

The `milestonetimeline` package^{*}

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Contents

1 Introduction

The `milestonetimeline` package provides a simple yet powerful way to create horizontal milestone timelines in LaTeX documents. It supports both date-based positioning (for accurate timelines) and automatic spacing (for conceptual timelines).

1.1 Key Features

- **Date-based positioning:** Milestones are placed proportionally based on actual dates
- **Automatic spacing:** Even distribution when dates are not specified
- **Label rotation:** Support for 0°, 45°, and 90° label angles
- **Per-milestone height:** Individual control over vertical spacing
- **Highlighted milestones:** Special markers for important events
- **Date markers:** Optional month/quarter markers on the timeline
- **Customizable colors:** Change timeline and highlight colors

2 Installation

2.1 Option 1: CTAN (Recommended)

Once published on CTAN, install via your TeX distribution:

```
tlmgr install milestonetimeline # TeX Live
```

*This document corresponds to `milestonetimeline` v1.0, dated 2026/02/25.

2.2 Option 2: Manual Installation

```
# Generate .sty from .dtx
latex milestonesetimeline.ins

# Move to your TeX directory
mkdir -p ~/texmf/tex/latex/milestonesetimeline
mv milestonesetimeline.sty ~/texmf/tex/latex/milestonesetimeline/

# Update filename database
texhash ~/texmf
```

2.3 Required Packages

The package automatically loads:

- `tikz`
- `xifthen`
- `xparse`
- `kvoptions`
- `pgfcalendar` (via `tikz`)

3 Basic Usage

3.1 Simple Timeline

```
\begin{timeline}[width=14]
  \milestone[above]{2025-01-15}{Kickoff}
  \milestone[below]{2025-06-30}{Midpoint}
  \milestone[above]{2025-12-31}{Complete}
\end{timeline}
```

3.2 Timeline with Date Range

```
\begin{timeline}[width=14,startdate=2025-01-01,enddate=2025-12-31]
  \milestone[above]{2025-01-15}{Kickoff}
  \milestone[below]{2025-06-30}{Midpoint}
  \milestone[above]{2025-12-31}{Complete}
\end{timeline}
```

4 Environment Options

All options are set in the optional argument of the `timeline` environment.

`width` (default: 14) Timeline width in centimeters

`heightabove` (default: 1.5) Default height above timeline (cm)

```
heightbelow (default: 1.5) Default height below timeline (cm)
dotsize (default: 3pt) Size of milestone dots
color (default: timelineblue) Main timeline color
highlightcolor (default: timelineorange) Color for highlighted milestones
startdate (default: empty) Start date for date-based positioning (YYYY-MM-DD)
enddate (default: empty) End date for date-based positioning (YYYY-MM-DD)
rotation (default: 0) Label rotation angle in degrees (0, 45, 90)
labelwidth (default: 3cm) Width of label text box
fontsize (default: \small) Font size for labels
```

5 Milestone Commands

5.1 \milestone

Adds a standard milestone to the timeline.

```
\milestone[position][options]{date}{label}
```

Parameters:

- `position` (optional): `above` (default) or `below`
- `options` (optional): Per-milestone height settings
- `date`: Milestone date (YYYY-MM-DD format recommended)
- `label`: Milestone text label

Examples:

```
% Basic usage
\milestone[above]{2025-01-15}{Kickoff Meeting}
\milestone[below]{2025-02-20}{Review}

% With custom height
\milestone[above][heightabove=2.5]{2025-03-15}{Long Label Text}
\milestone[below][heightbelow=2.0]{2025-04-10}{Another Label}
\milestone[above][height=3.0]{2025-05-01}{Very Tall}
```

5.2 \highlightmilestone

Adds a highlighted milestone (different color) for important events.

```
\highlightmilestone[position][options]{date}{label}
```

5.3 \milestoneat

Adds a milestone at a specific x-position (overrides date positioning).

```
\milestoneat[position][options]{x}{date}{label}
```

5.4 \timelinetitle

Adds a title above the timeline.

```
\timelinetitle{Your Timeline Title}
```

5.5 \datemarker

Adds date markers (e.g., month labels) on the timeline.

```
\datemarker{date}{label}
```

6 Per-Milestone Options

These options can be set individually for each milestone:

`heightabove` Height for above milestones only

`heightbelow` Height for below milestones only

`height` Sets both above and below heights

7 Complete Examples

7.1 Project Timeline

```
\begin{timeline}[
    width=16,
    heightabove=1.5,
    heightbelow=1.5,
    startdate=2025-01-26,
    enddate=2025-12-11
]
\timelinetitle{Project Timeline}
\milestone[above]{2025-01-26}{Kickoff}
\milestone[below]{2025-02-06}{Vendor Selection}
\milestone[above]{2025-03-15}{Requirements}
\milestone[below]{2025-04-12}{Prototype}
\highlightmilestone[above][heightabove=2.5]{2025-09-02}{User Training}
\milestone[below]{2025-10-20}{UAT Complete}
\milestone[above]{2025-12-01}{Go-Live}

\datemarker{2025-04-01}{Apr}
\datemarker{2025-08-01}{Aug}
```

```
\datemarker{2025-12-01}{Dec}
\end{timeline}
```

7.2 Compact Timeline

```
\begin{timeline}[
    width=16,
    heightabove=0.8,
    heightbelow=0.8,
    labelwidth=2cm,
    fontsize=\footnotesize,
    rotation=45,
    startdate=2025-01-01,
    enddate=2025-12-31
]
    \milestone[above]{2025-01-15}{Phase 1}
    \milestone[below]{2025-02-20}{Review}
    \milestone[above]{2025-03-31}{Milestone 1}
    \milestone[below]{2025-05-10}{Phase 2}
    \milestone[above]{2025-06-30}{Midpoint}
    \milestone[below]{2025-08-15}{Milestone 2}
    \milestone[above]{2025-10-01}{Phase 3}
    \milestone[below]{2025-12-31}{Complete}
\end{timeline}
```

8 Troubleshooting

8.1 Common Errors

Dimension too large Use TeX count registers (fixed in v0.4+)

Missing number Ensure date format is YYYY-MM-DD

Undefined control sequence Check all required packages are installed

Package hangs Avoid nested optional arguments (fixed in v0.7+)

8.2 Compilation Issues

- Run `pdflatex` twice for proper positioning
- Clear auxiliary files if errors persist
- Ensure `milestonetimeline.sty` is in the correct location

9 License

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10 Implementation

10.1 Package Setup

```
1 {*package}
2 \NeedsTeXFormat{LaTeX2e}[1994/06/01]
3 \ProvidesPackage{milestonetimeline}
4     [2026/02/25 v1.0 Milestone Timeline Package]
5
6 % =====
7 % Copyright (C) 2026 by Your Name <your.email@example.com>
8 %
9 % This file is part of the milestonetimeline package.
10 %
11 % The milestonetimeline package is free software: you can redistribute it
12 % and/or modify it under the terms of the GNU General Public License
13 % as published by the Free Software Foundation, either version 3 of
14 % the License, or (at your option) any later version.
15 %
16 % The milestonetimeline package is distributed in the hope that it will be
17 % useful, but WITHOUT ANY WARRANTY; without even the implied warranty
18 % of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
19 % GNU General Public License for more details.
20 %
21 % You should have received a copy of the GNU General Public License
22 % along with the milestonetimeline package. If not, see
23 % <https://www.gnu.org/licenses/>.
24 % =====
25
26 % Required packages
27 \RequirePackage{tikz}
28 \RequirePackage{xifthen}
29 \RequirePackage{xparse}
30 \RequirePackage{kvoptions}
31 \usetikzlibrary{calendar}
32
33 % Setup key-value options
34 \SetupKeyvalOptions{
35   family=milestonetimeline,
36   prefix=mtl@
37 }
38
39 % Define package options
40 \DeclareStringOption[14]{width}
41 \DeclareStringOption[1.5]{heightabove}
42 \DeclareStringOption[1.5]{heightbelow}
43 \DeclareStringOption[3pt]{dotsize}
44 \DeclareStringOption[timelineblue]{color}
45 \DeclareStringOption[timelineorange]{highlightcolor}
46 \DeclareStringOption[] {startdate}
47 \DeclareStringOption[] {enddate}
48 \DeclareStringOption[0]{rotation}
49 \DeclareStringOption[3cm]{labelwidth}
50 \DeclareStringOption[\small]{fontsize}
```

```

51
52 % Define colors
53 \definecolor{timelineblue}{RGB}{65, 105, 165}
54 \definecolor{timelineorange}{RGB}{205, 100, 50}
55 \definecolor{timelinegray}{RGB}{200, 200, 200}
56
57 \ProcessKeyvalOptions*
58
59 % Counter for automatic positioning
60 \newcounter{mtl@milestonepos}
61
62 % TeX count registers for Julian day calculations
63 \newcount\mtl@startjulian
64 \newcount\mtl@endjulian
65 \newcount\mtl@milestonejulian
66 \newcount\mtl@tempjulian
67 \newcount\mtl@totaldays
68 \newcount\mtl@markerjulian
69
70 % Per-milestone height variables
71 \newcommand{\mtl@ milestone@heightabove}{\mtl@heightabove}
72 \newcommand{\mtl@ milestone@heightbelow}{\mtl@heightbelow}
73

```

10.2 Timeline Environment

```

74 % Timeline environment
75 \NewDocumentEnvironment{timeline}{O{}}
76 {%
77   % Process local options
78   \setkeys{milestonetimeline}{#1}
79
80   % Initialize per-milestone heights to defaults
81   \edef\mtl@ milestone@heightabove{\mtl@heightabove}
82   \edef\mtl@ milestone@heightbelow{\mtl@heightbelow}
83
84   \begin{tikzpicture}[
85     every node/.style={font=\sffamily},
86   ]
87   % Draw main timeline
88   \draw[thick,\mtl@color!50] (0,0) -- (\mtl@width,0);
89   \setcounter{mtl@milestonepos}{0}
90
91   % Initialize total days
92   \mtl@totaldays=0
93
94   % Calculate date range if provided
95   \ifthenelse{\equal{\mtl@startdate}{}}
96   {\ifthenelse{\equal{\mtl@enddate}{}}
97    {\pgfcalendardatejulian{\mtl@startdate}{\mtl@startjulian}}
98    {\pgfcalendardatejulian{\mtl@enddate}{\mtl@endjulian}}
99    \mtl@totaldays=\mtl@endjulian
100   \advance\mtl@totaldays by -\mtl@startjulian
101 }%
102 }%

```

```

103 }
104 {
105   \end{tikzpicture}
106 }
107

```

10.3 Position Calculation

```

108 % Calculate position based on date
109 \newcommand{\mtl@calculateposition}[2]{%
110   % #1 = milestone date
111   % #2 = output macro (x position)
112   \ifnum\mtl@totaldays>0
113     % Date-based positioning
114     \pgfcalendardatejulian{\#1}{\mtl@milestonejulian}
115     \mtl@tempjulian=\mtl@milestonejulian
116     \advance\mtl@tempjulian by -\mtl@startjulian
117     % Now use pgfmath with the smaller relative day number
118     \pgfmathsetmacro{\#2}{(\the\mtl@tempjulian / \the\mtl@totaldays) * \mtl@width}
119     % Ensure position is within bounds
120     \ifdim\#2pt<0pt \def{\#2{0}}\fi
121     \ifdim\#2pt>\mtl@width pt \edef{\#2{\mtl@width}}\fi
122   \else
123     % Automatic positioning (fallback)
124     \stepcounter{mtl@milestonepos}
125     \pgfmathsetmacro{\#2}{(\themtl@milestonepos-1)*(\mtl@width/12)}
126   \fi
127 }
128

```

10.4 Drawing Commands

```

129 % Internal command to draw milestone above timeline
130 \newcommand{\mtl@drawmilestoneabove}[3]{%
131   % #1 = x position
132   % #2 = date
133   % #3 = label
134   \draw (#1,0.1) -- (#1,-0.1);
135   \fill[\mtl@color] (#1,\mtl@milestone@heightabove) circle (\mtl@dotsize);
136   \draw (#1,\mtl@milestone@heightabove) -- (#1,0.1);
137   \node[anchor=south west,align=left,xshift=5pt,inner sep=1pt,rotate=\mtl@rotation] at (#1,\mtl@heightabove) {\begin{minipage}{\mtl@labelwidth}\mtl@fontsize\textbf{\#3}\end{minipage}};
138   \begin{minipage}{\mtl@labelwidth}\mtl@fontsize\textbf{\#3}\end{minipage};
139   % Reset to default for next milestone
140   \edef{\mtl@milestone@heightabove}{\mtl@heightabove}
141   \edef{\mtl@milestone@heightbelow}{\mtl@heightbelow}
142 }
143
144 % Internal command to draw milestone below timeline
145 \newcommand{\mtl@drawmilestonebelow}[3]{%
146   % #1 = x position
147   % #2 = date
148   % #3 = label
149   \draw (#1,0.1) -- (#1,-0.1);
150   \fill[\mtl@color] (#1,-\mtl@milestone@heightbelow) circle (\mtl@dotsize);
151   \draw (#1,-\mtl@milestone@heightbelow) -- (#1,-0.1);
152   \node[anchor=north west,align=left,xshift=5pt,inner sep=1pt,rotate=\mtl@rotation] at (#1,-\mtl@heightbelow) {\begin{minipage}{\mtl@labelwidth}\mtl@fontsize\textbf{\#3}\end{minipage}};
153   \begin{minipage}{\mtl@labelwidth}\mtl@fontsize\textbf{\#3}\end{minipage};
154 }
155

```

```

153   {\begin{minipage}{\mtl@labelwidth}\mtl@fontsize#3\\[2pt]\#2\end{minipage}};
154 % Reset to default for next milestone
155 \edef\mtl@ milestone@heightabove{\mtl@heightabove}
156 \edef\mtl@ milestone@heightbelow{\mtl@heightbelow}
157 }
158
159 % Internal command to draw highlight milestone above timeline
160 \newcommand{\mtl@drawhighlightabove}[3]{%
161   % #1 = x position
162   % #2 = date
163   % #3 = label
164   \draw (#1,0.1) -- (#1,-0.1);
165   \fill[\mtl@highlightcolor] (#1,\mtl@ milestone@heightabove) circle (\mtl@dotsize);
166   \draw (#1,\mtl@ milestone@heightabove) -- (#1,0.1);
167   \node[anchor=south west,align=left,xshift=5pt,inner sep=1pt,rotate=\mtl@rotation] at (#1,\mtl@heightabove)
168     {\begin{minipage}{\mtl@labelwidth}\mtl@fontsize\textbf{#3}\\[2pt]\#2\end{minipage}};
169 % Reset to default for next milestone
170 \edef\mtl@ milestone@heightabove{\mtl@heightabove}
171 \edef\mtl@ milestone@heightbelow{\mtl@heightbelow}
172 }
173
174 % Internal command to draw highlight milestone below timeline
175 \newcommand{\mtl@drawhighlightbelow}[3]{%
176   % #1 = x position
177   % #2 = date
178   % #3 = label
179   \draw (#1,0.1) -- (#1,-0.1);
180   \fill[\mtl@highlightcolor] (#1,-\mtl@ milestone@heightbelow) circle (\mtl@dotsize);
181   \draw (#1,-\mtl@ milestone@heightbelow) -- (#1,-0.1);
182   \node[anchor=north west,align=left,xshift=5pt,inner sep=1pt,rotate=\mtl@rotation] at (#1,-\mtl@heightbelow)
183     {\begin{minipage}{\mtl@labelwidth}\mtl@fontsize#3\\[2pt]\#2\end{minipage}};
184 % Reset to default for next milestone
185 \edef\mtl@ milestone@heightabove{\mtl@heightabove}
186 \edef\mtl@ milestone@heightbelow{\mtl@heightbelow}
187 }
188

```

10.5 Per-Milestone Options

```

189 % Key-value setup for per-milestone options
190 \define@key{mtlmilestone}{heightabove}{\edef\mtl@ milestone@heightabove{#1}}
191 \define@key{mtlmilestone}{heightbelow}{\edef\mtl@ milestone@heightbelow{#1}}
192 \define@key{mtlmilestone}{height}{\edef\mtl@ milestone@heightabove{#1}\edef\mtl@ milestone@heightbelow{#1}}
193

```

10.6 User Commands

```

194 % Command to add a milestone with optional height
195 % Usage: \milestone[position][height=value][date][label]
196 \NewDocumentCommand{\milestone}{O{above}O{}mm}{%
197   % Reset to defaults first
198   \edef\mtl@ milestone@heightabove{\mtl@heightabove}
199   \edef\mtl@ milestone@heightbelow{\mtl@heightbelow}
200   % Apply per-milestone options
201   \setkeys{mtlmilestone}{#2}
202

```

```

203 \mtl@calculateposition{#3}{\mtl@xpos}
204
205 \ifthenelse{\equal{#1}{above}}
206   {%
207     \mtl@drawmilestoneabove{\mtl@xpos}{#3}{#4}%
208   }
209   {%
210     \mtl@drawmilestonebelow{\mtl@xpos}{#3}{#4}%
211   }
212 }
213
214 % Command for highlighted milestone with optional height
215 \NewDocumentCommand{\highlightmilestone}{O{above}O{}mm}{%
216   % Reset to defaults first
217   \edef\mtl@milestone@heightabove{\mtl@heightabove}
218   \edef\mtl@milestone@heightbelow{\mtl@heightbelow}
219   % Apply per-milestone options
220   \setkeys{mtlmilestone}{#2}
221
222   \mtl@calculateposition{#3}{\mtl@xpos}
223
224 \ifthenelse{\equal{#1}{above}}
225   {%
226     \mtl@drawhighlightabove{\mtl@xpos}{#3}{#4}%
227   }
228   {%
229     \mtl@drawhighlightbelow{\mtl@xpos}{#3}{#4}%
230   }
231 }
232
233 % Command for manual positioning
234 \NewDocumentCommand{\milestoneat}{O{above}O{}mmm}{%
235   % Reset to defaults first
236   \edef\mtl@milestone@heightabove{\mtl@heightabove}
237   \edef\mtl@milestone@heightbelow{\mtl@heightbelow}
238   % Apply per-milestone options
239   \setkeys{mtlmilestone}{#2}
240
241 \ifthenelse{\equal{#1}{above}}
242   {%
243     \mtl@drawmilestoneabove{#3}{#4}{#5}%
244   }
245   {%
246     \mtl@drawmilestonebelow{#3}{#4}{#5}%
247   }
248 }
249
250 % Command for title
251 \NewDocumentCommand{\timelinetitle}{m}{%
252   \node[anchor=south,font=\sfamily\Large] at (\mtl@width/2,\mtl@heightabove+1) {#1};
253 }
254
255 % Command to add date markers on timeline
256 \NewDocumentCommand{\datemarker}{mm}{%

```

```
257 \ifnum\mtl@totaldays>0
258   \pgfcalendardatejulian{\#1}{\mtl@markerjulian}
259   \mtl@tempjulian=\mtl@markerjulian
260   \advance\mtl@tempjulian by -\mtl@startjulian
261   \pgfmathsetmacro{\mtl@markerpos}{(\the\mtl@tempjulian / \the\mtl@totaldays) * \mtl@width}
262   \draw (\mtl@markerpos,0.05) -- (\mtl@markerpos,-0.05);
263   \node[anchor=north,font=\sffamily\small,text=\mtl@color!70] at (\mtl@markerpos,-0.1) {\#2};
264 \fi
265 }
266
267 </package>
```