}
556 \definecolor{mLightBrown}{HTML}{EB811B}
557 \definecolor{mLightGreen}{HTML}{14B03D}
```

## 6.5.3 Base styles

All colors in the METROPOLIS theme are derived from the definitions of `normal text`, `alerted text`, and `example text`.

```
558 \newcommand{\@metropolis@colors@dark}{
559   \setbeamercolor{normal text}{%
560     fg=black!2,
561     bg=mDarkTeal
562   }
563 }
564 \newcommand{\@metropolis@colors@light}{
565   \setbeamercolor{normal text}{%
566     fg=mDarkTeal,
567     bg=black!2
568   }
569 }
570 \setbeamercolor{alerted text}{%
571   fg=mLightBrown
572 }
573 \setbeamercolor{example text}{%
574   fg=mLightGreen
575 }
```

## 6.5.4 Derived colors

The titles and structural elements (e.g. `itemize` bullets) are set in the same color as `normal text`. This would ideally be done by setting `normal text` as a parent style, which we do to set `titlelike`, but this doesn't work for `structure` as its foreground is set explicitly in `beamercolorthemedefault.sty`.

```
576 \setbeamercolor{titlelike}{use=normal text, parent=normal text}
577 \setbeamercolor{author}{use=normal text, parent=normal text}
```

```

578 \setbeamercolor{date}{use=normal text, parent=normal text}
579 \setbeamercolor{institute}{use=normal text, parent=normal text}
580 \setbeamercolor{structure}{use=normal text, fg=normal text.fg}

```

The “primary” palette should be used for the most important navigational elements, and possibly of other elements. The METROPOLIS theme uses it for frame titles and slides.

```

581 \setbeamercolor{palette primary}{%
582   use=normal text,
583   fg=normal text.bg,
584   bg=normal text.fg
585 }
586 \setbeamercolor{frametitle}{%
587   use=palette primary,
588   parent=palette primary
589 }

```

The METROPOLIS inner or outer themes optionally display progress bars in various locations. Their color is set by **progress bar** but the two different kinds can be customized separately. The horizontal rule on the title page is also set based on the progress bar color and can be customized with **title separator**.

```

590 \setbeamercolor{progress bar}{%
591   use=alerted text,
592   fg=alerted text.fg,
593   bg=normal text.bg!50!normal text.fg
594 }
595 \setbeamercolor{title separator}{
596   use=progress bar,
597   parent=progress bar
598 }
599 \setbeamercolor{progress bar in head/foot}{%
600   use=progress bar,
601   parent=progress bar
602 }
603 \setbeamercolor{progress bar in section page}{
604   use=progress bar,
605   parent=progress bar
606 }

```



## Blocks

```
607 \newcommand{\@metropolis@block@transparent}{
608   \setbeamercolor{block title}{use=normal text, parent=normal text}
609 }
610 \newcommand{\@metropolis@block@fill}{
611   \setbeamercolor{block title}{%
612     use=normal text,
613     fg=normal text.fg,
614     bg=normal text.bg!80!fg
615   }
616 }
617 \setbeamercolor{block title alerted}{%
618   use={block title, alerted text},
619   bg=block title.bg,
620   fg=alerted text.fg
621 }
622 \setbeamercolor{block title example}{%
623   use={block title, example text},
624   bg=block title.bg,
625   fg=example text.fg
626 }
627 \setbeamercolor{block body alerted}{use=block body, parent=block body}
628 \setbeamercolor{block body example}{use=block body, parent=block body}
629 \setbeamercolor{block body}{
630   use={block title, normal text},
631   bg=block title.bg!50!normal text.bg
632 }
```

## Footnotes

```
633 \setbeamercolor{footnote}{fg=normal text.fg!90}
634 \setbeamercolor{footnote mark}{fg=.
```

## Process package options

```
635 \@metropolis@color@setdefaults
636 \ProcessPgfPackageOptions{/metropolis/color}

637 \mode<all>
```

## 6.6 Tol pgfplots theme

Paul Tol's 12-color palette<sup>1</sup> is as follows:

```
638 \definecolor{TolDarkPurple}{HTML}{332288}
639 \definecolor{TolDarkBlue}{HTML}{6699CC}
640 \definecolor{TolLightBlue}{HTML}{88CCEE}
641 \definecolor{TolLightGreen}{HTML}{44AA99}
642 \definecolor{TolDarkGreen}{HTML}{117733}
643 \definecolor{TolDarkBrown}{HTML}{999933}
644 \definecolor{TolLightBrown}{HTML}{DDCC77}
645 \definecolor{TolDarkRed}{HTML}{661100}
646 \definecolor{TolLightRed}{HTML}{CC6677}
647 \definecolor{TolLightPink}{HTML}{AA4466}
648 \definecolor{TolDarkPink}{HTML}{882255}
649 \definecolor{TolLightPurple}{HTML}{AA4499}
```

To use these colors, we describe “cycle lists” from which PGF chooses styles for the different series in a chart.

`mbarplot cycle` Colors and styles intended for bar charts with up to 12 series.

```
650 \pgfplotscreateplotcyclelist{mbarplot cycle}{%
651   {draw=TolDarkBlue,   fill=TolDarkBlue!70},
652   {draw=TolLightBrown, fill=TolLightBrown!70},
653   {draw=TolLightGreen, fill=TolLightGreen!70},
654   {draw=TolDarkPink,   fill=TolDarkPink!70},
655   {draw=TolDarkPurple, fill=TolDarkPurple!70},
656   {draw=TolDarkRed,    fill=TolDarkRed!70},
657   {draw=TolDarkBrown,  fill=TolDarkBrown!70},
658   {draw=TolLightRed,   fill=TolLightRed!70},
659   {draw=TolLightPink,  fill=TolLightPink!70},
660   {draw=TolLightPurple, fill=TolLightPurple!70},
661   {draw=TolLightBlue,  fill=TolLightBlue!70},
662   {draw=TolDarkGreen,  fill=TolDarkGreen!70},
663 }
```

`mlineplot cycle` Colors and styles intended for line charts with up to 4 series.

---

<sup>1</sup>Tol actually describes several palettes; these colours are taken from the bottom row of Figure 3 in his technical note.

```

664 \pgfplotscreateplotcyclelist{mlineplot cycle}{%
665   {TolDarkBlue, mark=*, mark size=1.5pt},
666   {TolLightBrown, mark=square*, mark size=1.3pt},
667   {TolLightGreen, mark=triangle*, mark size=1.5pt},
668   {TolDarkBrown, mark=diamond*, mark size=1.5pt},
669 }

```

However, the above cycle lists are not applied automatically. We still need to define styles — `mlineplot` and `mbarplot` — that the user can apply to the axis of a `pgfplots` chart to use the colors. We'll also take the opportunity to adjust the display of chart axes when these styles are used.

```

670 \pgfplotsset{
671   compat=1.9,

```

`mlineplot` A style to apply to the axis of a PGF line plot.

```

672   mlineplot/.style={
673     mbaseplot,
674     xmajorgrids=true,
675     ymajorgrids=true,
676     major grid style={dotted},
677     axis x line=bottom,
678     axis y line=left,
679     legend style={
680       cells={anchor=west},
681       draw=none
682     },
683     cycle list name=mlineplot cycle,
684   },

```

`mbarplot` A style to apply to the axis of a PGF bar chart. `mbarplot` uses vertical bars by default, while `horizontal mbarplot` has horizontal bars as the name implies. Their shared properties are factored out into the internal style `mbarplot base`.

```

685   mbarplot base/.style={
686     mbaseplot,
687     bar width=6pt,
688     axis y line*=none,
689   },
690   mbarplot/.style={

```

```

691   mbarplot base,
692   ybar,
693   xmajorgrids=false,
694   ymajorgrids=true,
695   area legend,
696   legend image code/.code={%
697     \draw[#1] (0cm,-0.1cm) rectangle (0.15cm,0.1cm);
698   },
699   cycle list name=mbarplot cycle,
700 },
701 horizontal mbarplot/.style={
702   mbarplot base,
703   xmajorgrids=true,
704   ymajorgrids=false,
705   xbar stacked,
706   area legend,
707   legend image code/.code={%
708     \draw[#1] (0cm,-0.1cm) rectangle (0.15cm,0.1cm);
709   },
710   cycle list name=mbarplot cycle,
711 },

```

**mbaseplot** Adjusts the appearance of the axes in a PGF chart.

```

712 mbaseplot/.style={
713   legend style={
714     draw=none,
715     fill=none,
716     cells={anchor=west},
717   },
718   x tick label style={
719     font=\footnotesize
720   },
721   y tick label style={
722     font=\footnotesize
723   },
724   legend style={
725     font=\footnotesize
726   },
727   major grid style={

```

```
728     dotted,  
729     },  
730     axis x line*=bottom,  
731     },  
732     disable thousands separator/.style={  
733     /pgf/number format/.cd,  
734     1000 sep={}  
735     },  
736 }
```