Package ‘tmap’

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Thematic maps are geographical maps in which spatial data distributions are visualized. This package offers a flexible, layer-based, and easy to use approach to create thematic maps, such as choropleths and bubble maps. It is based on the grammar of graphics, and resembles the syntax of ggplot2.

Details

This page provides a brief overview of all package functions. See `vignette("tmap-getstarted")` for a short introduction with examples.

Quick plotting method

\texttt{qtm} \hspace*{2cm} Plot a thematic map

Main plotting method

Shape specification:

\texttt{tm_shape} \hspace*{2cm} Specify a shape object

Aesthetics base layers:

\texttt{tm_polygons} \hspace*{1cm} Create a polygon layer (with borders)
\texttt{tm_symbols} \hspace*{1cm} Create a layer of symbols
\texttt{tm_lines} \hspace*{1cm} Create a layer of lines
\texttt{tm_raster} \hspace*{1cm} Create a raster layer
\texttt{tm_text} \hspace*{1cm} Create a layer of text labels
\texttt{tm_basemap} \hspace*{1cm} Create a layer of basemap tiles
\texttt{tm_tiles} \hspace*{1cm} Create a layer of overlay tiles
Aesthetics derived layers:

- **tm_fill**: Create a polygon layer (without borders)
- **tm_borders**: Create polygon borders
- **tm_bubbles**: Create a layer of bubbles
- **tm_squares**: Create a layer of squares
- **tm_dots**: Create a layer of dots
- **tm_markers**: Create a layer of markers
- **tm_iso**: Create a layer of iso/contour lines
- **tm_rgb**: Create a raster layer of an image

Faceting (small multiples)

- **tm_facets**: Define facets

Attributes:

- **tm_grid**: Create grid lines
- **tm_scale_bar**: Create a scale bar
- **tm_compass**: Create a map compass
- **tm_credits**: Create a text for credits
- **tm_logo**: Create a logo
- **tm_xlab** and **tm_ylab**: Create axis labels
- **tm_minimap**: Create a minimap (view mode only)

Layout element:

- **tm_layout**: Adjust the layout (main function)
- **tm_legend**: Adjust the legend
- **tm_view**: Configure the interactive view mode
- **tm_style**: Apply a predefined style
- **tm_format**: Apply a predefined format

Change options:

- **tmap_mode**: Set the tmap mode: "plot" or "view"
- **ttm**: Toggle between the modes
- **tmap_options**: Set global tmap options (from tm_layout, tm_view, and a couple of others)
- **tmap_style**: Set the default style
Create icons:

| tmap_icons | Specify icons for markers or proportional symbols |

Output functions

| print | Plot in graphics device or view interactively in web browser or RStudio’s viewer pane |
| tmap_last | Redraw the last map |
| tmap_leaflet | Obtain a leaflet widget object |
| tmap_animation | Create an animation |
| tmap_arrange | Create small multiples of separate maps |
| tmap_save | Save thematic maps (either as image or HTML file) |

Spatial datasets

| World | World country data (sf object of polygons) |
| NLD_prov | Netherlands province data (sf object of polygons) |
| NLD_muni | Netherlands municipal data (sf object of polygons) |
| metro | Metropolitan areas (sf object of points) |
| rivers | Rivers (sf object of lines) |
| land | Global land cover (RasterBrick object) |

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References


See Also

vignette("tmap-getstarted")
### tmap

**Stacking of tmap elements**

**Description**

The plus operator allows you to stack **tmap-elements**, and groups of **tmap-elements**.

**Usage**

```r
## S3 method for class 'tmap'
e1 + e2
```

**Arguments**

- `e1`: **first tmap-element**
- `e2`: **second tmap-element**

**References**


**See Also**

- **tmap-element** and **vignette("tmap-getstarted")**

---

### land

**Spatial data of global land cover**

**Description**

Spatial data of global land cover, of class **RasterBrick**. The data includes a population times series from 1950 to (forecasted) 2030. All metro areas with over 1 million inhabitants in 2010 are included.

**Usage**

```r
data(land)
```

**Details**

**Important**: publication of these maps is only allowed when cited to Tateishi et al. (2014), and when "Geospatial Information Authority of Japan, Chiba University and collaborating organizations." is shown. See [http://www.iscgm.org/gm/glcnmo.html#use](http://www.iscgm.org/gm/glcnmo.html#use).

**Source**

[http://www.iscgm.org/gm/glcnmo.html](http://www.iscgm.org/gm/glcnmo.html)
References


metro

Spatial data of metropolitan areas

Description

Spatial data of metropolitan areas, of class sf. The data includes a population times series from 1950 to (forecasted) 2030. All metro areas with over 1 million inhabitants in 2010 are included.

Usage

data(metro)

Source

https://esa.un.org/unpd/wup/

References


print.tmap

Draw thematic map

Description

Draw thematic map. If the tmap mode is set to "plot" (see tmap_mode), the map is plot in the current graphics device. If the mode is set to "view", the map is shown interactively as an htmlwidget.

Usage

## S3 method for class 'tmap'
print(
  x,
  vp = NULL,
  return.asp = FALSE,
  mode =getOption("tmap.mode"),
  show = TRUE,
  knit = FALSE,
  options = NULL,
  ...
)

knit_print.tmap(x, ..., options = NULL)
Arguments

- **x**
  - tmap object. A tmap object is created with `qtm` or by stacking `tmap-element`s.
- **vp**
  - `viewport` to draw the plot in. This is particularly useful for insets.
- **return.asp**
  - Logical that determines whether the aspect ratio of the map is returned. In that case, `grid.newpage()` will be called, but without plotting of the map. This is used by `tmap_save` to determine the aspect ratio of the map.
- **mode**
  - the mode of tmap: "plot" (static) or "view" (interactive). See `tmap_mode` for details.
- **show**
  - logical that determines whether to show the map. Obviously TRUE by default, but `show=FALSE` can be useful for just obtaining the returned objects.
- **knit**
  - should `knit_print` be enabled, or the normal `print` function?
- **options**
  - options passed on to knitprint
- **...**
  - not used

Value

If `mode="plot"`, then a list is returned with the processed shapes and the metadata. If `mode="view"`, a `leaflet` object is returned (see also `tmap_leaflet`)

**qtm**

*Quick thematic map plot*

Description

Draw a thematic map quickly. This function is a convenient wrapper of the main plotting method of stacking `tmap-element`s. Without arguments or with a search term, this function draws an interactive map.

Usage

```r
qtm(
  shp,
  fill = NA,
  symbols.size = NULL,
  symbols.col = NULL,
  symbols.shape = NULL,
  dots.col = NULL,
  text = NULL,
  text.size = 1,
  text.col = NA,
  lines.lwd = NULL,
  lines.col = NULL,
  raster = NA,
  borders = NA,
  ...)```
Arguments

- **shp**
  - One of
    - shape object, which is an object from a class defined by the `sf`, `sp`, or `raster` package. For instance, an `sf` object, an `SpatialPolygons(DataFrame)`, or a `RasterBrick`.
    - Not specified, i.e. `qtm()` is executed. In this case a plain interactive map is shown.
    - A OSM search string, e.g. `qtm("Amsterdam")`. In this case a plain interactive map is shown positioned according to the results of the search query (from OpenStreetMap nominatim)

- **fill**
  - either a color to fill the polygons, or name of the data variable in `shp` to draw a choropleth. Only applicable when `shp` contains polygons. Set `fill = NULL` to draw only polygon borders. See also argument `borders`.

- **symbols.size**
  - either the size of the symbols or a name of the data variable in `shp` that specifies the sizes of the symbols. See also the `size` argument of `tm_symbols`. Only applicable when `shp` contains spatial points, lines, or polygons.

- **symbols.col**
  - either the color of the symbols or a name of the data variable in `shp` that specifies the colors of the symbols. See also the `col` argument of `tm_symbols`. Only applicable when `shp` contains spatial points, lines, or polygons.

- **symbols.shape**
  - either the shape of the symbols or a name of the data variable in `shp` that specifies the shapes of the symbols. See also the `shape` argument of `tm_symbols`. Only applicable when `shp` contains spatial points, lines, or polygons.

- **dots.col**
  - name of the data variable in `shp` for the dot map that specifies the colors of the dots. If `dots.col` is specified instead `symbols.col`, dots instead of bubbles are drawn (unless `symbols.shape` is specified).

- **text**
  - Name of the data variable that contains the text labels. Only applicable when `shp` contains spatial points, lines, or polygons.

- **text.size**
  - Font size of the text labels. Either a constant value, or the name of a numeric data variable. Only applicable when `shp` contains spatial points, lines, or polygons.

- **text.col**
  - name of the data variable in `shp` for the that specifies the colors of the text labels. Only applicable when `shp` contains spatial points, lines, or polygons.

- **lines.lwd**
  - either a line width or a name of the data variable that specifies the line width. Only applicable when `shp` contains spatial lines.
lines.col  either a line color or a name of the data variable that specifies the line colors. Only applicable when shp contains spatial lines.

raster  either a color or a name of the data variable that specifies the raster colors. Only applicable when shp is a spatial raster.

borders  color of the polygon borders. Use NULL to omit the borders.

by  data variable name by which the data is split, or a vector of two variable names to split the data by two variables (where the first is used for the rows and the second for the columns). See also tm_facets

scale  numeric value that serves as the global scale parameter. All font sizes, symbol sizes, border widths, and line widths are controlled by this value. The parameters symbols.size, text.size, and lines.lwd can be scaled separately with respectively symbols.scale, text.scale, and lines.scale. See also ....

title  main title. For legend titles, use X.style, where X is the layer name (see ...).

projection  Either a crs object or a character value (PROJ.4 character string). By default, the projection is used that is defined in the shp object itself.

bbox  bounding box. Argument passed on to tm_shape

basemaps  name(s) of the provider or an URL of a tiled basemap. It is a shortcut to tm_basemap. Set to NULL to disable basemaps. By default, it is set to the tmap option basemaps.

overlays  name(s) of the provider or an URL of a tiled overlay map. It is a shortcut to tm_tiles.

style  Layout options (see tm_layout) that define the style. See tmap_style for details.

format  Layout options (see tm_layout) that define the format. See tmap_format for details.

...  arguments passed on to the tm_* functions. The prefix of these arguments should be with the layer function name without "tm_" and a period. For instance, the palette for polygon fill color is called fill.palette. The following prefixes are supported: shape., fill., borders., polygons., symbols., dots., lines., raster., text., layout., grid., facets., and view.. Arguments that have a unique name, i.e. that does not exist in any other layer function, e.g. convert2density, can also be called without prefix.

Details

The first argument is a shape object (normally specified by tm_shape). The next arguments, from fill to raster, are the aesthetics from the main layers. The remaining arguments are related to the map layout. Any argument from any main layer function, such as tm_polygons, can be specified (see ...). It is also possible to stack tmap-elements on a qtm plot. See examples.

By default, a scale bar is shown. This option can be set with tmap_options (argument qtm.scalebar).

A minimap is shown by default when qtm is called without arguments of with a search term. This option can be set with tmap_options (argument qtm.minimap).

Value

tmap-element
References

See Also
vignette("tmap-getstarted")

Examples
data(World, rivers, metro)

# just the map
qtm(World)

# choropleth
qtm(World, fill = "economy", format = "World", style = "col_blind")

# choropleth with more specifications
qtm(World, fill="HPI", fill.n = 9, fill.palette = "div",
     fill.title = "Happy Planet Index", fill.id = "name",
     style = "gray", format = "World")
# this map can also be created with the main plotting method,
# which is recommended in this case.
## Not run:
  tm_shape(World) +
  tm_polygons("HPI", n = 9, palette = "div",
               title = "Happy Planet Index", id = "name") +
  tm_style("gray") +
  tm_format("World")
## End(Not run)

# bubble map
## Not run:
  qtm(World, borders = NULL) +
  qtm(metro, symbols.size = "pop2010",
      symbols.title.size= "Metropolitan Areas",
      symbols.id= "name",
      format = "World")
## End(Not run)

# dot map
## Not run:
current.mode <- tmap_mode("view")
qtm(metro, bbox = "China")
tmap_mode(current.mode) # restore mode
## End(Not run)

## Not run:
# without arguments, a plain interactive map is shown (the mode is set to view)
renderTmap

qtm()

# search query for OpenStreetMap nominatim
qtm("Amsterdam")

## End(Not run)

---

**renderTmap**

**Wrapper functions for using tmap in shiny**

**Description**

Use `tmapOutput` to create a UI element, and `renderTmap` to render the tmap map. To update the map (more specifically, to add and remove layers) use `tmapProxy`. Adding layers is as usual, removing layers can be done with the function `tm_remove_layer`.

**Usage**

```r
renderTmap(expr, env = parent.frame(), quoted = FALSE)
tmapOutput(outputId, width = "100\%", height = 400)
tmapProxy(mapId, session = shiny::getDefaultReactiveDomain(), x)
```

**Arguments**

- `expr`: A tmap object. A tmap object is created with `qtm` or by stacking `tmap-elements`.
- `env`: The environment in which to evaluate `expr`.
- `quoted`: Is `expr` a quoted expression (with `quote()`)? This is useful if you want to save an expression in a variable.
- `outputId`: Output variable to read from.
- `width`, `height`: the width and height of the map.
- `mapId`: single-element character vector indicating the output ID of the map to modify (if invoked from a Shiny module, the namespace will be added automatically).
- `session`: the Shiny session object to which the map belongs; usually the default value will suffice.
- `x`: the tmap object that specifies the added and removed layers.
- `zindex`: the z index of the pane in which the layer is contained that is going to be removed. It is recommended to specify the `zindex` for this layer when creating the map (inside `renderTmap`).
Details

Two features from tmap are not (yet) supported in Shiny: small multiples (facets) and colored backgrounds (argument bg.color of `tm_layout`). Workarounds for small multiples: create multiple independent maps or specify as.layers = TRUE in `tm_facets`.

Examples

```r
if (require("shiny")) {

  data(World)
  world_vars <- setdiff(names(World), c("iso_a3", "name", "sovereign", "geometry"))

  ui <- fluidPage(
    tmapOutput("map"),
    selectInput("var", "Variable", world_vars)
  )

  server <- function(input, output, session) {
    output$map <- renderTmap({
      tm_shape(World) +
      tm_polygons(world_vars[1], zindex = 401)
    })

    observe({
      var <- input$var
      tmapProxy("map", session, {
        tm_remove_layer(401) +
        tm_shape(World) +
        tm_polygons(var, zindex = 401)
      })
    })
  }

  app <- shinyApp(ui, server)
  if (interactive()) app
}
```

rivers  Spatial data of rivers

Description

Spatial data of rivers, of class `sf`

Usage

data(rivers)
theme_ps

### Description

ggplot2 theme for proportional symbols. By default, this theme only shows the plotting area, so without titles, axes, and legend.

### Usage

```r
theme_ps(
  base_size = 12,
  base_family = "",
  plot.axes = FALSE,
  plot.legend = FALSE
)
```

### Arguments

- `base_size`: base size
- `base_family`: base family
- `plot.axes`: should the axes be shown?
- `plot.legend`: should the legend(s) be shown?

---

### tmap-element

#### Description

Building block for drawing thematic maps. All element functions have the prefix `tm_`.

#### Details

The fundamental, and hence required element is `tm_shape`, which specifies the shape object, and also specifies the projection and bounding box.

The elements that serve as aesthetics layers are

- **Base layers:**
  - `tm_polygons`: Create a polygon layer (with borders)
  - `tm_symbols`: Create a layer of symbols
  - `tm_lines`: Create a layer of lines
tm_raster Create a raster layer  
tm_text Create a layer of text labels  
tm_basemap Create a layer of basemap tiles  
tm_tiles Create a layer of overlay tiles

Derived layers:

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tm_fill</td>
<td>Create a polygon layer (without borders)</td>
</tr>
<tr>
<td>tmBorders</td>
<td>Create polygon borders</td>
</tr>
<tr>
<td>tm_bubbles</td>
<td>Create a layer of bubbles</td>
</tr>
<tr>
<td>tm_squares</td>
<td>Create a layer of squares</td>
</tr>
<tr>
<td>tm_dots</td>
<td>Create a layer of dots</td>
</tr>
<tr>
<td>tm_markers</td>
<td>Create a layer of markers</td>
</tr>
<tr>
<td>tm_iso</td>
<td>Create a layer of iso/contour lines</td>
</tr>
<tr>
<td>tm_rgb</td>
<td>Create a raster layer of an image</td>
</tr>
</tbody>
</table>

The layers can be stacked by simply adding them with the + symbol. The combination of the elements described above form one group. Multiple groups can be stacked. Each group should start with tm_shape.

Attributes layers:

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tm_grid</td>
<td>Create grid lines</td>
</tr>
<tr>
<td>tm_scale_bar</td>
<td>Create a scale bar</td>
</tr>
<tr>
<td>tm_compass</td>
<td>Create a map compass</td>
</tr>
<tr>
<td>tm_credits</td>
<td>Create a text for credits</td>
</tr>
<tr>
<td>tm_logo</td>
<td>Create a logo</td>
</tr>
<tr>
<td>tm_xlab and tm_ylab</td>
<td>Create axis labels</td>
</tr>
<tr>
<td>tm_minimap</td>
<td>Create a minimap (view mode only)</td>
</tr>
</tbody>
</table>

Layout element:

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tm_layout</td>
<td>Adjust the layout (main function)</td>
</tr>
<tr>
<td>tm_legend</td>
<td>Adjust the legend</td>
</tr>
<tr>
<td>tm_view</td>
<td>Configure the interactive view mode</td>
</tr>
<tr>
<td>tm_style</td>
<td>Apply a predefined style</td>
</tr>
<tr>
<td>tm_format</td>
<td>Apply a predefined format</td>
</tr>
</tbody>
</table>

References

See Also

vignette("tmap-getstarted")

The examples in each of the element functions

tmap_animation  Create animation

Description

Create a gif or mpeg animation from a tmap plot. The free tool ImageMagick is required.

Usage

tmap_animation(
  tm,
  filename = "animation.gif",
  width = NA,
  height = NA,
  dpi = NA,
  delay = 40,
  loop = TRUE,
  restart.delay = 0
)

Arguments

tm  tmap object. In order to create a series of tmap plots, which will be the frames of the animation, it is important to set nrow and ncol in tmap_facets, for otherwise a small multiples plot is generated. Commonly, where one map is shown at a time, both nrow and ncol are set to 1.

filename  filename of the video (should be a .gif or .mpg file)

width  width of the animation file (in pixels)

height  height of the animation file (in pixels)

dpi  dots per inch. Only applicable for raster graphics. By default 300, but this can be set with the option output.dpi in tmap_options.

delay  delay time between images (in 1/100th of a second)

loop  logical that determined whether the animation is looped, or an integer value that determines how many times the animation is looped.

restart.delay  delay time between the loops (in 1/100th of a second)

Note

Not only tmap plots are supported, but any series of R plots.
tmap_arrange

Examples

```r
## Not run:
data(NLD_prov)

m1 <- tm_shape(NLD_prov) +
    tm_polygons("yellow") +
    tm_facets(along = "name")

tmap_animation(m1, filename="Dutch_provinces.gif", width=800, delay=40)

data(World, metro)

m2 <- tm_shape(World, simplify = 0.5) +
    tm_fill() +
    tm_shape(metro) +
    tm_bubbles(size = paste0("pop", seq(1970, 2030, by=10)),
               col = "purple",
               border.col = "black", border.alpha = .5,
               scale = 2) +
    tm_facets(free.scales.symbol.size = FALSE, nrow=1, ncol=1) +
    tm_format("World", scale=.5)

tmap_animation(m2, filename="World population.gif", width=1200, delay=100)

## End(Not run)
```

---

**tmap_arrange**

*Arrange small multiples in grid layout*

**Description**

Arrange small multiples in a grid layout. Normally, small multiples are created by specifying multiple variables for one aesthetic or by specifying the by argument (see `tm_facets`). This function can be used to arrange custom small multiples in a grid layout.

**Usage**

```r
tmap_arrange(
    ..., 
    ncol = NA,
    nrow = NA,
    widths = NA,
    heights = NA,
    sync = FALSE,
    asp = 0,
    outer.margins = 0.02
)
```
knit_print.tmap_arrange(x, ..., options = NULL)

## S3 method for class 'tmap_arrange'
print(x, knit = FALSE, ..., options = NULL)

### Arguments

...  

  

  tmap  objects or one list of tmap objects. The number of multiples that can be plot is limited (see details).

  

col

  number of columns

  

  ncol

  number of rows

  

  nrow

  number of rows

  

  widths

  vector of column widths. It should add up to 1 and the length should be equal to ncol

  

  heights

  vector of row heights. It should add up to 1 and the length should be equal to nrow

  

  sync

  logical. Should the navigation in view mode (zooming and panning) be synchronized? By default FALSE.

  

  asp

  aspect ratio. The aspect ratio of each map. Normally, this is controlled by the asp argument from tm_layout (also a tmap option). This argument will overwrite it, unless set to NULL. The default value for asp is 0, which means that the aspect ratio is adjusted to the size of the device divided by the number of columns and rows. When asp is set to NA, which is also the default value for tm_layout, the aspect ratio will be adjusted to the used shapes.

  

  outer.margins

  outer.margins, numeric vector four or a single value. If defines the outer margins for each multiple. If will overwrite the outer.margins argument from tm_layout, unless set to NULL.

  

  x

  a tmap_arrange object (returned from tmap_arrange)

  

  options

  options passed on to knitprint

  

  knit

  should knit_print be enabled, or the normal print function?

### Details

The global option tmap.limits controls the limit of the number of facets that are plotted. By default, tmap_options(tmap.limits=c(facets.view=4,facets.plot=64)). The maximum number of interactive facets is set to four since otherwise it may become very slow.

### Examples

data(World)
w1 <- qtm(World, projection = "+proj=eck4", title="Eckert IV")
w2 <- qtm(World, projection = 3857, title="Mercator")
w3 <- qtm(World, projection = "+proj=gall", title="Gall stereographic")
w4 <- qtm(World, projection = "+proj=robin", title="Robinsin")
current.mode <- tmap_mode("plot")
tmap_arrange(w1, w2, w3, w4, widths = c(.25, .75))
tmap_mode(current.mode)
tmap_format  

Get or add format options

Description

Format options are tmap options that are shape dependent. With tmap_format() the predefined formats can be retrieved. The values for a specific format can be retrieved with tmap_format(format), where format is the name of the format. The function tmap_format_add is used to add a format.

Usage

```
tmap_format(format)
tmap_format_add(..., name)
```

Arguments

- **format**: name of the format. Run tmap_format() to see the choices.
- **...**: options from tm_layout or tm_view. Can also be a list of those options.
- **name**: name of the new format.

Value

The function tmap_format() returns the names of the available formats. When format is defined, it returns the option list corresponding the that format.

See Also

- tm_layout for predefined styles, tmap_style_catalogue to create a style catalogue of all available styles, and tmap_options for tmap options.
- tmap_options for tmap options

Examples

```
# available formats
tmap_format()

# create option list to be used as a new format
World_small <- tmap_format("World")
World_small$scale <- 2

# add format
tmap_format_add(World_small, name = "World_small")

# observe that World_small is successfully added:
tmap_format()
data(World)
```
tmap_icons(World, fill="HPI", format="World_small")

### tmap_icons

**Specify icons**

#### Description

Specifies icons from a png images, which can be used as markers in thematic maps. The function `marker_icon` is the specification of the default marker.

#### Usage

```r
 tmap_icons(
   file,
   width = 48,
   height = 48,
   keep.asp = TRUE,
   just = c("center", "center"),
   as.local = TRUE,
   ...)
```

`marker_icon()`

#### Arguments

- **file**: character value/vector containing the file path(s) or url(s).
- **width**: width of the icon. If `keep.asp`, this is interpreted as the maximum width.
- **height**: height of the icon. If `keep.asp`, this is interpreted as the maximum height.
- **keep.asp**: keep the aspect ratio of the png image. If TRUE and the aspect ratio differs from width/height either width or height is adjusted accordingly.
- **just**: justification of the icons relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left alignment and 1 right alignment. The default value of just is c("center","center").
- **as.local**: if the file is a url, should it be saved to local temporary file?
- **...**: arguments passed on to `icons`. When iconWidth, iconHeight, iconAnchorX and iconAnchorY are specified, they override width and height, and just.

#### Value

icon data (see `icons`)  

#### See Also

`tm_symbols`
tmap_last

Retrieve the last map to be modified or created

Description

Retrieve the last map to be modified or created. Works in the same way as ggplot2's last_plot, although there is a difference: last_map returns the last call instead of the stacked tmap-elements.

Usage

    tmap_last()

Value

    call

See Also

    tmap_save

tmap_leaflet

Create a leaflet widget from a tmap object

Description

Create a leaflet widget from a tmap object. An interactive map (see tmap_mode) is an automatically generated leaflet widget. With this function, this leaflet widget is obtained, which can then be changed or extended by using leaflet's own methods.

Usage

    tmap_leaflet(
        x, 
        mode = "view", 
        show = FALSE, 
        add.titles = TRUE, 
        in.shiny = FALSE, 
        ... 
    )
Arguments

x  tmap object. A tmap object is created with qtm or by stacking tmap-elements.
mode the mode of tmap, which is set to "view" in order to obtain the leaflet object. See tmap_mode for details.
show should the leaflet map be shown? FALSE by default
add.titles add titles to leaflet object
in.shiny is the leaflet output going to be used in shiny? If so, two features are not supported and therefore disabled: facets and colored backgrounds.
... arguments passed on to print.tmap

Value

leaflet object

See Also

tmapOutput for tmap in Shiny, tmap_mode, tm_view, print.tmap

Examples

# world choropleth/bubble map of the world
data(World, metro)
metro$growth <- (metro$pop2020 - metro$pop2010) / (metro$pop2010 * 10) * 100

map1 <- tm_shape(metro) +
tm_bubbles("pop2010", col = "growth",
  border.col = "black", border.alpha = .5,
  style="fixed", breaks=c(-Inf, seq(0, 6, by=2), Inf),
  palette="RdYlBu", contrast=1,
  title.size="Metro population",
  title.col="Growth rate (%)", id="name") +
tm_layout(legend.bg.color = "grey90", legend.bg.alpha=.5, legend.frame=TRUE)

lf <- tmap_leaflet(map1)

# show leaflet widget
lf

# add marker
require(leaflet)
lf %>% leaflet::addMarkers(2.2945, 48.8582, popup = "Eiffel tower")

## Not run:
# alternative
eiffelTower <- geocode_OSM("Eiffel Tower, Paris", as.SPDF = TRUE)

map1 +
tm_shape(eiffelTower) +
tm_markers()
tmap_mode

## End(Not run)

---

### tmap_mode

Set tmap mode to static plotting or interactive viewing

---

#### Description

Set tmap mode to static plotting or interactive viewing. The global option tmap.mode determines the whether thematic maps are plot in the graphics device, or shown as an interactive leaflet map (see also tmap_options). The function tmap_mode is a wrapper to set this global option. The convenient function ttm is a toggle switch between the two modes. Tip 1: use tmap_mode in scripts and ttm in the console. Tip 2: use ttm in combination with tmap_last to redraw the last map in the other mode.

#### Usage

```r
tmap_mode(mode = c("plot", "view"))

ttm()
```

#### Arguments

- **mode**
  - one of
  - **"plot"** Thematic maps are shown in the graphics device. This is the default mode, and supports all tmap’s features, such as small multiples (see tm_facets) and extensive layout settings (see tm_layout). It is recommended for saving static maps (see tmap_save).
  - **"view"** Thematic maps are viewed interactively in the web browser or RStudio’s Viewer pane. Maps are fully interactive with tiles from OpenStreetMap or other map providers (see tm_tiles). See also tm_view for options related to the "view" mode. This mode generates a leaflet widget, which can also be directly obtained with tmap_leaflet. With RMarkdown, it is possible to publish it to an HTML page. There are a couple of constraints in comparison to "plot":
    - The map is always projected according to the Web Mercator projection. Although this projection is the de facto standard for interactive web-based mapping, it lacks the equal-area property, which is important for many thematic maps, especially choropleths (see examples from tm_shape).
    - Small multiples are not supported
    - The legend cannot be made for aesthetics regarding size, which are symbol size and line width.
    - Text labels are not supported (yet)
    - The layout options set with tm_layout regarding map format are not used. However, the styling options still apply.
Value

the mode before changing

References


See Also

vignette("tmap-getstarted"), tmap_last to show the last map, tm_view for viewing options, and tmap_leaflet for obtaining a leaflet widget, and tmap_options for tmap options.

Examples

```r
# world choropleth/bubble map of the world
data(World, metro)
metro$growth <- (metro$pop2020 - metro$pop2010) / (metro$pop2010 * 10) * 100

map1 <- tm_shape(World) +
tm_polygons("income_grp", palette="-Blues", contrast=.7, id="name", title="Income group") +
tm_shape(metro) +
tm_bubbles("pop2010", col = "growth", border.col = "black", border.alpha = .5, style="fixed", breaks=c(-Inf, seq(0, 6, by=2), Inf), palette="-RdYlBu", contrast=1, title.size="Metro population", title.col="Growth rate (%)", id="name", popup.vars = c("pop2010", "pop2020", "growth") +
tm_layout(legend.bg.color = "grey90", legend.bg.alpha=.5, legend.frame=TRUE)

# initial mode: "plot"
current.mode <- tmap_mode("plot")

# plot map
map1

# switch to other mode: "view"
ttm()

# view map
map1

## Not run:
# choropleth of the Dutch population in interactive mode:
require(tmaptools)
data(NLD_muni, NLD_prov)
NLD_muni$pop_dens <- calc_densities(NLD_muni, var = "population")

tm_shape(NLD_muni) +
tm_fill(col="pop_dens", style="kmeans", title = "Population (per km^2)", id = "name") +
```
tm_borders("grey25", alpha=.5) +
tm_shape(NLD_prov) +
tm_borders("grey40", lwd=2)

## End(Not run)

# restore current mode
tmap_mode(current.mode)

---

$tmap\_options$

Options for tmap

### Description

Get or set global options for tmap. The behaviour of tmap_options is similar to options: all tmap options are retrieved when this function is called without arguments. When arguments are specified, the corresponding options are set, and the old values are silently returned as a list. The function tmap_options_reset is used to reset all options back to the default values (also the style is reset to "white"). Differences with the default values can be shown with tmap_options_diff. The function tmap_options_save can be used to save the current options as a new style. See details below on how to create a new style.

### Usage

```r
tmap_options(
  ..., unit, limits, max.categories, max.raster, basemaps, basemaps.alpha, overlays, overlays.alpha, qtm.scalebar, qtm.minimap, show.messages, output.format, output.size, output.dpi
)

tmap_options_diff()

tmap_options_reset()

tmap_options_save(style)
```

Arguments

... options from \texttt{tm_layout} or \texttt{tm_view}. Note that the difference with using \texttt{tm_layout} or \texttt{tm_view} directly, is that options set with \texttt{tmap_options} remain for the entire session (unless changed with \texttt{tmap_options} or \texttt{tmap_style}). It can also be a single unnamed argument which is a named list of options (similar behaviour as \texttt{options}).

\texttt{unit} this is the default value for the \texttt{unit} argument of \texttt{tm_shape}. It specifies the unit of measurement, which is used in the scale bar and the calculation of density values. By default (when loading the package), it is "metric". Other valid values are "imperial", "km", "m", "mi", and "ft".

\texttt{limits} this option determines how many facets (small multiples) are allowed for per mode. It should be a vector of two numeric values named \texttt{facets.view} and \texttt{facets.plot}. By default (i.e. when loading the package), it is set to \texttt{c(facets.view = 4,facets.plot = 64)}.

\texttt{max.categories} in case \texttt{col} is the name of a categorical variable in the layer functions (e.g. \texttt{tm_polygons}), this value determines how many categories (levels) it can have maximally. If the number of levels is higher than \texttt{max.categories}, then levels are combined.

\texttt{max.raster} the maximum size of rasters, in terms of number of raster cells. It should be a vector of two numeric values named \texttt{plot} and \texttt{view}, which determines the size in plotting and viewing mode. The default values are \texttt{c(plot = 1e7,view = 1e6)}. Rasters that are larger will be shown at a decreased resolution.

\texttt{basemaps} default basemaps. Basemaps are normally configured with \texttt{tm_basemap}. When this is not done, the basemaps specified by this option are shown (in view mode). Vector of one or more names of baselayer maps, or \texttt{NULL} if basemaps should be omitted. For options see the list \texttt{leaflet::providers}, which can be previewed at \url{http://leaflet-extras.github.io/leaflet-providers/preview}. Also supports URL's for tile servers, such as "\url{http://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png}". If a named vector is provided, the names are used in the layer control legend (similar to the group argument of \texttt{tm_basemap}. See also overlays, which is the default option for overlay tiles.

\texttt{basemaps.alpha} default transparency (opacity) value for the basemaps. Can be a vector of values, one for each basemap.

\texttt{overlays} default overlay tilemaps. Overlays tilemaps are shown as front layer (in contrast to basemaps, which are background layers), so they are only useful when they are semi-transparent. Like basemaps, a vector of tilemaps is expected, or \texttt{NULL} is overlays should be omitted.

\texttt{overlays.alpha} default transparency (opacity) value for the overlay maps. Can be a vector of values, one for each overlay map.

\texttt{qtm.scalebar} should a scale bar be added to interactive maps created with \texttt{qtm}. In other words, should \texttt{tm_scale_bar()} be added automatically? The value \texttt{NA} means that the scale bar is only added when \texttt{qtm} is called without arguments or with a search term. The default value is \texttt{TRUE}.

\texttt{qtm.minimap} should a minimap be added to interactive maps created with \texttt{qtm}. In other words, should \texttt{tm_minimap()} be added automatically? The value \texttt{NA} means that the
minimap is only added in navigation mode (i.e. when `qtm` is called without arguments or with a search term. The default value is `FALSE`.

`show.messages` should messages be shown?

`output.format` The format of the static maps saved with `tmap_save` without specification of the filename. The default is "png".

`output.size` The size of the static maps saved with `tmap_save` without specification of width and height. The unit is squared inch and the default is 49. This means that square maps (so with aspect ratio 1) will be saved as 7 by 7 inch images and a map with aspect ratio 2 (e.g. most world maps) will be saved as approximately 10 by 5 inch.

`output.dpi` The default number of dots per inch for `tmap_save` and `tmap_animation`.

`style` style name

Details

The options can be divided into three parts: one part contains the arguments from `tm_layout`, one part contains the arguments from `tm_view`, and one part contains options that can only be set with `tmap_options`. Observe that the options from `tm_layout` and `tm_view` can also be set with those functions. It is recommended to use `tmap_options` when setting specific options during global session. However, options that are only relevant for a specific map can better be set with `tm_layout` or `tm_view`.

A new style can be created in two ways. The first approach is to use the function `tmap_options_save`, which takes a snapshot of the current tmap options. E.g., `tmap_options_save("my_style")` will save the current tmap options as a style called "my_style". See the examples in which a style called "red" is created. The second way to create a style is to create a list with tmap options and with a attribute called style. This approach is illustrated in the last example, in which a style called "black" is created.

The newly created style, say "my_style", will be accessible globally via `tmap_style("my_style")` and `+ tm_style("my_style")` until the R session is restarted or tmap is reloaded. In order to save the style for future use or sharing, obtain the option list as follows: `my_style <- tmap_options()` and save the object `my_style` in the usual way. Next time, the style can be loaded simply by running `tmap_options(my_style)`, which corresponds to the second way to create a style (see the paragraph above).

See Also

`tm_layout`, `tm_view`, and `tmap_style`

Examples

```r
# load data
data(World)

# get current options
str(tmap_options())

# get current style
tmap_style()
```
# plot map (with default options)
tm_shape(World) + tm_polygons("HPI")

# change style to cobalt
tmap_style("cobalt")

# observe the changed options
tmap_options_diff()

# plot the map again
tm_shape(World) + tm_polygons("HPI")

# define red style

# change the background color
tmap_options(bg.color = "red")

# note that the current style is modified
tmap_style()

# observe the changed options
tmap_options_diff()

# save the current options as style "red"
tmap_options_save("red")

# plot the map again
tm_shape(World) + tm_polygons("HPI")

# the specified arguments of tm_layout and tm_view will override the options temporarily:
tm_shape(World) + tm_polygons("HPI") + tm_layout(bg.color="purple")

# when tm_style_ is called, it will override all options temporarily:
tm_shape(World) + tm_polygons("HPI") + tm_layout(bg.color="purple") + tm_style("classic")

# reset all options
tmap_options_reset()

# check style and options
tmap_style()
tmap_options_diff()

# define black style

# create style list with style attribute
black_style <- structure(
  list(
    bg.color = "black",
...
tmap_save = c(fill = "grey40", borders = "grey40",
symbols = "grey80", dots = "grey80",
lines = "white", text = "white",
na = "grey30", null = "grey15"),
aes.palette = list(seq = "plasma", div = "PiYG", cat = "Dark2"),
attr.color = "white",
panel.label.color = "white",
panel.label.bg.color = "grey40",
main.title.color = "white"
),
style = "black"
)

# assign the style
tmap_options(black_style)

# observe that "black" is a new style
tmap_style()

# plot the world map again, this time with the newly created black style
tm_shape(World) +
tm_polygons("HPI")

# reset all options
tmap_options_reset()

---

### tmap_save

**Save tmap**

#### Description

Save tmap to a file. This can be either a static plot (e.g. png) or an interactive map (html).

#### Usage

```r

```
Arguments

- **tm**: tmap object
- **filename**: filename including extension, and optionally the path. The extensions pdf, eps, svg, wmf (Windows only), png, jpg, bmp, tiff, and html are supported. If the extension is missing, the file will be saved as a static plot in "plot" mode and as an interactive map (html) in "view" mode. The default format for static plots is png, but this can be changed using the option "output.format" in `tmap_options`
- **height, width**: The width and height of the plot (not applicable for html files). Units are set with the argument units. If one of them is not specified, this is calculated using the formula \( \text{asp} = \text{width} / \text{height} \), where asp is the estimated aspect ratio of the map. If both are missing, they are set such that \( \text{width} \times \text{height} \) is equal to the option "output.size" in `tmap_options`. This is by default 49, meaning that is the map is a square (so aspect ratio of 1) both width and height are set to 7.
- **units**: units for width and height ("in", "cm", or "mm"). By default, pixels ("px") are used if either width or height is set to a value greater than 50. Else, the units are inches ("in")
- **dpi**: dots per inch. Only applicable for raster graphics. By default it is set to 300, but this can be changed using the option "output.dpi" in `tmap_options`
- **outer.margins**: overrides the outer.margins argument of `tm_layout` (unless set to NA)
- **asp**: if specified, it overrides the asp argument of `tm_layout`. Tip: set to 0 if map frame should be placed on the edges of the image.
- **scale**: overrides the scale argument of `tm_layout` (unless set to NA)
- **insets_tm**: tmap object of an inset map, or a list of tmap objects of multiple inset maps. The number of tmap objects should be equal to the number of viewports specified with `insets_vp`
- **insets_vp**: viewport of an inset map, or a list of viewports of multiple inset maps. The number of viewports should be equal to the number of tmap objects specified with `insets_tm`
- **add.titles**: add titles to leaflet object
- **verbose**: Deprecated. It is now controlled by the tmap option `show.messages` (see `tmap_options`)
- **...**: arguments passed on to device functions or to `saveWidget`

Examples

```r
## Not run:
data(NLD_muni, NLD_prov)
m <- tm_shape(NLD_muni) +
  tm_fill(col="population", convert2density=TRUE,
          style="kmeans",
          title=expression("Population (per " * km^2 * ")")
  ) +
tm_borders("black", alpha=.5) +
```
tm_shape(NLD_prov) +
  tm_borders("grey25", lwd=2) +
  tm_style("classic") +
  tm_format("NLD", inner.margins = c(.02, .15, .06, .15)) +
  tm_scale_bar(position = c("left", "bottom")) +
  tm_compass(position=c("right", "bottom"))

tmap_save(m, "choropleth.png", height=7)

data(World)
  m2 <- tm_shape(World) +
  tm_fill("well_being", id="name", title="Well-being") +
  tm_format("World")

  # save image
  tmap_save(m2, "World_map.png", width=1920, height=1080, asp=0)

  # cut left inner margin to make sure Antarctica is snapped to frame
  tmap_save(m2 + tm_layout(inner.margins = c(0, -.1, 0.05, 0.01)),
            "World_map2.png", width=1920, height=1080, asp=0)

  # save interactive plot
  tmap_save(m2, "World_map.html")

  ## End(Not run)

---

tmap_style  

Set or get the default tmap style

Description

Set or get the default tmap style. Without arguments, the current style is returned. Also the available styles are displayed. When a style is set, the corresponding tmap options (see tmap_options) will be set accordingly. The default style (i.e. when loading the package) is "white".

Usage

tmap_style(style)

Arguments

style  

name of the style. When omitted, tmap_style returns the current style and also shows all available styles. When the style is specified, tmap_style sets the style accordingly. Note that in that case, all tmap options (see tmap_options) will be reset according to the style definition. See tm_layout for predefined styles, and tmap_style_catalogue for creating a catalogue.
Details

Note that `tm_style` is used within a plot call (so it only affects that plot), whereas `tmap_style` sets the style globally.

After loading a style, the options that defined this style (i.e. the difference with the default "white" style) can be obtained by `tmap_options_diff`.

The documentation of `tmap_options` (details and the examples) shows how a new style is created.

Value

the style before changing

See Also

tmap_options for tmap options, and tmap_style_catalogue to create a style catalogue of all available styles.

Examples

data(World)

```r
current.style <- tmap_style("classic")
qtm(World, fill="life_exp", fill.title="Life expectancy")

tmap_style("cobalt")
qtm(World, fill="life_exp", fill.title="Life expectancy")

# restore current style
tmap_style(current.style)
```

Description

Create a style catalogue for each predefined tmap style. The result is a set of png images, one for each style.

Usage

tmap_style_catalogue(path = "./tmap_style_previews", styles = NA)

tmap_style_catalog(path = "./tmap_style_previews", styles = NA)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>path</td>
<td>path where the png images are stored</td>
</tr>
<tr>
<td>styles</td>
<td>vector of styles function names (see tmap_style) for which a preview is generated. By default, a preview is generated for all loaded styles.</td>
</tr>
</tbody>
</table>
### tmap_tip

Get a tip about tmap

**Description**

Generates a tip with an example. The tip and example code are printed, and the example itself is executed.

**Usage**

```r
tmap_tip(latest.version = FALSE)
```

**Arguments**

- **latest.version** should only tips be generated from the latest version of tmap? False by default.

**Examples**

```r
tmap_tip()
```

### tm_add_legend

Add manual legend

**Description**

Creates a tmap-element that adds a manual legend.

**Usage**

```r
tm_add_legend(
    type = c("fill", "symbol", "text", "line"),
    labels = NULL,
    col = NULL,
    size = NULL,
    shape = NULL,
    lwd = NULL,
    lty = NULL,
    text = NULL,
    alpha = NA,
    border.col = "black",
    border.lwd = 1,
    border.alpha = NA,
    title = "",
    is.portrait = TRUE,
    legend.format = list(),
    reverse = FALSE,
)```
Arguments

- **type**: type of legend. One of "fill", "symbol", "text", or "line"
- **labels**: legend labels
- **col**: legend colors
- **size**: legend symbol sizes (if type=="symbol")
- **shape**: legend symbol shapes (if type=="symbol")
- **lwd**: legend line widths (if type=="line")
- **lty**: legend line types (if type=="line")
- **text**: legend texts (if type=="text")
- **alpha**: legend fill transparency
- **border.col**: legend border col (if type is "fill" or "symbol")
- **border.lwd**: legend border width (if type is "fill" or "symbol")
- **border.alpha**: legend border alpha (if type is "fill" or "symbol")
- **title**: legend title
- **is.portrait**: is legend portrait (TRUE) or landscape (FALSE)?
- **legend.format**: options to format the legend, see `tm_symbols` (the description of the argument `legend.format`) for details. Note that many of these arguments are not applicable for `tm_add_legend` since labels should be a character vector. However, some options could still be handy, e.g. `list(text.align = "right")`.
- **reverse**: are the legend items reversed (by default FALSE)?
- **z**: legend stack position
- **group**: name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. By default NULL, which means that the legend will not be shown in the layer control item.

See Also

`tm_symbols` for an example
tm_basemap  

Draw a tile layer

Description

Creates a tmap-element that draws a tile layer. This feature is only available in view mode. For plot mode, a tile image can be retrieved by read_osm. The function tm_basemap draws the tile layer as basemap (i.e. as bottom layer), whereas tm_tiles draws the tile layer as overlay layer (where the stacking order corresponds to the order in which this layer is called). Note that basemaps are shown by default (see details).

Usage

tm_basemap(server = NA, group = NA, alpha = NA, tms = FALSE)

Extra

server
name of the provider or an URL. The list of available providers can be obtained with leaflet::providers. See http://leaflet-extras.github.io/leaflet-providers/preview for a preview of those. When a URL is provided, it should be in template format, e.g. "http://{s}.tile.openstreetmap.org/{z}/{x}/{y}.png". Use NULL in tm_basemap to disable the basemaps.

group
name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in tm_shape). Tile layers generated with tm_basemap will be base groups whereas tile layers generated with tm_tiles will be overlay groups.

alpha
alpha

tms
is the provided tile server defined according to the TMS protocol? By default FALSE.

zindex
zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".

Details

When tm_basemap is not specified, the default basemaps are shown, which can be configured by the basemaps argument in tmap_options. By default (for style "white") three basemaps are drawn: c("Esri.WorldGrayCanvas","OpenStreetMap","Esri.WorldTopoMap"). To disable basemaps, add tm_basemap(NULL) to the plot, or set tmap_options(basemaps = NULL). Similarly, when tm_tiles is not specified, the overlay maps specified by the overlays argument in
in `tmap_options` are shown as front layer. By default, this argument is set to NULL, so no overlay maps are shown by default. See examples.

**Examples**

```r
## Not run:
current.mode <- tmap_mode("view")
data(World, metro)

tm_basemap(leaflet::providers$Stamen.Watercolor) +
tm_shape(metro, bbox = "India") + tm_dots(col = "red", group = "Metropolitan areas") +
tm_tiles(paste0("http://services.arcgisonline.com/arcgis/rest/services/Canvas/World_Light_Gray_Reference/MapServer/tile/{z}/{y}/{x}", group = "Labels"))

# Use tmap options to set the basemap and overlay map permanently during the R session:
opts <- tmap_options(basemaps = c(Canvas = "Esri.WorldGrayCanvas", Imagery = "Esri.WorldImagery"), overlays = c(Labels = paste0("http://services.arcgisonline.com/arcgis/rest/services/Canvas/World_Light_Gray_Reference/MapServer/tile/{z}/{y}/{x}")))

qtm(World, fill = "HPI", fill.palette = "RdYlGn")

# restore options
tmap_options(opts)

# restore current mode
tmap_mode(current.mode)

## End(Not run)
```

---

**tm_compass**

*Map compass*

**Description**

Creates a map compass.

**Usage**

```r
tm_compass(
  north = 0,
  type = NA,
  text.size = 0.8,
  size = NA,
  show.labels = 1,
  cardinal.directions = c("N", "E", "S", "W"),
  text.color = NA,
  color.dark = NA,
)```
Arguments

north  north direction in degrees: 0 means up, 90 right, etc.
type  compass type, one of: "arrow", "4star", "8star", "radar", "rose". The
default is controlled by \texttt{tm_layout} (which uses "arrow" for the default style)
text.size  relative font size
size  size of the compass in number of text lines. The default values depend on the
type: for "arrow" it is 2, for "4star" and "8star" it is 4, and for "radar" and "rose" it is 6.
show.labels  number that specifies which labels are shown: 0 means no labels, 1 (default)
means only north, 2 means all four cardinal directions, and 3 means the four
cardinal directions and the four intercardinal directions (e.g. north-east).
cardinal.directions  labels that are used for the cardinal directions north, east, south, and west.
text.color  color of the text. By default equal to the argument \texttt{attr.color} of \texttt{tm_layout}.
color.dark  color of the dark parts of the compass, typically (and by default) black.
color.light  color of the light parts of the compass, typically (and by default) white.
lwd  line width of the compass
position  position of the compass. Vector of two values, specifying the x and y coordi-
nates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT"
for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the
second value, or this vector contains two numeric values between 0 and 1 that
specifies the x and y value of the left bottom corner of the compass. The up-
percase values correspond to the position without margins (so tighter to the
frame). The default value is controlled by the argument "attr.position" of
\texttt{tm_layout}.
just  Justification of the attribute relative to the point coordinates. The first value
specifies horizontal and the second value vertical justification. Possible values
are: "left", "right", "center", "bottom", and "top". Numeric values of
0 specify left/bottom alignment and 1 right/top alignment. This option is only
used, if position is specified by numeric coordinates. The default value is
controlled by the argument "attr.just" of \texttt{tm_layout}.
fontsize  deprecated: renamed to text.size

Examples

current.mode <- tmap_mode("plot")
data(NLD_muni)
```r
# map(NLD_muni, theme = "NLD") + tm_compass()
# map(NLD_muni, theme = "NLD") + tm_compass(type="radar", position=c("left", "top"), show.labels = 3)

# restore current mode
tm_map(current.mode)
```

---

### tm_credits

**Credits text**

**Description**

Creates a text annotation that could be used for credits or acknowledgements.

**Usage**

```r
tm_credits(
  text,
  size = 0.7,
  col = NA,
  alpha = NA,
  align = "left",
  bg.color = NA,
  bg.alpha = NA,
  fontface = NA,
  fontfamily = NA,
  position = NA,
  just = NA
)
```

**Arguments**

- **text**: text. Multiple lines can be created with the line break symbol "\n". Facets can have different texts: in that case a vector of characters is required. Use "" to omit the credits for specific facets.
- **size**: relative text size
- **col**: color of the text. By default equal to the argument attr.color of `tm_layout`
- **alpha**: transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of `col` is used (normally 1).
- **align**: horizontal alignment: "left" (default), "center", or "right". Only applicable if text contains multiple lines
- **bg.color**: background color for the text
- **bg.alpha**: Transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the bg.color is used (normally 1).
- **fontface**: font face of the text. By default, determined by the fontface argument of `tm_layout`.
tm_facets

fontfamily
position
just

See Also
tm_xlab

Examples

current.mode <- tmap_mode("plot")
data(NLD_muni, NLD_prov)

tm_shape(NLD_muni) +
  tm_fill(col="population", convert2density=TRUE,
  style="kmeans", title = expression("Population (per " * km^2 * ")")) +
  tm_borders("grey25", alpha=.5) +
  tm_shape(NLD_prov) +
  tm_borders("grey40", lwd=2) +
  tm_format("NLD", bg.color="white", frame = TRUE) +
  tm_credits("(c) Statistics Netherlands (CBS) and\nKadaster Nederland", position=c("left", "bottom"))

# restore current mode
  tmap_mode(current.mode)

Description

Creates a tmap-element that specifies facets (small multiples). Small multiples can be created in two ways: 1) by specifying the by argument with one or two variable names, by which the data is grouped, 2) by specifying multiple variable names in any of the aesthetic argument of the layer functions (for instance, the argument col in tm_fill). This function further specifies the facets, for instance number of rows and columns, and whether the coordinate and scales are fixed or free (i.e.
independent of each other). An overview of the different approaches to create facets is provided in the examples.

Usage

tm_facets(
  by = NULL,
  along = NULL,
  as.layers = FALSE,
  ncol = NA,
  nrow = NA,
  free.coords = !as.layers,
  drop.units = TRUE,
  drop.empty.facets = TRUE,
  drop.NA.facets = FALSE,
  sync = NA,
  showNA = NA,
  textNA = "Missing",
  free.scales = is.null(by) && is.null(along),
  free.scales.fill = free.scales,
  free.scales.symbol.size = free.scales,
  free.scales.symbol.col = free.scales,
  free.scales.symbol.shape = free.scales,
  free.scales.text.size = free.scales,
  free.scales.text.col = free.scales,
  free.scales.line.col = free.scales,
  free.scales.line.lwd = free.scales,
  free.scales.raster = free.scales,
  inside.original.bbox = FALSE,
  scale.factor = 2,
  drop.shapes = drop.units
)

Arguments

by          data variable name by which the data is split, or a vector of two variable names to split the data by two variables (where the first is used for the rows and the second for the columns).

along       data variable name by which the data is split and plotted on separate pages. This is especially useful for animations made with tmap_animation. The along argument can be used in combination with the by argument. It is only supported in "plot" mode (so not in "view" mode).

as.layers   logical that determines whether facets are shown as different layers in "view" mode. By default FALSE, i.e. facets are drawn as small multiples.

ncol        number of columns of the small multiples grid. Not applicable if by contains two variable names.

nrow        number of rows of the small multiples grid. Not applicable if by contains two variable names.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>free.coords</strong></td>
<td>logical. If the by argument is specified, should each map have its own coordinate ranges? By default TRUE, unless facets are shown in as different layers (as.layers = TRUE)</td>
</tr>
<tr>
<td><strong>drop.units</strong></td>
<td>logical. If the by argument is specified, should non-selected spatial units be dropped? If FALSE, they are plotted where mapped aesthetics are regarded as missing values. Not applicable for raster shapes. By default TRUE.</td>
</tr>
<tr>
<td><strong>drop.empty.facets</strong></td>
<td>logical. If the by argument is specified, should empty facets be dropped? Empty facets occur when the by-variable contains unused levels. When TRUE and two by-variables are specified, empty rows and columns are dropped.</td>
</tr>
<tr>
<td><strong>drop.NA.facets</strong></td>
<td>logical. If the by argument is specified, and all values of the defined aesthetic variables (e.g. col from tm_fill) for specific facets, should these facets be dropped? FALSE by default.</td>
</tr>
<tr>
<td><strong>sync</strong></td>
<td>logical. Should the navigation in view mode (zooming and panning) be synchronized? By default TRUE if the facets have the same bounding box. This is generally the case when rasters are plotted, or when free.coords is FALSE.</td>
</tr>
<tr>
<td><strong>showNA</strong></td>
<td>If the by argument is specified, should missing values of the by-variable be shown in a facet? If two by-variables are specified, should missing values be shown in an additional row and column? If NA, missing values only are shown if they exist. Similar to the useNA argument of table, where TRUE, FALSE, and NA correspond to &quot;always&quot;, &quot;no&quot;, and &quot;ifany&quot; respectively.</td>
</tr>
<tr>
<td><strong>textNA</strong></td>
<td>text used for facets of missing values.</td>
</tr>
<tr>
<td><strong>free.scales</strong></td>
<td>logical. Should all scales of the plotted data variables be free, i.e. independent of each other? Possible data variables are color from tm_fill, color and size from tm_symbols and line color from tm_lines.</td>
</tr>
<tr>
<td><strong>free.scales.fill</strong></td>
<td>logical. Should the color scale for the choropleth be free?</td>
</tr>
<tr>
<td><strong>free.scales.symbol.size</strong></td>
<td>logical. Should the symbol size scale for the symbol map be free?</td>
</tr>
<tr>
<td><strong>free.scales.symbol.col</strong></td>
<td>logical. Should the color scale for the symbol map be free?</td>
</tr>
<tr>
<td><strong>free.scales.symbol.shape</strong></td>
<td>logical. Should the symbol shape scale for the symbol map be free?</td>
</tr>
<tr>
<td><strong>free.scales.text.size</strong></td>
<td>logical. Should the text size scale be free?</td>
</tr>
<tr>
<td><strong>free.scales.text.col</strong></td>
<td>logical. Should the text color scale be free?</td>
</tr>
<tr>
<td><strong>free.scales.line.col</strong></td>
<td>Should the line color scale be free?</td>
</tr>
<tr>
<td><strong>free.scales.line.lwd</strong></td>
<td>Should the line width scale be free?</td>
</tr>
<tr>
<td><strong>free.scales.raster</strong></td>
<td>Should the color scale for raster layers be free?</td>
</tr>
<tr>
<td><strong>inside.original.bbox</strong></td>
<td>If free.coords, should the bounding box of each small multiple be inside the original bounding box?</td>
</tr>
</tbody>
</table>
scale.factor Number that determines how the elements (e.g., font sizes, symbol sizes, line widths) of the small multiples are scaled in relation to the scaling factor of the shapes. The elements are scaled to the scale.factor**th root of the scaling factor of the shapes. So, for scale.factor=1, they are scaled proportional to the scaling of the shapes. Since elements, especially text, are often too small to read, a higher value is recommended. By default, scale.factor=2.

drop.shapes deprecated: renamed to drop.units

Details

The global option limits controls the limit of the number of facets that are plotted. By default, tmap_options(limits=c(facets.plot=64, facets.view=4)). The maximum number of interactive facets is set to four since otherwise it may become very slow.

Value

tmap-element

References


See Also

vignette("tmap-getstarted")

Examples

data(World, NLD_muni, NLD_prov, land, metro)
current.mode <- tmap_mode("plot")

# CASE 1: Facets defined by constant values
tm_shape(World) +
   tm_fill(c("forestgreen", "goldenrod")) +
   tm_format("World", title=c("A green world", "A dry world"), bg.color="lightskyblue2",
                   title.position=c("left", "bottom"))

# CASE 2: Facets defined by multiple variables
tm_shape(World) +
   tm_polygons(c("well_being", "life_exp"),
               style=c("pretty", "fixed"), breaks=list(NULL, c(65,70,75,80,85)),
               palette=list("Oranges", "Purples"),
               border.col = "black",
               title=c("Well-Being Index", "Life Expectancy")) +
   tm_format("World")

## Not run:
tm_shape(NLD_muni) +
   tm_fill(c("pop_0_14", "pop_15_24", "pop_25_44", "pop_45_64", "pop_65plus"),
           style="kmeans",
           border.col="black",
           title="Population Age Groups",
           title.position=c("left", "bottom"))

# CASE 3: Facets defined by a combination of variables
tm_shape(World) +
   tm_polygons(c("well_being", "life_exp"),
               style=c("pretty", "fixed"), breaks=list(NULL, c(65,70,75,80,85)),
               palette=list("Oranges", "Purples"),
               border.col = "black",
               title=c("Well-Being Index", "Life Expectancy")) +
   tm_fill(c("forestgreen", "goldenrod"),
           style="pretty"),
   tm_format("World", title=c("A green world", "A dry world"), bg.color="lightskyblue2",
             title.position=c("left", "bottom"))

## Not run:
tm_shape(NLD_muni) +
   tm_polygons(c("well_being", "life_exp"),
               style=c("pretty", "fixed"), breaks=list(NULL, c(65,70,75,80,85)),
               palette=list("Oranges", "Purples"),
               border.col = "black",
               title=c("Well-Being Index", "Life Expectancy")) +
   tm_fill(c("forestgreen", "goldenrod"),
           style="pretty",
           border.col="black",
           title="Population Age Groups",
           title.position=c("left", "bottom"))
palette=list("Oranges", "Greens", "Blues", "Purples", "Greys"),
title=c("Population 0 to 14", "Population 15 to 24", "Population 25 to 44",
"Population 45 to 64", "Population 65 and older") +
tm_shape(NLD_prov) +
tm_borders() +
tm_format("NLD", frame = TRUE, asp=0)

## End(Not run)

# CASE 3: Facets defined by group-by variable(s)
# A group-by variable that divides the objects spatially
tm_shape(NLD_prov) +
  tm_polygons("gold2") +
  tm_facets(by="name")

## Not run:
  tm_shape(NLD_muni) +
  tm_borders() +
  tm_facets(by="province") +
  tm_fill("population", style="kmeans", convert2density = TRUE) +
  tm_shape(NLD_prov) +
  tm_borders(lwd=4) +
  tm_facets(by="name")

## End(Not run)

# The objects are divided by a non-spatial variable (e.g. date/time)
if (require(dplyr) && require(tidyr)) {
  metro_long <- metro %>%
    gather(year, population, -name, -name_long, -iso_a3, -geometry) %>%
    mutate(year = as.integer(substr(year, 4, 7)))

tm_shape(metro_long) +
  tm_bubbles("population") +
  tm_facets(by = "year")
}

## Not run:
  tm_shape(land) +
  tm_raster("black") +
  tm_facets(by="cover_cls")

## End(Not run)

# Facets defined by two group-by variables
## Not run:
World$HPI3 <- cut(World$HPI, breaks = c(20, 35, 50, 65),
  labels = c("HPI low", "HPI medium", "HPI high"))
World$GDP3 <- cut(World$gdp_cap_est, breaks = c(0, 5000, 20000, Inf),
  labels = c("GDP low", "GDP medium", "GDP high"))

tm_shape(World) +
  tm_fill("HPI3", palette="Dark2", colorNA="grey90", legend.show = FALSE) +
  tm_facets(c("HPI3", "GDP3"), showNA=FALSE, free.coords = FALSE, drop.units = FALSE)
tm_fill <- function() {
  # tm_fill draws polygons

  # Description
  # Creates a tmap-element that draws the polygons. tm_fill fills the polygons. Either a fixed color is used, or a color palette is mapped to a data variable. tm_borders draws the borders of the polygons. tm_polygons fills the polygons and draws the polygon borders.

  # Usage
  tm_fill(
    col = NA,
    alpha = NA,
    palette = NULL,
    convert2density = FALSE,
    area = NULL,
    n = 5,
    style = ifelse(is.null(breaks), "pretty", "fixed"),
    breaks = NULL,
    interval.closure = "left",
    labels = NULL,
    midpoint = NULL,
    stretch.palette = TRUE,
    contrast = NA,
    colorNA = NA,
    textNA = "Missing",
    showNA = NA,
    colorNULL = NA,
    thres.poly = 0,
    title = NA,
  )
}

# Example usage

metro_edited <- metro %>%
  mutate(pop1950cat = cut(pop1950, breaks = c(0.5, 1, 1.5, 2, 3, 5, 10, 40)*1e6),
         pop2020cat = cut(pop2020, breaks = c(0.5, 1, 1.5, 2, 3, 5, 10, 40)*1e6))

tm_shape(World) +
tm_fill() +
tm_shape(metro_edited) +
tm_dots("red", size = .5) +
tm_facets(c("pop1950cat", "pop2020cat"), free.coords = FALSE) +
tm_layout(panel.label.rot = c(0, 90), panel.label.size = 2)

## End(Not run)

# restore current mode

tmap_mode(current.mode)
tm_fill

legend.show = TRUE,
legend.format = list(),
legend.is.portrait = TRUE,
legend.reverse = FALSE,
legend.hist = FALSE,
legend.hist.title = NA,
legend.z = NA,
legend.hist.z = NA,
id = NA,
popup.vars = NA,
popup.format = list(),
zindex = NA,
group = NA,
auto.palette.mapping = NULL,
max.categories = NULL,
...
)

tmBorders(col = NA, lwd = 1, lty = "solid", alpha = NA, group = NA)

tm_polygons(
  col = NA,
  alpha = NA,
  border.col = NA,
  border.alpha = NA,
  group = NA,
  ...
)

Arguments

col For tm_fill, it is one of
  • a single color value
  • the name of a data variable that is contained in shp. Either the data variable contains color values, or values (numeric or categorical) that will be depicted by a color palette (see palette). In the latter case, a choropleth is drawn.
  • "MAP_COLORS". In this case polygons will be colored such that adjacent polygons do not get the same color. See the underlying function map_coloring for details.

For tm_borders, it is a single color value that specifies the border line color. If multiple values are specified, small multiples are drawn (see details).

alpha transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the col is used (normally 1).

palette a palette name or a vector of colors. See tmaptools::palette_explorer() for the named palettes. Use a "-" as prefix to reverse the palette. The default palette is taken from tm_layout's argument aes.palette, which typically depends on
the style. The type of palette from `aes.palettes` is automatically determined, but can be overwritten: use "seq" for sequential, "div" for diverging, and "cat" for categorical.

*convert2density*

boolean that determines whether `col` is converted to a density variable. Should be `TRUE` when `col` consists of absolute numbers. The area size is either approximated from the shape object, or given by the argument `area`.

*area*

Name of the data variable that contains the area sizes in squared kilometer.

*n*

preferred number of classes (in case `col` is a numeric variable).

*style*

method to process the color scale when `col` is a numeric variable. Discrete options are "cat", "fixed", "sd", "equal", "pretty", "quantile", "kmeans", "hclust", "bclust", "fisher", "jenks", and "log10_pretty". A numeric variable is processed as a categorical variable when using "cat", i.e. each unique value will correspond to a distinct category. For the other discrete options (except "log10_pretty"), see the details in `classIntervals`. Continuous options are "cont", "order", and "log10". The first maps the values of `col` to a smooth gradient, the second maps the order of values of `col` to a smooth gradient, and the third uses a logarithmic transformation.

*breaks*

in case `style`="fixed", `breaks` should be specified. The `breaks` argument can also be used when `style`="cont". In that case, the breaks are mapped evenly to the sequential or diverging color palette.

*interval.closure*

value that determines whether where the intervals are closed: "left" or "right". Only applicable if `col` is a numeric variable.

*labels*

labels of the classes.

*midpoint*

The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the color palette are assigned to negative respectively positive values. If all values are positive or all values are negative, then the midpoint is set to `NA`, which means that the value that corresponds to the middle color class (see `style`) is mapped to the middle color. Only applies when `col` is a numeric variable. If it is specified for sequential color palettes (e.g. "Blues"), then this color palette will be treated as a diverging color palette.

*stretch.palette*

Logical that determines whether the categorical color palette should be stretched if there are more categories than colors. If `TRUE` (default), interpolated colors are used (like a rainbow). If `FALSE`, the palette is repeated.

*contrast*

vector of two numbers that determine the range that is used for sequential and diverging palettes (applicable when `auto.palette.mapping=TRUE`). Both numbers should be between 0 and 1. The first number determines where the palette begins, and the second number where it ends. For sequential palettes, 0 means the brightest color, and 1 the darkest color. For diverging palettes, 0 means the middle color, and 1 both extremes. If only one number is provided, this number is interpreted as the endpoint (with 0 taken as the start).

*colorNA*

color used for missing values. Use `NULL` for transparency.
textNA text used for missing values.

showNA logical that determines whether missing values are named in the legend. By default (NA), this depends on the presence of missing values.

colorNULL colour for polygons that are shown on the map that are out of scope

thres.poly number that specifies the threshold at which polygons are taken into account. The number itself corresponds to the proportion of the area sizes of the polygons to the total polygon size. By default, all polygons are drawn. To ignore polygons that are not visible in a normal plot, a value like 1e-05 is recommended.

title title of the legend element

legend.show logical that determines whether the legend is shown

legend.format list of formatting options for the legend numbers. Only applicable if labels is undefined. Parameters are:

fun Function to specify the labels. It should take a numeric vector, and should return a character vector of the same size. By default it is not specified. If specified, the list items scientific, format, and digits (see below) are not used.

scientific Should the labels be formatted scientifically? If so, square brackets are used, and the format of the numbers is "g". Otherwise, format="f", and text.seperator, text.less.than, and text.or.more are used. Also, the numbers are automatically rounded to millions or billions if applicable.

format By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn if needed to save space.

digits Number of digits after the decimal point if format="f", and the number of significant digits otherwise.

big.num.abbr Vector that defines whether and which abbreviations are used for large numbers. It is a named numeric vector, where the name indicated the abbreviation, and the number the magnitude (in terms on numbers of zero). Numbers are only abbreviation when they are large enough. Set it to NA to disable abbreviations. The default is c("mln" = 6,"bln" = 9). For layers where style is set to log10 or log10_pretty, the default is NA.

prefix Prefix of each number

suffix Suffix of each number

text.separator Character string to use to separate numbers in the legend (default: "to").

text.less.than Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.or.more Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.align Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.protrait = TRUE), and "center" otherwise.
**text.to.columns** Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

... Other arguments passed on to `formatC`

**legend.is.portrait**
logical that determines whether the legend is in portrait mode (TRUE) or landscape (FALSE)

**legend.reverse**
logical that determines whether the items are shown in reverse order, i.e. from bottom to top when `legend.is.portrait` = TRUE and from right to left when `legend.is.portrait` = FALSE

**legend.hist**
logical that determines whether a histogram is shown

**legend.hist.title**
title for the histogram. By default, one title is used for both the histogram and the normal legend.

**legend.z**
index value that determines the position of the legend element with respect to other legend elements. The legend elements are stacked according to their z values. The legend element with the lowest z value is placed on top.

**legend.hist.z**
index value that determines the position of the histogram legend element

**id**
name of the data variable that specifies the indices of the polygons. Only used for "view" mode (see `tmap_mode`).

**popup.vars**
names of data variables that are shown in the popups in "view" mode. If `convert2density`=TRUE, the derived density variable name is suffixed with _density. If NA (default), only aesthetic variables (i.e. specified by col and lwd) are shown). If they are not specified, all variables are shown. Set `popup.vars` to FALSE to disable popups. When a vector of variable names is provided, the names (if specified) are printed in the popups.

**popup.format**
list of formatting options for the popup values. See the argument `legend.format` for options. Only applicable for numeric data variables. If one list of formatting options is provided, it is applied to all numeric variables of `popup.vars`. Also, a (named) list of lists can be provided. In that case, each list of formatting options is applied to the named variable.

**zindex**
zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if `zindex` is set to 500, the pane will be named "tmap500".

**group**
name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set `group` = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in `tm_shape`).

**auto.palette.mapping**
deprecated. It has been replaced by `midpoint` for numeric variables and `stretch.palette` for categorical variables.

**max.categories**
deprecated. It has moved to `tmap_options`.
for tm_polygons, these arguments passed to either tm_fill or tm_borders. For tm_fill, these arguments are passed on to map_coloring.

lwd
border line width (see par)
lty
border line type (see par)
border.col
border line color
border.alpha
transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the col is used (normally 1).

Details

Small multiples can be drawn in two ways: either by specifying the by argument in tm_facets, or by defining multiple variables in the aesthetic arguments. The aesthetic argument of tm_fill (and tm_polygons) is col. In the latter case, the arguments, except for thres.poly, and the ones starting with legend., can be specified for small multiples as follows. If the argument normally only takes a single value, such as n, then a vector of those values can be specified, one for each small multiple. If the argument normally can take a vector, such as palette, then a list of those vectors (or values) can be specified, one for each small multiple.

Value
tmap-element

References


See Also

vignette("tmap-getstarted")

Examples

data(World)

# Constant fill
tm_shape(World) + tm_fill("darkolivegreen3") + tm_format("World", title="A green World")

# Borders only
tm_shape(World) + tm_borders()

# Data variable containing colours values
World$isNLD <- ifelse(World$name=="Netherlands", "darkorange", "darkolivegreen3")
tm_shape(World) +
  tm_fill("isNLD") +
  tm_layout("Find the Netherlands!")

tm_shape(World) +
tm_polygons("economy", title="Economy", id="name") +
tm_text("iso_a3", size="AREA", scale=1.5) +
tm_format("World")
# Numeric data variable
tm_shape(World) +
tm_polygons("HPI", palette="RdYlGn", style="cont", n=8,
title="Happy Planet Index", id="name") +
tm_text("iso_a3", size="AREA", scale=1.5) +
tm_style("grey") +
tm_format("World")

## Not run:
data(NLD_prov, NLD_muni)
# Map coloring algorithm
tm_shape(NLD_prov) +
  tm_fill("name", legend.show = FALSE) +
tm_shape(NLD_muni) +
  tm_polygons("MAP_COLORS", palette="Greys", alpha = .25) +
tm_shape(NLD_prov) +
  tm_borders(lwd=2) +
  tm_text("name", shadow=TRUE) +
tm_format("NLD", title="Dutch provinces and municipalities", bg.color="white")

# Cartogram
if (require(cartogram)) {
  NLD_prov_pop <- cartogram(NLD_prov, "population")
  tm_shape(NLD_prov_pop) +
  tm_polygons("origin_non_west", title = "Non-western origin (%)")
}

## End(Not run)

# TIP: check out these examples in view mode, enabled with tmap_mode("view")

---

**tm_grid**

**Coordinate grid / graticule lines**

**Description**

Creates a tmap-element that draws coordinate grid lines. It serves as a layer that can be drawn anywhere between other layers. By default, tm_grid draws horizontal and vertical lines according to the coordinate system of the (master) shape object. Latitude and longitude graticules are drawn with tm_graticules.

**Usage**

```r
tm_grid(
  x = NA,
  y = NA,
  n.x = NA,
  n.y = NA,
)```
tm_grid

projection = NA,
col = NA,
lwd = 1,
alpha = NA,
labels.show = TRUE,
labels.size = 0.6,
labels.col = NA,
labels.rot = c(0, 0),
labels.format = list(big.mark = ","),
labels.cardinal = FALSE,
labels.margin.x = 0,
labels.margin.y = 0,
labels.space.x = NA,
labels.space.y = NA,
labels.inside.frame = FALSE,
ticks = labels.show && !labels.inside.frame,
lines = TRUE,
ndiscr = 100,
zindex = NA
)

tm_graticules(
  x = NA,
y = NA,
n.x = NA,
n.y = NA,
projection = 4326,
labels.format = list(suffix = intToUtf8(176)),
labels.cardinal = TRUE,
...)

Arguments

x x coordinates for vertical grid lines. If NA, it is specified with a pretty scale and n.x.
y y coordinates for horizontal grid lines. If NA, it is specified with a pretty scale and n.y.
n.x preferred number of grid lines for the x axis. For the labels, a pretty sequence is used, so the number of actual labels may be different than n.x.
n.y preferred number of grid lines for the y axis. For the labels, a pretty sequence is used, so the number of actual labels may be different than n.y.
projection projection character. If specified, the grid lines are projected accordingly. Many world maps are projected, but still have latitude longitude (epsg 4326) grid lines.
col color of the grid lines.
lwd line width of the grid lines
alpha    alpha transparency of the grid lines. Number between 0 and 1. By default, the
          alpha transparency of col is taken.
labels.show show tick labels
labels.size font size of the tick labels
labels.col font color of the tick labels
labels.rot Rotation angles of the labels. Vector of two values: the first is the rotation angle
          (in degrees) of the tick labels on the x axis and the second is the rotation angle
          of the tick labels on the y axis. Only 0, 90, 180, and 270 are valid values.
labels.format list of formatting options for the grid labels. Parameters are:
          fun    Function to specify the labels. It should take a numeric vector, and should
                  return a character vector of the same size. By default it is not specified. If
                  specified, the list items scientific, format, and digits (see below) are
                  not used.
          scientific Should the labels be formatted scientifically? If so, square brackets
                  are used, and the format of the numbers is "g". Otherwise, format="f",
                  and text.separator, text.less.than, and text.or.more are used. Also,
                  the numbers are automatically rounded to millions or billions if applicable.
          format    By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE
                  then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn
                  if needed to save space.
          digits    Number of digits after the decimal point if format="f", and the number
                  of significant digits otherwise.
... Other arguments passed on to formatC
labels.cardinal  add the four cardinal directions (N, E, S, W) to the labels, instead of using
               negative coordinantes for west and south (so it assumes that the coordinates are
               positive in the north-east direction).
labels.margin.x  margin between tick labels of x axis and the frame. Note that when labels.inside.frame
               == FALSE and ticks == TRUE, the ticks will be adjusted accordingly.
labels.margin.y  margin between tick labels of y axis and the frame. Note that when labels.inside.frame
               == FALSE and ticks == TRUE, the ticks will be adjusted accordingly.
labels.space.x space that is used for the labels and ticks for the x-axis when labels.inside.frame
               == FALSE. By default, it is determined automatically using the widths and heights
               of the tick labels. The unit of this parameter is text line height.
labels.space.y space that is used for the labels and ticks for the y-axis when labels.inside.frame
               == FALSE. By default, it is determined automatically using the widths and heights
               of the tick labels. The unit of this parameter is text line height.
labels.inside.frame Show labels inside the frame? By default FALSE
ticks    If labels.inside.frame = FALSE, should ticks can be drawn between the la-
          bels and the frame?
lines    If labels.inside.frame = FALSE, should grid lines can be drawn?
ndiscr  number of points to discretize a parallel or meridian (only applicable for curved grid lines)

zindex  zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes “tmap401”, “tmap402”, etc., except for the base tile layers, which are placed in the standard “tile”. This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named “tmap500”.

... arguments passed on to tm_grid

Examples

current.mode <- tmap_mode("plot")
data(NLD_muni, World)

tmap_arrange(
  qtm(NLD_muni, borders = NULL) + tm_grid(),
  qtm(NLD_muni, borders = NULL) + tm_graticules()
)

qtm(World, shape.projection = "+proj=robin", style = "natural") +
  tm_graticules(ticks = FALSE) +
  tm_layout(frame=FALSE)

tmap_mode(current.mode)

---

### tm_iso

*Draw iso (contour) lines with labels*

**Description**

This function is a wrapper of `tm_lines` and `tm_text` aimed to draw isopleths.

**Usage**

```r

tm_iso(
  col = NA,
  text = "level",
  size = 0.5,
  remove.overlap = TRUE,
  along.lines = TRUE,
  overwrite.lines = TRUE,
  group = NA,
  ...
)
```

---
Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>col</td>
<td>line color. See <code>tm_lines</code>.</td>
</tr>
<tr>
<td>text</td>
<td>text to display.</td>
</tr>
<tr>
<td>size</td>
<td>text size (see <code>tm_text</code>)</td>
</tr>
<tr>
<td>remove.overlap</td>
<td>see <code>tm_text</code></td>
</tr>
<tr>
<td>along.lines</td>
<td>see <code>tm_text</code></td>
</tr>
<tr>
<td>overwrite.lines</td>
<td>see <code>tm_text</code></td>
</tr>
<tr>
<td>group</td>
<td>name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in <code>tm_shape</code>).</td>
</tr>
</tbody>
</table>

... arguments passed on to `tm_lines` or `tm_text`

---

tm_layout

**Layout of cartographic maps**

Description

This element specifies the map layout. The main function `tm_layout` controls title, margins, aspect ratio, colors, frame, legend, among many other things. The function `tm_legend` is a shortcut to access all legend arguments without this prefix. The other functions are wrappers for two purposes: `tm_format` specifies position related layout settings such as margins, and `tm_style` specifies general styling related layout settings such as colors and font. Typically, the former functions are shape dependent, and the latter functions are shape independent. See details for predefined styles and formats. With `tmap.style`, a default style can be specified. Multiple `tm_layout` elements (or wrapper functions) can be stacked: called arguments will be overwritten.

Usage

```r
tm_layout(
  title,
  scale,
  title.size,
  bg.color,
  aes.color,
  aes.palette,
  attr.color,
  sepia.intensity,
  saturation,
  frame,
  frame.lwd,
  frame.double.line,
  asp,
)```
outer.margins,
inner.margins,
between.margin,
outer.bg.color,
fontface,
fontfamily,
compass.type,
earthboundary,
earthboundary.color,
earthboundary.lwd,
earth.datum,
space.color,
legend.show,
legend.only,
legend.outside,
legend.outside.position,
legend.outside.size,
legend.position,
legend.stack,
legend.just,
legend.width,
legend.height,
legend.hist.height,
legend.hist.width,
legend.title.color,
legend.title.size,
legend.title.fontface,
legend.title.fontfamily,
legend.text.color,
legend.text.size,
legend.text.fontface,
legend.text.fontfamily,
legend.hist.size,
legend.format,
legend.frame,
legend.frame.lwd,
legend.bg.color,
legend.bg.alpha,
legend.hist.bg.color,
legend.hist.bg.alpha,
title.snap.to.legend,
title.position,
title.color,
title.fontface,
title.fontfamily,
title.bg.color,
title.bg.alpha,
panel.show,
panel.labels,
panel.label.size,
panel.label.color,
panel.label.fontface,
panel.label.fontfamily,
panel.label.bg.color,
panel.label.height,
panel.label.rot,
main.title,
main.title.size,
main.title.color,
main.title.fontface,
main.title.fontfamily,
main.title.position,
attr.outside,
attr.outside.position,
attr.outside.size,
attr.position,
attr.just,

design.mode
)

tm_legend(...)

tm_style(style, ...)

tm_format(format, ...)

Arguments

title Global title of the map. For small multiples, multiple titles can be specified. The title is drawn inside the map. Alternatively, use panel.labels to print the map as a panel, with the title inside the panel header (especially useful for small multiples). Another alternative is the main.title which prints a title above the map. Titles for the legend items are specified at the layer functions (e.g. tm_fill).

scale numeric value that serves as the global scale parameter. All font sizes, symbol sizes, border widths, and line widths are controlled by this value. Each of these elements can be scaled independently with the scale, lwd, or size arguments provided by the tmap-elements.

title.size Relative size of the title
bg.color Background color. By default it is "white". A recommended alternative for choropleths is light grey (e.g., "grey85").

eaes.color Default color values for the aesthetics layers. Should be a named vector with the names chosen from: fill, borders, symbols, dots, lines, text, na. Use "#00000000" for transparency.

aes.palette Default color palettes for the aesthetics. It takes a list of three items: seq for sequential palettes, div for diverging palettes, and cat for categorical palettes. By
default, Color Brewer palettes (see (see tmaptools::palette_explorer())) are used. It is also possible provide a vector of colors for any of these items.

**attr.color**
Default color value for map attributes

**sepia.intensity**
Number between 0 and 1 that defines the amount of sepia effect, which gives the map a brown/yellowish flavour. By default this effect is disabled (sepia.intensity=0). All colored used in the map are adjusted with this effect.

**saturation**
Number that determines how much saturation (also known as chroma) is used: saturation=0 is greyscale and saturation=1 is normal. A number larger than 1 results in very saturated maps. All colored used in the map are adjusted with this effect. Hacking tip: use a negative number.

**frame**
Either a boolean that determines whether a frame is drawn, or a color value that specifies the color of the frame.

**frame.lwd**
width of the frame

**frame.double.line**
draw a double frame line border?

**asp**
Aspect ratio. The aspect ratio of the map (width/height). If NA, it is determined by the bounding box (see argument bbox of tm_shape), the outer.margins, and the inner.margins. If 0, then the aspect ratio is adjusted to the aspect ratio of the device.

**outer.margins**
Relative margins between device and frame. Vector of four values specifying the bottom, left, top, and right margin. Values are between 0 and 1. When facets are created, the outer margins are the margins between the outer panels and the device borders (see also between.margin)

**inner.margins**
Relative margins inside the frame. Vector of four values specifying the bottom, left, top, and right margin. Values are between 0 and 1. By default, 0 for each side if master shape is a raster, otherwise 0.02.

**between.margin**
Margin between facets (small multiples) in number of text line heights. The height of a text line is automatically scaled down based on the number of facets.

**outer.bg.color**
Background color outside the frame.

**fontface**
global font face for the text in the map. It can also be set locally per element (see e.g. title.fontface).

**fontfamily**
global font family for the text in the map. It can also be set locally per (see e.g. title.fontfamily).

**compass.type**
type of compass, one of: "arrow", "4star", "8star", "radar", "rose". Of course, only applicable if a compass is shown. The compass type can also be set within tm_compass.

**earth.boundary**
Logical that determines whether the boundaries of the earth are shown or an object that specifies the boundaries. This object can be a vector of size four, a 2 by 2 matrix (bounding box), or an extent object. By default, the boundaries are c(-180,-90,180,90). Useful for projected world maps. Often, it is useful to crop both poles (e.g., with c(-180,-88,180,88)).

**earth.boundary.color**
Color of the earth boundary.
earth.boundary.lwd
Line width of the earth boundary.

earth.datum
Geodetic datum to determine the earth boundary. By default epsg 4326 (long/lat).

space.color
Color of the space, i.e. the region inside the frame, and outside the earth boundary.

legend.show
Logical that determines whether the legend is shown.

legend.only
Logical. Only draw the legend (without map)? Particularly useful for small multiples with a common legend.

legend.outside
Logical that determines whether the legend is plot outside of the map/facets. Especially useful when using facets that have a common legend (i.e. with free.scales=FALSE).

legend.outside.position
Character that determines the outside position of the legend. Only applicable when legend.outside=TRUE. One of: "right", "left", "top", or "bottom".

legend.outside.size
Numeric value that determines the relative size of the legend, when legend.outside=TRUE. If the first value of legend.outside.position is "top" or "bottom", then it is the width of the legend, else it is the height of the legend. Note that the actual height or width of the legend is determined by the content of the legend (and the used font sizes). This argument specifies the upperbound of the width or height.

legend.position
Position of the legend. Vector of two values, specifying the x and y coordinates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT" for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y coordinates of the left bottom corner of the legend. The uppercase values correspond to the position without margins (so tighter to the frame). By default, it is automatically placed in the corner with most space based on the (first) shape object. If legend.outside=TRUE, this argument specifies the legend position within the outside panel.

legend.stack
Value that determines how different legends are stacked: "vertical" or "horizontal". To stack items within a same legend, look at "legend.is.portrait" in the specific layer calls.

legend.just
Justification of the legend relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left/bottom alignment and 1 right/top alignment. This option is only used, if legend.position is specified by numeric coordinates.

legend.width
Width of the legend. This number is relative to the map area (so 1 means the whole map width). If it is a negative number, it will be the exact legend width. If it is a positive number (by default), it will be the maximum legend width; the actual legend width will be decreased automatically based on the legend content and font sizes or Default color value for map attributes

legend.height
Height of the legend. If it is a negative number, it will be the exact legend height. If it is a positive number (by default), it will be the maximum legend height; the actual legend height will be decreased automatically based on the legend content and font sizes.
legend.hist.height
height of the histogram. This height is initial. If the total legend is downscaled
to legend.height, the histogram is downscaled as well.

legend.hist.width
width of the histogram. By default, it is equal to the legend.width.

legend.title.color
color of the legend titles

legend.title.size
Relative font size for the legend title

legend.title.fontface
font face for the legend title. By default, set to the global parameter fontface.

legend.title.fontfamily
font family for the legend title. By default, set to the global parameter fontfamily.

legend.text.color
color of the legend text

legend.text.size
Relative font size for the legend text elements

legend.text.fontface
font face for the legend text labels. By default, set to the global parameter
fontface.

legend.text.fontfamily
font family for the legend text labels. By default, set to the global parameter
fontfamily.

legend.hist.size
Relative font size for the choropleth histogram

legend.format
list of formatting options for the legend numbers. Only applicable for layer
functions (such as \texttt{tm\_fill}) where \texttt{labels} is undefined. Parameters are:

\textbf{fun} Function to specify the labels. It should take a numeric vector, and should
return a character vector of the same size. By default it is not specified. If
specified, the list items scientific, format, and digits (see below) are
not used.

\textbf{scientific} Should the labels be formatted scientifically? If so, square brackets
are used, and the format of the numbers is "g". Otherwise, format="f",
and text.separator, text.less.than, text.or.more, and big.num.abbr
are used. Also, the numbers are automatically rounded to millions or bil-
ions if applicable.

\textbf{format} By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE
then "g", which means that numbers are formatted scientifically; i.e. n.dddE+nn
if needed to save space.

\textbf{digits} Number of digits after the decimal point if format="f", and the number of
significant digits otherwise.

\textbf{big.num.abbr} Vector that defines whether and which abbreviations are used for
large numbers. It is a named numeric vector, where the name indicated the
abbreviation, and the number the magnitude (in terms on numbers of zero).
Numbers are only abbreviation when they are large enough. Set it to \texttt{NA}
to disable abbreviations. The default is c("mln" = 6,"bln" = 9). For layers
where \texttt{style} is set to \texttt{log10} or \texttt{log10\_pretty}, the default is \texttt{NA}. 
text.separator  Character string to use to separate numbers in the legend (default: "to").

text.less.than  Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.or.more  Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

text.align  Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.protrait = TRUE), and "center" otherwise.

text.to.columns  Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

text.align  Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.protrait = TRUE), and "center" otherwise.

text.to.columns  Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

... Other arguments passed on to formatC

legend.frame  either a logical that determines whether the legend is placed inside a frame, or a color that directly specifies the frame border color.

legend.frame.lwd  line width of the legend frame (applicable if legend.frame is TRUE or a color)

legend.bg.color  Background color of the legend. Use TRUE to match with the overall background color bg.color.

legend.bg.alpha  Transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the legend.bg.color is used (normally 1).

legend.hist.bg.color  Background color of the histogram

legend.hist.bg.alpha  Transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the legend.hist.bg.color is used (normally 1).

title.snap.to.legend  Logical that determines whether the title is part of the legend. By default FALSE, unless the legend is drawn outside the map (see legend.outside).

title.position  Position of the title. Vector of two values, specifying the x and y coordinates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT" for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y coordinates of the tile. The uppercase values correspond to the position without margins (so tighter to the frame). By default the title is placed on top of the legend (determined by legend.position).

title.color  color of the title
tm_layout

| **title.fontface** | font face for the title. By default, set to the global parameter `fontface`.
| **title.fontfamily** | font family for the title. By default, set to the global parameter `fontfamily`.
| **title.bg.color** | background color of the title. Use `TRUE` to match with the overall background color `bg.color`. By default, it is `TRUE` if `legend.frame` is `TRUE` or a color.
| **title.bg.alpha** | Transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the `title.bg.color` is used (normally 1).
| **panel.show** | Logical that determines if the map(s) are shown as panels. If `TRUE`, the title will be placed in the panel header instead of inside the map. By default, it is `TRUE` when small multiples are created with the `by` variable. (See `tm_facets`)
| **panel.labels** | Panel labels. Only applicable when `panel.show` is `TRUE`. For cross tables facets, it should be a list containing the row names in the first, and column names in the second item.
| **panel.label.size** | Relative font size of the panel labels
| **panel.label.color** | Font color of the panel labels
| **panel.label.fontface** | font face for the panel labels. By default, set to the global parameter `fontface`.
| **panel.label.fontfamily** | font family for the panel labels. By default, set to the global parameter `fontfamily`.
| **panel.label.bg.color** | Background color of the panel labels
| **panel.label.height** | Height of the labels in number of text line heights.
| **panel.label.rot** | Rotation angles of the panel labels. Vector of two values: the first is the rotation angle (in degrees) of the row panels, which are only used in cross-table facets (when `tm_facets`'s `by` is specified with two variables). The second is the rotation angle of the column panels.
| **main.title** | Title that is printed above the map (or small multiples). When multiple pages are generated (see `along` argument of `tm_facets`), a vector can be provided. By default, the main title is only printed when this `along` argument is specified.
| **main.title.size** | Size of the main title
| **main.title.color** | Color of the main title
| **main.title.fontface** | font face for the main title. By default, set to the global parameter `fontface`.
| **main.title.fontfamily** | font family for the main title. By default, set to the global parameter `fontfamily`.
| **main.title.position** | Position of the main title. Either a numeric value between 0 (left) and 1 (right), or a character value: "left", "center", or "right".
| **attr.outside** | Logical that determines whether the attributes are plot outside of the map/facets.
attr.outside.position

Character that determines the outside position of the attributes: "top" or "bottom". Only applicable when attr.outside=TRUE. If the legend is also drawn outside (with legend.outside=TRUE) and on the same side of the map (e.g. also "top" or "bottom"), the attributes are placed between the map and the legend. This can be changed by setting attr.outside.position to "TOP" or "BOTTOM": in this case, the attributes are placed above respectively below the legend.

attr.outside.size

Numeric value that determines the relative height of the attribute viewport, when attr.outside=TRUE.

attr.position

Position of the map attributes, which are tm_credits, tm_scale_bar, tm_compass, and tm_minimap. Vector of two values, specifying the x and y coordinates. The first value is "left", "LEFT", "center", "right", or "RIGHT", and the second value "top", "TOP", "center", "bottom", or "BOTTOM". The uppercase values correspond to the position without margins (so tighter to the frame). Positions can also be set separately in the map attribute functions. If attr.outside=TRUE, this argument specifies the position of the attributes within the outside panel.

attr.just

Justification of the attributes relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left/bottom alignment and 1 right/top alignment. This option is only used, if attr.position is specified by numeric coordinates. It can also be specified per attribute function.

design.mode

Logical that enables the design mode. If TRUE, inner and outer margins, legend position, aspect ratio are explicitly shown. Also, feedback text in the console is given.

...

other arguments from tm_layout

style

name of the style

format

name of the format

Details

Predefined styles:

"white" White background, commonly used colors (default)
"gray"/"grey" Grey background, useful to highlight sequential palettes (e.g. in choropleths)
"natural" Emulation of natural view: blue waters and green land
"bw" Greyscale, obviously useful for greyscale printing
"classic" Classic styled maps (recommended)
"cobalt" Inspired by latex beamer style cobalt
"albatross" Inspired by latex beamer style albatross
"beaver" Inspired by latex beamer style beaver

Predefined formats
"World" Format specified for world maps
"World_wide" Format specified for world maps with more space for the legend
"NLD" Format specified for maps of the Netherlands
"NLD_wide" Format specified for maps of the Netherlands with more space for the legend

References

See Also

vignette("tmap-getstarted")

Examples

```r
data(World, land)

tm_shape(World) +
    tm_fill("pop_est_dens", style="kmeans", title="Population density") +
    tm_style("albatross", frame.lwd=10) + tm_format("World", title="The World")

## Not run:
tm_shape(land) +
    tm_raster("elevation", breaks=c(-Inf, 250, 500, 1000, 1500, 2000, 2500, 3000, 4000, Inf),
    palette = terrain.colors(9), title = "Elevation", midpoint = NA) +
    tm_shape(World, is.master=TRUE) +
    tm_borders("grey20") +
    tm_grid(projection="longlat", labels.size = .5) +
    tm_text("name", size="AREA") +
    tm_credits("Eckert IV projection", position = c(0.65, 0.15), color.light = "grey90") +
    tm_style("classic") +
    tm_layout(bg.color="lightblue",
    inner.margins=c(0.04, 0.03, 0.02, 0.01),
    earth.boundary = TRUE,
    space.color="grey90") +
    tm_legend(position = c("left", "bottom"),
    frame = TRUE,
    bg.color="lightblue")

## End(Not run)

tm_shape(World, projection="+proj=robin") +
    tm_polygons("HPI", palette="div", n=7,
    title = "Happy Planet Index") +
    tm_credits("Robinson projection", position = c("right", "BOTTOM")) +
    tm_style("natural", earth.boundary = c(-180, -87, 180, 87), inner.margins = 0.05) +
    tm_legend(position=c("left", "bottom"), bg.color="grey95", frame=TRUE)

# Example to illustrate the type of titles
```
tm_lines

Draw spatial lines

description

Creates a tmap-element that draw spatial lines.

Usage

tm_lines(
  col = NA,
  lwd = 1,
  lty = "solid",
  alpha = NA,
  scale = 1,
  lwd.legend = NULL,
  lwd.legend.labels = NULL,
Arguments

col color of the lines. Either a color value or a data variable name. If multiple values are specified, small multiples are drawn (see details).

lwd line width. Either a numeric value or a data variable. In the latter case, the class of the highest values (see style) will get the line width defined by scale. If multiple values are specified, small multiples are drawn (see details).

lty line type.

alpha transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the col is used (normally 1).

scale line width multiplier number.
lwd.legend vector of line widths that are shown in the legend. By default, this is determined automatically.

lwd.legend.labels vector of labels for that correspond to lwd.legend.

n preferred number of color scale classes. Only applicable when lwd is the name of a numeric variable.

style method to process the color scale when col is a numeric variable. Discrete options are "cat", "fixed", "sd", "equal", "pretty", "quantile", "kmeans", "hclust", "bclust", "fisher", "jenks", and "log10_pretty". A numeric variable is processed as a categorical variable when using "cat", i.e. each unique value will correspond to a distinct category. For the other discrete options (except "log10_pretty"), see the details in classIntervals. Continuous options are "cont", "order", and "log10". The first maps the values of col to a smooth gradient, the second maps the order of values of col to a smooth gradient, and the third uses a logarithmic transformation.

breaks in case style=="fixed", breaks should be specified. The breaks argument can also be used when style=="cont". In that case, the breaks are mapped evenly to the sequential or diverging color palette.

interval.closure value that determines whether where the intervals are closed: "left" or "right". Only applicable if col is a numeric variable.

palette a palette name or a vector of colors. See tmaptools::palette_explorer() for the named palettes. Use a "-" as prefix to reverse the palette. The default palette is taken from tm_layout's argument aes.palette, which typically depends on the style. The type of palette from aes.palette is automatically determined, but can be overwritten: use "seq" for sequential, "div" for diverging, and "cat" for categorical.

labels labels of the classes

midpoint The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the color palette are assigned to negative respectively positive values. If all values are positive or all values are negative, then the midpoint is set to NA, which means that the value that corresponds to the middle color class (see style) is mapped to the middle color. Only applies when col is a numeric variable. If it is specified for sequential color palettes (e.g. "Blues"), then this color palette will be treated as a diverging color palette.

stretch.palette Logical that determines whether the categorical color palette should be stretched if there are more categories than colors. If TRUE (default), interpolated colors are used (like a rainbow). If FALSE, the palette is repeated.

contrast vector of two numbers that determine the range that is used for sequential and diverging palettes (applicable when auto.palette.mapping=TRUE). Both numbers should be between 0 and 1. The first number determines where the palette begins, and the second number where it ends. For sequential palettes, 0 means the brightest color, and 1 the darkest color. For diverging palettes, 0 means the middle color, and 1 both extremes. If only one number is provided, this number is interpreted as the endpoint (with 0 taken as the start).
colorNA  color used for missing values. Use NULL for transparency.
textNA   text used for missing values.
showNA   logical that determines whether missing values are named in the legend. By default (NA), this depends on the presence of missing values.
colorNULL colour for polygons that are shown on the map that are out of scope
title.col title of the legend element regarding the line colors
title.lwd title of the legend element regarding the line widths
legend.col.show logical that determines whether the legend for the line colors is shown
legend.lwd.show logical that determines whether the legend for the line widths is shown
legend.format list of formatting options for the legend numbers. Only applicable if labels is undefined. Parameters are:
  fun Function to specify the labels. It should take a numeric vector, and should return a character vector of the same size. By default it is not specified. If specified, the list items scientific, format, and digits (see below) are not used.
  scientific Should the labels be formatted scientifically? If so, square brackets are used, and the format of the numbers is "g". Otherwise, format="f", and text.separator, text.less.than, and text.or.more are used. Also, the numbers are automatically rounded to millions or billions if applicable.
  format By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn if needed to save space.
  digits Number of digits after the decimal point if format="f", and the number of significant digits otherwise.
  big.num.abbr Vector that defines whether and which abbreviations are used for large numbers. It is a named numeric vector, where the name indicated the abbreviation, and the number the magnitude (in terms on numbers of zero). Numbers are only abbreviation when they are large enough. Set it to NA to disable abbreviations. The default is c("mln" = 6,"bln" = 9). For layers where style is set to log10 or log10_pretty, the default is NA.
  prefix Prefix of each number
  suffix Suffix of each number
  text.separator Character string to use to separate numbers in the legend (default: "to").
  text.less.than Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE
  text.or.more Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE
  text.align Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.protrait = TRUE), and "center" otherwise.
text.to.columns Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

... Other arguments passed on to formatC

legend.col.is.portrait
logical that determines whether the legend element regarding the line colors is in portrait mode (TRUE) or landscape (FALSE)

legend.lwd.is.portrait
logical that determines whether the legend element regarding the line widths is in portrait mode (TRUE) or landscape (FALSE)

legend.col.reverse
logical that determines whether the items of the legend regarding the line colors sizes are shown in reverse order, i.e. from bottom to top when legend.col.is.portrait = TRUE and from right to left when legend.col.is.portrait = FALSE

legend.lwd.reverse
logical that determines whether the items of the legend regarding the line widths are shown in reverse order, i.e. from bottom to top when legend.lwd.is.portrait = TRUE and from right to left when legend.lwd.is.portrait = FALSE

legend.hist
logical that determines whether a histogram is shown regarding the line colors

legend.hist.title
title for the histogram. By default, one title is used for both the histogram and the normal legend for line colors.

legend.col.z
index value that determines the position of the legend element regarding the line colors with respect to other legend elements. The legend elements are stacked according to their z values. The legend element with the lowest z value is placed on top.

legend.lwd.z
index value that determines the position of the legend element regarding the line widths. (See legend.col.z)

legend.hist.z
index value that determines the position of the legend element regarding the histogram. (See legend.col.z)

id
name of the data variable that specifies the indices of the lines. Only used for "view" mode (see tmap_mode).

popup.vars
names of data variables that are shown in the popups in "view" mode. If NA (default), only aesthetic variables (i.e. specified by col and lwd) are shown. If they are not specified, all variables are shown. Set popup.vars to FALSE to disable popups. When a vector of variable names is provided, the names (if specified) are printed in the popups.

popup.format
list of formatting options for the popup values. See the argument legend.format for options. Only applicable for numeric data variables. If one list of formatting options is provided, it is applied to all numeric variables of popup vars. Also, a (named) list of lists can be provided. In that case, each list of formatting options is applied to the named variable.

zindex
zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and
the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".

**group**

name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in tm_shape).

**auto.palette.mapping**

deprecated. It has been replaced by midpoint for numeric variables and stretch.palette for categorical variables.

**max.categories**

deprecated. It has moved to tmap_options.

**Details**

Small multiples can be drawn in two ways: either by specifying the by argument in tm_facets, or by defining multiple variables in the aesthetic arguments. The aesthetic arguments of tm_lines are col and lwd. In the latter case, the arguments, except for the ones starting with legend., can be specified for small multiples as follows. If the argument normally only takes a single value, such as n, then a vector of those values can be specified, one for each small multiple. If the argument normally can take a vector, such as palette, then a list of those vectors (or values) can be specified, one for each small multiple.

**Value**

tmap-element

**References**


**See Also**

vignette("tmap-getstarted")

**Examples**

data(World, rivers)

qtm(rivers)

## Not run:
tm_shape(World) +
  tm_fill() +
tm_shape(rivers) +
  tm_lines(col="black", lwd="scalerank", scale=2, legend.lwd.show = FALSE) +
tm_style("cobalt", title = "Rivers of the World") +
tm_format("World")

## End(Not run)
tm_logo

Description

Creates a map logo. Multiple logos can be specified which are shown next to each other. Logos placed on top of each other can be specified with stacking tm_logo elements.

Usage

tm_logo(
    file,
    height = 3,
    halign = "center",
    margin = 0.2,
    position = NA,
    just = NA
)

Arguments

file
either a filename or url of a png image. If multiple files/urls are provided with a character vector, the logos are placed near each other. To specify logos for small multiples use a list of character values/vectors. In order to stack logos vertically, multiple tm_logo elements can be stacked.

height
height of the logo in number of text line heights. The width is scaled based the height and the aspect ratio of the logo. If multiple logos are specified by a vector or list, the heights can be specified accordingly.

halign
if logos in one row have different heights, halign specifies the vertical alignment. Possible values are "top", "center" and "bottom".

margin
margin around the logo in number of text line heights.

position
position of the logo. Vector of two values, specifying the x and y coordinates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT" for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y value of the center of the text. The uppercase values correspond to the position without margins (so tighter to the frame). The default value is controlled by the argument "attr.position" of tm_layout.

just
Justification of the attribute relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left/bottom alignment and 1 right/top alignment. This option is only used, if position is specified by numeric coordinates. The default value is controlled by the argument "attr.just" of tm_layout.
Examples

```r
## Not run:
data(NLD_muni, NLD_prov)

tm_shape(NLD_muni) +
tm_polygons("origin_native", border.alpha=0.5, style="cont", title="Native Dutch (%)") +
tm_logo("http://statline.cbs.nl/Statweb/Images/cbs_logo.png", position = c("left", "bottom"), height = 2) +
tm_layout(bg.color="gray98")

data(World)

tm_shape(World) +
tm_polygons("HPI", palette="RdYlGn") +
tm_logo(c("https://www.r-project.org/logo/Rlogo.png", system.file("img/tmap.png", package="tmap")))+
tm_format("World")

## End(Not run)
```

### Description

Creates a minimap in view mode. See `addMiniMap`.

### Usage

```r
tm_minimap(server = NA, position = c("left", "bottom"), toggle = TRUE, ...)
```

### Arguments

- **server**: name of the provider or an URL (see `tm_tiles`). By default, it shows the same map as the basemap, and moreover, it will automatically change when the user switches basemaps. Note the latter does not happen when `server` is specified.
- **position**: position of the scale bar Vector of two values, specifying the x and y coordinates. The first is either "left" or "right", the second either "top" or "bottom".
- **toggle**: should the minimap have a button to minimise it? By default TRUE.
- **...**: arguments passed on to `addMiniMap`.

### See Also

`addMiniMap`
draw a raster

Description

Creates a tmap-element that draws a raster. For coloring, there are three options: 1) a fixed color is used, 2) a color palette is mapped to a data variable, 3) RGB values are used. The function tm_raster is designed for options 1 and 2, while tm_rgb is used for option 3.

Usage

tm_raster(
  col = NA,
  alpha = NA,
  palette = NULL,
  n = 5,
  style = ifelse(is.null(breaks), "pretty", "fixed"),
  breaks = NULL,
  interval.closure = "left",
  labels = NULL,
  midpoint = NULL,
  stretch.palette = TRUE,
  contrast = NA,
  saturation = 1,
  interpolate = NA,
  colorNA = NULL,
  textNA = "Missing",
  showNA = NA,
  colorNULL = NULL,
  title = NA,
  legend.show = TRUE,
  legend.format = list(),
  legend.is.portrait = TRUE,
  legend.reverse = FALSE,
  legend.hist = FALSE,
  legend.hist.title = NA,
  legend.z = NA,
  legend.hist.z = NA,
  zindex = NA,
  group = NA,
  auto.palette.mapping = NULL,
  max.categories = NULL,
  max.value = 255
)

tm_rgb(
  r = 1,
Arguments

col three options: a single color value, the name of a data variable that is contained in `shp`, or the name of a variable in `shp` that contain color values. In the second case the values (numeric or categorical) that will be depicted by a color palette (see `palette`). If multiple values are specified, small multiples are drawn (see details). By default, it is a vector of the names of all data variables unless the by argument of `tm_facets` is defined (in that case, the default color of dots is taken from the tmap option `aes.color`). Note that the number of small multiples is limited by tmap_options("limits").

alpha transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the col is used (normally 1).

palette a palette name or a vector of colors. See tmaptools::palette_explorer() for the named palettes. Use a "-" as prefix to reverse the palette. The default palette is taken from tm_layout's argument `aes.palette`, which typically depends on the style. The type of palette from `aes.palette` is automatically determined, but can be overwritten: use "seq" for sequential, "div" for diverging, and "cat" for categorical.

n preferred number of classes (in case col is a numeric variable)

style method to process the color scale when col is a numeric variable. Discrete options are "cat", "fixed", "sd", "equal", "pretty", "quantile", "kmeans", "hclust", "bclust", "fisher", "jenks", and "log10_pretty". A numeric variable is processed as a categorical variable when using "cat", i.e. each unique value will correspond to a distinct category. For the other discrete options (except "log10_pretty"), see the details in classIntervals. Continuous options are "cont", "order", and "log10". The first maps the values of col to a
smooth gradient, the second maps the order of values of col to a smooth gradient, and the third uses a logarithmic transformation.

**breaks**
in case style=="fixed", breaks should be specified. The breaks argument can also be used when style="cont". In that case, the breaks are mapped evenly to the sequential or diverging color palette.

**interval.closure**
value that determines whether where the intervals are closed: "left" or "right". Only applicable if col is a numeric variable.

**labels**
labels of the classes

**midpoint**
The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the color palette are assigned to negative respectively positive values. If all values are positive or all values are negative, then the midpoint is set to NA, which means that the value that corresponds to the middle color class (see style) is mapped to the middle color. Only applies when col is a numeric variable. If it is specified for sequential color palettes (e.g. "Blues"), then this color palette will be treated as a diverging color palette.

**stretch.palette**
Logical that determines whether the categorical color palette should be stretched if there are more categories than colors. If TRUE (default), interpolated colors are used (like a rainbow). If FALSE, the palette is repeated.

**contrast**
vector of two numbers that determine the range that is used for sequential and diverging palettes (applicable when auto.palette.mapping=TRUE). Both numbers should be between 0 and 1. The first number determines where the palette begins, and the second number where it ends. For sequential palettes, 0 means the brightest color, and 1 the darkest color. For diverging palettes, 0 means the middle color, and 1 both extremes. If only one number is provided, this number is interpreted as the endpoint (with 0 taken as the start).

**saturation**
Number that determines how much saturation (also known as chroma) is used: saturation=0 is greyscale and saturation=1 is normal. This saturation value is multiplied by the overall saturation of the map (see tm_layout).

**interpolate**
Should the raster image be interpolated? By default FALSE for tm_raster and TRUE for tm_rgb.

**colorNA**
color used for missing values. Use NULL for transparency.

**textNA**
text used for missing values.

**showNA**
logical that determines whether missing values are named in the legend. By default (NA), this depends on the presence of missing values.

**colorNULL**
colour for polygons that are shown on the map that are out of scope

**title**
title of the legend element

**legend.show**
logical that determines whether the legend is shown

**legend.format**
list of formatting options for the legend numbers. Only applicable if labels is undefined. Parameters are:

- **fun** Function to specify the labels. It should take a numeric vector, and should return a character vector of the same size. By default it is not specified. If
specified, the list items `scientific`, `format`, and `digits` (see below) are
not used.

**scientific** Should the labels be formatted scientifically? If so, square brackets
are used, and the format of the numbers is "g". Otherwise, `format="f",
and `text.separator`, `text.less.than`, and `text.or.more` are used. Also,
the numbers are automatically rounded to millions or billions if applicable.

**format** By default, "f", i.e. the standard notation `xxx.xxx`, is used. If `scientific=TRUE`
then "g", which means that numbers are formatted scientifically, i.e. `n.dddE+nn`
if needed to save space.

**digits** Number of digits after the decimal point if `format="f"`, and the number
of significant digits otherwise.

**big.num.abbr** Vector that defines whether and which abbreviations are used for
large numbers. It is a named numeric vector, where the name indicated the
abbreviation, and the number the magnitude (in terms on numbers of zero).
Numbers are only abbreviation when they are large enough. Set it to NA to
disable abbreviations. The default is `c("mln" = 6,"bln" = 9)`. For layers
where `style` is set to `log10` or `log10_pretty`, the default is NA.

**prefix** Prefix of each number

**suffix** Suffix of each number

**text.separator** Character string to use to separate numbers in the legend (de-
default: "to").

**text.less.than** Character value(s) to use to translate "Less than". When a char-
acter vector of length 2 is specified, one for each word, these words are
aligned when `text.to.columns = TRUE`

**text.or.more** Character value(s) to use to translate "or more". When a character
vector of length 2 is specified, one for each word, these words are aligned
when `text.to.columns = TRUE`

**text.align** Value that determines how the numbers are aligned, "left", "center"
or "right". By default "left" for legends in portrait format (`legend.is.portrait = TRUE`),
and "center" otherwise.

**text.to.columns** Logical that determines whether the text is aligned to three
columns (from, `text.separator`, to). By default FALSE.

... Other arguments passed on to `formatC`

**legend.is.portrait**
logical that determines whether the legend is in portrait mode (TRUE) or land-
scape (FALSE)

**legend.reverse** logical that determines whether the items of the legend regarding the text sizes
are shown in reverse order, i.e. from bottom to top when `legend.is.portrait = TRUE` and from right to left when `legend.is.portrait = FALSE`

**legend.hist** logical that determines whether a histogram is shown

**legend.hist.title** title for the histogram. By default, one title is used for both the histogram and
the normal legend.

**legend.z** index value that determines the position of the legend element with respect to
other legend elements. The legend elements are stacked according to their z
values. The legend element with the lowest z value is placed on top.
legend.hist.z  index value that determines the position of the histogram legend element
zindex  zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".
group  name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in tm_shape).
auto.palette.mapping  deprecated. It has been replaced by midpoint for numeric variables and stretch.palette for categorical variables.
max.categories  deprecated. It has moved to tmap_options.
max.value  for tm_rgb, what is the maximum value per layer? By default 255.
r  raster band for the red channel. It should be an integer between 1 and the number of raster layers.
g  raster band for the green channel. It should be an integer between 1 and the number of raster layers.
b  raster band for the blue channel. It should be an integer between 1 and the number of raster layers.
...  arguments passed on from tm_raster to tm_rgb
a  raster band for the alpha channel. It should be an integer between 1 and the number of raster layers.

Details

Small multiples can be drawn in two ways: either by specifying the by argument in tm_facets, or by defining multiple variables in the aesthetic arguments. The aesthetic argument of tm_raster is col. In the latter case, the arguments, except for the ones starting with legend., can be specified for small multiples as follows. If the argument normally only takes a single value, such as n, then a vector of those values can be specified, one for each small multiple. If the argument normally can take a vector, such as palette, then a list of those vectors (or values) can be specified, one for each small multiple.

Value

tmap-element

References


See Also

vignette("tmap-getstarted")
Examples

data(World, land, metro)

tm_shape(land, ylim = c(-88,88)) +
  tm_raster("cover_cls", palette = pal8, title = "Global Land Cover") +
tm_shape(metro) + tm_dots(col = "#E31A1C") +
tm_shape(World) +
  tm_borders(col = "black") +
tm_layout(scale = .8,
  legend.position = c("left","bottom"),
  legend.bg.color = "white", legend.bg.alpha = .2,
  legend.frame = "gray50")

## Not run:
pal20 <- c("#003200", "#3C9600", "#006E00", "#556E19", "#00C800", "#8CBE8C",
  "#467864", "#B4E664", "#9BC832", "#EBFF64", "#F06432", "#9132E6",
  "#E664E6", "#9B82E6", "#BB4EF0", "#646464", "#C8C8C8", "#FF0000",
  "#FFFFF", "#5ADDCD")
tm_shape(land) +
  tm_raster("cover", palette = pal20, title = "Global Land Cover") +
  tm_layout(scale = .8, legend.position = c("left","bottom"))

## End(Not run)

tm_shape(land, ylim = c(-88,88)) +
  tm_raster("trees", palette = "Greens", title = "Percent Tree Cover") +
tm_shape(World) +
  tm_borders() +
  tm_layout(legend.position = c("left", "bottom"), bg.color = "lightblue")

## Not run:
  tm_shape(land) +
  tm_raster("black") +
  tm_facets(by="cover_cls")

## End(Not run)

# TIP: check out these examples in view mode, enabled with tmap_mode("view")

---

### tm_scale_bar

**Scale bar**

The `tm_scale_bar` function is used to create a scale bar. By default, the coordinate units are assumed to be meters, and the map units in kilometers. This can be changed in `tm_shape`. The scale bar provides a visual representation of the map's scale, allowing for better interpretation of the map's geographical extent. It is particularly useful in large-scale maps where the map's scale is not immediately obvious.

```r
tm_scale_bar
```

**Description**

`tm_scale_bar` is a function that allows you to add a scale bar to your `tm_shape` objects. The `tm_shape` function is used to create spatial data visualizations, and `tm_scale_bar` adds a scale bar to these visualizations. The scale bar helps to visualize the map's scale, making it easier to understand the geographical extent of the map.

**Syntax**

```r
tm_scale_bar(name, scale = 0.5, legend.position = c("left","bottom"),
  legend.bg.color = "white", legend.bg.alpha = 0.2,
  legend.frame = "gray50")
```

- **name**: A character string specifying the name of the `tm_shape` object to which the scale bar is added.
- **scale**: A numeric value specifying the scale of the scale bar. The default is 0.5.
- **legend.position**: A character vector specifying the position of the legend. The default is c("left","bottom").
- **legend.bg.color**: A character string specifying the background color of the legend. The default is "white".
- **legend.bg.alpha**: A numeric value specifying the alpha value of the legend background. The default is 0.2.
- **legend.frame**: A character string specifying the frame color of the legend. The default is "gray50".

**Example**

To add a scale bar to a map visualized with `tm_shape`, you can use the following code:

```r
tm_shape(land, ylim = c(-88,88)) +
  tm_raster("cover_cls", palette = pal8, title = "Global Land Cover") +
  tm_shape(metro) + tm_dots(col = "#E31A1C") +
  tm_shape(World) +
  tm_borders(col = "black") +
  tm_layout(scale = .8,
    legend.position = c("left","bottom"),
    legend.bg.color = "white", legend.bg.alpha = .2,
    legend.frame = "gray50")
```

This code creates a map with a scale bar that visually represents the map's scale. The scale bar helps to understand the geographical extent of the map, making it easier to interpret the visualizations.
Usage

tm_scale_bar(
    breaks = NULL,
    width = NA,
    text.size = 0.5,
    text.color = NA,
    color.dark = "black",
    color.light = "white",
    lwd = 1,
    position = NA,
    just = NA,
    size = NULL
)

Arguments

breaks breaks of the scale bar. If not specified, breaks will be automatically be chosen given the preferred width of the scale bar. Not available for view mode.

width (preferred) width of the scale bar. Only applicable when breaks=NULL. In plot mode, it corresponds the relative width; the default is 0.25 so one fourth of the map width. In view mode, it corresponds to the width in pixels; the default is 100.

text.size relative text size (which is upperbound by the available label width)

text.color color of the text. By default equal to the argument attr.color of tm_layout.

color.dark color of the dark parts of the scale bar, typically (and by default) black.

color.light color of the light parts of the scale bar, typically (and by default) white.

lwd line width of the scale bar

position position of the scale bar Vector of two values, specifying the x and y coordinates. Either this vector contains "left", "LEFT", "center", "right", or "RIGHT" for the first value and "top", "TOP", "center", "bottom", or "BOTTOM" for the second value, or this vector contains two numeric values between 0 and 1 that specifies the x and y value of the left bottom corner of the scale bar. The uppercase values correspond to the position without margins (so tighter to the frame). The default value is controlled by the argument "attr.position" of tm_layout.

just Justification of the attribute relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left/bottom alignment and 1 right/top alignment. This option is only used, if position is specified by numeric coordinates. The default value is controlled by the argument "attr.just" of tm_layout.

size deprecated: renamed to text.size

Examples

current.mode <- tmap_mode("plot")
data(NLD_muni)
qtm(NLD_muni, theme = "NLD") + tm_scale_bar(position=c("left", "bottom"))

# restore current mode
tmap_mode(current.mode)

tm_sf

Draw simple features

Description

Creates a tmap-element that draws simple features. Basically, it is a stack of tm_polygons, tm_lines and tm_dots. In other words, polygons are plotted as polygons, lines as lines and points as dots.

Usage

```r
tm_sf(
  col = NA,
  size = 0.02,
  shape = 16,
  lwd = 1,
  lty = "solid",
  alpha = NA,
  palette = NULL,
  border.col = NA,
  border.lwd = 1,
  border.lty = "solid",
  border.alpha = NA,
  group = NA,
  ...
)
```

Arguments

- **col** color of the simple features. See the `col` argument of `tm_polygons`, `tm_lines` and `tm_symbols`.
- **size** size of the dots. See the `size` argument of `tm_symbols`. By default, the size is similar to dot size (see `tm_dots`)
- **shape** shape of the dots. See the `shape` argument of `tm_symbols`.
- **lwd** width of the lines. See the `lwd` argument of `tm_lines`.
- **lty** type of the lines. See the `lty` argument of `tm_lines`.
- **alpha** transparency number. See alpha argument of `tm_polygons`, `tm_lines` and `tm_symbols`.
- **palette** palette. See palette argument of `tm_polygons`, `tm_lines` and `tm_symbols`.
**tm_shape**

_border.col_  
color of the borders. See border.col argument of `tm_polygons` and `tm_symbols`.  

_border.lwd_  
line width of the borders. See border.lwd argument of `tm_polygons` and `tm_symbols`.  

_border.lty_  
line type of the borders. See border.lty argument of `tm_polygons` and `tm_symbols`.  

_border.alpha_  
transparency of the borders. See border.alpha argument of `tm_polygons` and `tm_symbols`.  

_group_  
name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in `tm_shape`).  

...  
other arguments passed on to `tm_polygons, tm_lines` and `tm_symbols`  

**Value**

`tmmap-element`

**See Also**

`vignette("tm-map-getstarted")`

**Examples**

```r
data(World)
World$geometry[World$continent == "Africa"] <- sf::st_centroid(World$geometry[World$continent == "Africa"])
World$geometry[World$continent == "South America"] <- sf::st_cast(World$geometry[World$continent == "South America"], "MULTILINESTRING", group_or_split = FALSE)

tm_shape(World) +
tm_sf()
```

---

**tm_shape**  
*Specify the shape object*

**Description**

Creates a `tmmap-element` that specifies a spatial data object, which we refer to as shape. Also the projection and covered area (bounding box) can be set. It is possible to use multiple shape objects within one plot (see `tmmap-element`).
tm_shape

Usage

tm_shape(
  shp,
  name = NULL,
  is.master = NA,
  projection = NULL,
  bbox = NULL,
  unit = NULL,
  simplify = 1,
  point.per = NA,
  line.center = "midpoint",
  filter = NULL,
  ...
)

Arguments

shp  shape object, which is an object from a class defined by the sf, sp, or raster
      package. For instance, an sf object, an SpatialPolygons(DataFrame), or a
      RasterBrick.

name  name of the shape object (character) as it appears in the legend in "view" mode.
      Default value is the name of shp.

is.master  logical that determines whether this tm_shape is the master shape element. The
            bounding box, projection settings, and the unit specifications of the resulting
            thematic map are taken from the tm_shape element of the master shape object.
            By default, the first master shape element with a raster shape is the master, and
            if there are no raster shapes used, then the first tm_shape is the master shape
            element.

projection  Either a crs object or a character value (PROJ.4 character string). By default,
            the projection is used that is defined in the shp object itself.

bbox  bounding box. One of the following:

  • A bounding box (an sf bbox object, see st_bbox, a 2 by 2 matrix (used by
      the sp package), or an Extent object used by the raster package).
  • Open Street Map search query. The bounding is automatically generated
  • Another shape object, from which the bounding box is extracted.

If unspecified, the current bounding box of shp is taken. The bounding box is
feed to bb (as argument x). The other arguments of bb can be specified directly
as well (see ..).

unit  desired units of the map. One of "metric" (default), "imperial", "km", "m",
      "mi" and "ft". Used to specify the scale bar (see tm_scale_bar) and to calcu-
      late densities for choropleths (see argument convert2density in tm_fill).

simplify  simplification factor for spatial polygons and spatial lines. A number between 0
            and 1 that indicates how many coordinates are kept. See the underlying function
simplify_shape, from which the arguments keep.units and keep.subunits can be passed on (see ...). This requires the suggested package rmapshaper.

point.per specification of how points or text labels are plotted when the geometry is a multi line or a multi polygon. One of "feature", "segment" or "largest". The first generates a point/label for every feature, the second for every segment (i.e. subfeature), the third only for the largest segment (subfeature). Note that the last two options can be significant slower. By default, it is set to "segment" if the geometry of shp is a (multi)points geometry or a geometrycollection, and "feature" otherwise.

line.center specification of where points are placed for (multi)line geometries. Either "midpoint" or "centroid". The former places a point at the middle of the line, the latter at the controid.

filter logical vector which indicated per feature whether it should be included. Features for which filter is FALSE will be colored light gray (see the colorNULL argument in the layer functions)

Arguments passed on to bb (e.g. ext can be used to enlarge or shrink a bounding box), and simplify_shape (the arguments keep.units and keep.subunits)

Value

tmap-element

References


See Also

current.mode <- tmap_mode("plot")
data(World, metro, rivers)

tm_shape(World, projection=4326) +
tm_polygons() +
tm_layout("Long lat coordinates (WGS84)", inner.margins=c(0,0,.1,0), title.size=.8)

World$highlighted <- ifelse(World$iso_a3 %in% c("GRL", "AUS"), "gold", "gray75")
tm_shape(World, projection=3857, ylim=c(.1, 1), relative = TRUE) +
tm_polygons("highlighted") +
tm_layout("Web Mercator projection. Although widely used, it is discouraged for statistical purposes. In reality, Australia is 3 times larger than Greenland!",
inner.margins=c(0,0,.1,0), title.size=.6)

tm_shape(World, projection="+proj=robin") +
tm_polygons() +
tm_layout(
tm_symbols

"Winkel-Tripel projection, adapted as default by the National Geographic Society for world maps."
inner.margins=c(0,0,.1,0), title.size=.8)

```
tm_shape(World) +
tm_polygons() +
tm_layout("Eckhart IV projection. Recommended in statistical maps for its equal-area property.",
inner.margins=c(0,0,.1,0), title.size=.8)
```

# different levels of simplification
## Not run:
tm1 <- tm_shape(World, simplify = 0.05) + tm_polygons() + tm_layout("Simplification: 0.05")
tm2 <- tm_shape(World, simplify = 0.1) + tm_polygons() + tm_layout("Simplification: 0.1")
tm3 <- tm_shape(World, simplify = 0.25) + tm_polygons() + tm_layout("Simplification: 0.25")
tm4 <- tm_shape(World, simplify = 0.5) + tm_polygons() + tm_layout("Simplification: 0.5")

```
require(tmaptools)
tmap_arrange(tm1, tm2, tm3, tm4)
```

## End(Not run)

# three groups of layers, each starting with tm_shape
## Not run:
tm_shape(World) +
   tm_fill("darkolivegreen3") +
tm_shape(metro) +
   tm_bubbles("pop2010", col = "grey30", scale=.5) +
tm_shape(rivers) +
   tm_lines("lightcyan1") +
tm_layout(bg.color="lightcyan1", inner.margins=c(0,0,.02,0), legend.show = FALSE)

## End(Not run)

# restore current mode
tmap_mode(current.mode)

---

**tm_symbols**

### Draw symbols

**Description**

Creates a tmap-element that draws symbols, including symbols and dots. The color, size, and shape of the symbols can be mapped to data variables.

**Usage**

```
tm_symbols(
    size = 1,
    col = NA,
    shape = 21,
```
alpha = NA,
border.col = NA,
border.lwd = 1,
border.alpha = NA,
scale = 1,
perceptual = FALSE,
clustering = FALSE,
size.max = NA,
size.lim = NA,
sizes.legend = NULL,
sizes.legend.labels = NULL,
n = 5,
style = ifelse(is.null(breaks), "pretty", "fixed"),
breaks = NULL,
interval.closure = "left",
palette = NULL,
labels = NULL,
midpoint = NULL,
stretch.palette = TRUE,
contrast = NA,
colorNA = NA,
textNA = "Missing",
showNA = NA,
colorNULL = NA,
shapes = 21:25,
shapes.legend = NULL,
shapes.legend.fill = NA,
shapes.labels = NULL,
shapeNA = 4,
shape.textNA = "Missing",
shape.showNA = NA,
shapes.n = 5,
shapes.style = ifelse(is.null(shapes.breaks), "pretty", "fixed"),
shapes.breaks = NULL,
shapes.interval.closure = "left",
legend.max.symbol.size = 0.8,
just = NA,
jitter = 0,
xmod = 0,
ymod = 0,
icon.scale = 3,
grob.dim = c(width = 48, height = 48, render.width = 256, render.height = 256),
title.size = NA,
title.col = NA,
title.shape = NA,
legend.size.show = TRUE,
legend.col.show = TRUE,
legend.shape.show = TRUE,
tm_symbols

legend.format = list(),
legend.size.is.portrait = FALSE,
legend.col.is.portrait = TRUE,
legend.shape.is.portrait = TRUE,
legend.size.reverse = FALSE,
legend.col.reverse = FALSE,
legend.shape.reverse = FALSE,
legend.hist = FALSE,
legend.hist.title = NA,
legend.size.z = NA,
legend.col.z = NA,
legend.shape.z = NA,
legend.hist.z = NA,
id = NA,
popup.vars = NA,
popup.format = list(),
zindex = NA,
group = NA,
auto.palette.mapping = NULL,
max.categories = NULL
)

tm_squares(size = 1, col = NA, shape = 22, scale = 4/3, ...)

tm_bubbles(
  size = 1,
  col = NA,
  shape = 21,
  scale = 4/3,
  legend.max.symbol.size = 1,
  ...
)

tm_dots(
  col = NA,
  size = 0.02,
  shape = 16,
  title = NA,
  legend.show = TRUE,
  legend.is.portrait = TRUE,
  legend.z = NA,
  ...
)

tm_markers(
  shape = marker_icon(),
  col = NA,
  border.col = NULL,
clustering = TRUE,
text = NULL,
text.just = "top",
markers.on.top.of.text = TRUE,
group = NA,
...)

Arguments

size     a single value or a `shp` data variable that determines the symbol sizes. The reference value size=1 corresponds to the area of symbols that have the same height as one line of text. If a data variable is provided, the symbol sizes are scaled proportionally (or perceptually, see perceptual) where by default the symbol with the largest data value will get size=1 (see also size.max). If multiple values are specified, small multiples are drawn (see details).

col      color(s) of the symbol. Either a color (vector), or categorical variable name(s). If multiple values are specified, small multiples are drawn (see details).

shape    shape(s) of the symbol. Either direct shape specification(s) or a data variable name(s) that is mapped to the symbols specified by the shapes argument. Note that the default shapes (specified by shapes) is not supported in "view" mode. See details for the shape specification.

alpha    transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the col is used (normally 1).

border.col color of the symbol borders.

border.lwd line width of the symbol borders. If NA, no symbol borders are drawn.

border.alpha transparency number, regarding the symbol borders, between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the col is used (normally 1).

scale     symbol size multiplier number.

perceptual logical that determines whether symbols are scales with a perceptually (TRUE) or mathematically (FALSE, default value). The perceived area of larger symbols is often underestimated. Flannery (1971) experimentally derived a method to compensate this for symbols, which is enabled by this argument.

clustering value that determines whether the symbols are clustered in "view" mode. It does not work proportional bubbles (i.e. tm_bubbles). One of: TRUE, FALSE, or the output of markerClusterOptions.

size.max value that is mapped to size=1. By default (NA), the maximum data value is chosen. Only applicable when size is the name of a numeric variable of `shp`

size.lim vector of two limit values of the size variable. Only symbols are drawn whose value is greater than or equal to the first value. Symbols whose values exceed the second value are drawn at the size of the second value. Only applicable when size is the name of a numeric variable of `shp`

d sizes.legend vector of symbol sizes that are shown in the legend. By default, this is determined automatically.
sizes.legend.labels
vector of labels for that correspond to sizes.legend.

n
preferred number of color scale classes. Only applicable when col is a numeric variable name.

- style
method to process the color scale when col is a numeric variable. Discrete options are "cat", "fixed", "sd", "equal", "pretty", "quantile", "kmeans", "hclust", "bclust", "fisher", "jenks", and "log10_pretty". A numeric variable is processed as a categorical variable when using "cat", i.e. each unique value will correspond to a distinct category. For the other discrete options (except "log10_pretty"), see the details in classIntervals. Continuous options are "cont", "order", and "log10". The first maps the values of col to a smooth gradient, the second maps the order of values of col to a smooth gradient, and the third uses a logarithmic transformation.

- breaks
in case style=="fixed", breaks should be specified. The breaks argument can also be used when style="cont". In that case, the breaks are mapped evenly to the sequential or diverging color palette.

- interval.closure
value that determines whether where the intervals are closed: "left" or "right". Only applicable if col is a numeric variable.

- palette
a palette name or a vector of colors. See tmaptools::palette_explorer() for the named palettes. Use a "-" as prefix to reverse the palette. The default palette is taken from tm_layout's argument aes.palette, which typically depends on the style. The type of palette from aes.palette is automatically determined, but can be overwritten: use "seq" for sequential, "div" for diverging, and "cat" for categorical.

- labels
labels of the classes

- midpoint
The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the color palette are assigned to negative respectively positive values. If all values are positive or all values are negative, then the midpoint is set to NA, which means that the value that corresponds to the middle color class (see style) is mapped to the middle color. Only applies when col is a numeric variable. If it is specified for sequential color palettes (e.g. "Blues"), then this color palette will be treated as a diverging color palette.

- stretch.palette
Logical that determines whether the categorical color palette should be stretched if there are more categories than colors. If TRUE (default), interpolated colors are used (like a rainbow). If FALSE, the palette is repeated.

- contrast
vector of two numbers that determine the range that is used for sequential and diverging palettes (applicable when auto.palette.mapping=TRUE). Both numbers should be between 0 and 1. The first number determines where the palette begins, and the second number where it ends. For sequential palettes, 0 means the brightest color, and 1 the darkest color. For diverging palettes, 0 means the middle color, and 1 both extremes. If only one number is provided, this number is interpreted as the endpoint (with 0 taken as the start).

- colorNA
colour for missing values. Use NULL for transparency.
textNA: text used for missing values of the color variable.
showNA: logical that determines whether missing values are named in the legend. By default (NA), this depends on the presence of missing values.
colorNULL: colour for polygons that are shown on the map that are out of scope.
shapes: palette of symbol shapes. Only applicable if shape is a (vector of) categorical variable(s). See details for the shape specification. By default, the filled symbols 21 to 25 are taken.
shapes.legend: symbol shapes that are used in the legend (instead of the symbols specified with shape). These shapes will be used in the legends regarding the size and color of the symbols. Especially useful when shapes consist of grobs that have to be represented by neutrally colored shapes (see also shapes.legend.fill).
shapes.legend.fill: Fill color of legend shapes. These colors will be used in the legends regarding the size and shape of the symbols. See also shapes.legend.
shapes.labels: Legend labels for the symbol shapes.
shapeNA: the shape (a number or grob) for missing values. By default a cross (number 4). Set to NA to hide symbols for missing values.
shape.textNA: text used for missing values of the shape variable.
shape.showNA: logical that determines whether missing values are named in the legend. By default (NA), this depends on the presence of missing values.
shapes.n: preferred number of shape classes. Only applicable when shape is a numeric variable name.
shapes.style: method to process the shape scale when shape is a numeric variable. See style argument for options.
shapes.breaks: in case shapes.style=="fixed", breaks should be specified.
shapes.interval.closure: value that determines whether where the intervals are closed: "left" or "right". Only applicable if shape is a numeric variable.
legend.max.symbol.size: Maximum size of the symbols that are drawn in the legend. For circles and bubbles, a value larger than one is recommended (and used for tm_bubbles).
just: justification of the symbols relative to the point coordinates. The first value specifies horizontal and the second value vertical justification. Possible values are: "left", "right", "center", "bottom", and "top". Numeric values of 0 specify left alignment and 1 right alignment. The default value is c("center","center"). For icons, this value may already be specified (see tmap_icons). The just, if specified, will overrides this.
jitter: number that determines the amount of jittering, i.e. the random noise added to the position of the symbols. 0 means no jittering is applied, any positive number means that the random noise has a standard deviation of jitter times the height of one line of text line.
xmod: horizontal position modification of the symbols, in terms of the height of one line of text. Either a single number for all polygons, or a numeric variable in
the shape data specifying a number for each polygon. Together with ymod, it
determines position modification of the symbols. See also jitter for random
position modifications. In most coordinate systems (projections), the origin is
located at the bottom left, so negative xmod move the symbols to the left, and
negative ymod values to the bottom.

ymod
vertical position modification. See xmod.

icon.scale
scaling number that determines how large the icons (or grobs) are in plot mode
in comparison to proportional symbols (such as bubbles). In view mode, the
size is determined by the icon specification (see tmap_icons) or, if grobs are
specified by grob.width and grob.height

grob.dim
vector of four values that determine how grob objects (see details) are shown in
view mode. The first and second value are the width and height of the displayed
icon. The third and fourth value are the width and height of the rendered png
image that is used for the icon. Generally, the third and fourth value should be
large enough to render a ggplot2 graphic successfully. Only needed for the view
mode.

title.size
title of the legend element regarding the symbol sizes

title.col
title of the legend element regarding the symbol colors

title.shape
title of the legend element regarding the symbol shapes

legend.size.show
logical that determines whether the legend for the symbol sizes is shown

legend.col.show
logical that determines whether the legend for the symbol colors is shown

legend.shape.show
logical that determines whether the legend for the symbol shapes is shown

legend.format
list of formatting options for the legend numbers. Only applicable if labels is
undefined. Parameters are:

fun Function to specify the labels. It should take a numeric vector, and should
return a character vector of the same size. By default it is not specified. If
specified, the list items scientific, format, and digits (see below) are
not used.

scientific Should the labels be formatted scientifically? If so, square brackets
are used, and the format of the numbers is "g". Otherwise, format="f",
and text.separator, text.less.than, and text.or.more are used. Also,
the numbers are automatically rounded to millions or billions if applicable.

format By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE
then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn
if needed to save space.

digits Number of digits after the decimal point if format="f", and the number of
significant digits otherwise.

big.num.abbr Vector that defines whether and which abbreviations are used for
large numbers. It is a named numeric vector, where the name indicated the
abbreviation, and the number the magnitude (in terms on numbers of zero).
Numbers are only abbreviation when they are large enough. Set it to NA to
disable abbreviations. The default is c("mln" = 6,"bln" = 9). For layers
where style is set to log10 or log10_pretty, the default is NA.
prefix  Prefix of each number
suffix  Suffix of each number
text.separator  Character string to use to separate numbers in the legend (default: "to").
text.less.than  Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE
text.or.more  Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE
text.align  Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.protrait = TRUE), and "center" otherwise.
text.to.columns  Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

... Other arguments passed on to formatC

legend.size.is.portrait  logical that determines whether the legend element regarding the symbol sizes is in portrait mode (TRUE) or landscape (FALSE)

legend.col.is.portrait  logical that determines whether the legend element regarding the symbol colors is in portrait mode (TRUE) or landscape (FALSE)

legend.shape.is.portrait  logical that determines whether the legend element regarding the symbol shapes is in portrait mode (TRUE) or landscape (FALSE)

legend.size.reverse  logical that determines whether the items of the legend regarding the symbol sizes are shown in reverse order, i.e. from bottom to top when legend.size.is.portrait = TRUE and from right to left when legend.size.is.portrait = FALSE

legend.col.reverse  logical that determines whether the items of the legend regarding the symbol colors are shown in reverse order, i.e. from bottom to top when legend.col.is.portrait = TRUE and from right to left when legend.col.is.portrait = FALSE

legend.shape.reverse  logical that determines whether the items of the legend regarding the symbol shapes are shown in reverse order, i.e. from bottom to top when legend.shape.is.portrait = TRUE and from right to left when legend.shape.is.portrait = FALSE

legend.hist  logical that determines whether a histogram is shown regarding the symbol colors

legend.hist.title  title for the histogram. By default, one title is used for both the histogram and the normal legend for symbol colors.

legend.size.z  index value that determines the position of the legend element regarding the symbol sizes with respect to other legend elements. The legend elements are stacked according to their z values. The legend element with the lowest z value is placed on top.
legend.col.z  index value that determines the position of the legend element regarding the symbol colors. (See legend.size.z)

legend.shape.z  index value that determines the position of the legend element regarding the symbol shapes. (See legend.size.z)

legend.hist.z  index value that determines the position of the histogram legend element. (See legend.size.z)

id  name of the data variable that specifies the indices of the symbols. Only used for "view" mode (see tmap_mode).

popup.vars  names of data variables that are shown in the popups in "view" mode. If NA (default), only aesthetic variables (i.e. specified by col and lwd) are shown. If they are not specified, all variables are shown. Set popup.vars to FALSE to disable popups. When a vector of variable names is provided, the names (if specified) are printed in the popups.

popup.format  list of formatting options for the popup values. See the argument legend.format for options. Only applicable for numeric data variables. If one list of formatting options is provided, it is applied to all numeric variables of popup.vars. Also, a (named) list of lists can be provided. In that case, each list of formatting options is applied to the named variable.

zindex  zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".

group  name of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in tm_shape).

auto.palette.mapping  deprecated. It has been replaced by midpoint for numeric variables and stretch.palette for categorical variables.

max.categories  deprecated. It has moved to tmap_options.

...  arguments passed on to tm_symbols. For tm_markers, arguments can also be passed on to tm_text. In that case, they have to be prefixed with text.. e.g. the col argument should be names text.col

title  shortcut for title.col for tm_dots

legend.show  shortcut for legend.col.show for tm_dots

legend.is.portrait  shortcut for legend.col.is.portrait for tm_dots

legend.z  shortcut for legend.col.z shortcut for tm_dots

text  text of the markers. Shown in plot mode, and as popup text in view mode.

text.just  justification of marker text (see just argument of tm_text). Only applicable in plot mode.

markers.on.top.of.text  For tm_markers, should the markers be drawn on top of the text labels?
Details

Small multiples can be drawn in two ways: either by specifying the by argument in `tm_facets`, or by defining multiple variables in the aesthetic arguments, which are `size`, `col`, and `shape`. In the latter case, the arguments, except for the ones starting with `legend`, can be specified for small multiples as follows. If the argument normally only takes a single value, such as `n`, then a vector of those values can be specified, one for each small multiple. If the argument normally can take a vector, such as `palette`, then a list of those vectors (or values) can be specified, one for each small multiple.

A shape specification is one of the following three options.

1. A numeric value that specifies the plotting character of the symbol. See parameter `pch` of `points` and the last example to create a plot with all options. Note that this is not supported for the "view" mode.
2. A grob object, which can be a ggplot2 plot object created with `ggplotGrob`. To specify multiple shapes, a list of grob objects is required. See example of a proportional symbol map with ggplot2 plots.
3. An icon specification, which can be created with `tmap_icons`.

To specify multiple shapes (needed for the `shapes` argument), a vector or list of these shape specification is required. The shape specification options can also be mixed. For the `shapes` argument, it is possible to use a named vector or list, where the names correspond to the value of the variable specified by the `shape` argument. For small multiples, a list of these shape specification(s) should be provided.

Value

tmap-element

References


See Also

vignette("tmap-getstarted")

Examples

data(World, metro)
metro$growth <- (metro$pop2020 - metro$pop2010) / (metro$pop2010 * 10) * 100

tm_shape(World) +
   tm_fill("grey70") +
tm_shape(metro) +
   tm_bubbles("pop2010", col = "growth",
                border.col = "black", border.alpha = .5,
                style="fixed", breaks=c(-Inf, seq(0, 6, by=2), Inf),
                ...)
tm_symbols

palette="-RdYlBu", contrast=1,
title.size="Metro population",
title.col="Growth rate (%)") +
tm_format("World")

tm_shape(metro) +
tm_symbols(size = "pop2010", col="pop2010", shape="pop2010",
legend.format = list(text.align="right", text.to.columns = TRUE)) +
tm_legend(outside = TRUE, outside.position = "bottom", stack = "horizontal")

if (require(ggplot2) && require(dplyr) && require(tidyR) && require(tmaptools) && require(sf)) {
data(NLD_prov)

origin_data <- NLD_prov %>%
st_set_geometry(NULL) %>%
mutate(FID= factor(1:n())) %>%
select(FID, origin_native, origin_west, origin_non_west) %>%
gather(key=origin, value=perc, origin_native, origin_west, origin_non_west, factor_key=TRUE)

origin_cols <- get_brewer_pal("Dark2", 3)
grobs <- lapply(split(origin_data, origin_data$FID), function(x) {
    ggplotGrob(ggplot(x, aes(x="", y=-perc, fill=origin)) +
    geom_bar(width=1, stat="identity") +
    scale_y_continuous(expand=c(0,0)) +
    scale_fill_manual(values=origin_cols) +
    theme_ps(plot.axes = FALSE))
})
names(grobs) <- NLD_prov$name

tm_shape(NLD_prov) +
tm_polygons(group = "Provinces") +
tm_symbols(size="population", shape="name",
shapes=grobs,
sizes.legend=c(.5, 1.3)*1e6,
scale=1,
legend.shape.show = FALSE,
legend.size.is.portrait = TRUE,
shapes.legend = 22,
title.size = "Population",
group = "Charts",
id = "name",
popup.vars = c("population", "origin_native",
"origin_west", "origin_non_west") +
tm_addLegend(type="fill",
group = "Charts",
col=origin_cols,
labels=c("Native", "Western", "Non-western"),
title="Origin") +
tm_format("NLD")
}
# TIP: check out these examples in view mode, enabled with tmap_mode("view")

## Not run:
if (require(rnaturalearth)) {

airports <- ne_download(scale=10, type="airports")
airplane <- tmapIcons(system.file("img/airplane.png", package = "tmap"))

current.mode <- tmap_mode("view")
tm_shape(airports) +
tm_symbols(shape=airplane, size="natlscale",
    legend.size.show = FALSE, scale=1, border.col = NULL, id="name", popup.vars = TRUE) +
tm_view(set.view = c(lon = 15, lat = 48, zoom = 4))
tmap_mode(current.mode)
}

## End(Not run)

#####################################################################################
## Not run:
# plot all available symbol shapes:
if (require(ggplot2)) {
  ggplot(data.frame(p=c(0:25,32:127))) +
  geom_point(aes(x=p%%16, y=-(p%/%16), shape=p), size=5, fill="red") +
  geom_text(mapping=aes(x=p%%16, y=-(p%%16+0.25), label=p), size=3) +
  scale_shape_identity() +
  theme(axis.title=element_blank(),
    axis.text=element_blank(),
    axis.ticks=element_blank(),
    panel.background=element_blank())
}

## End(Not run)

---

**tm_text**  
*Add text labels*

**Description**

Creates a **tmap-element** that adds text labels.

**Usage**

```r
tm_text(  
text,  
size = 1,
)```
col = NA,
root = 3,
clustering = FALSE,
size.lim = NA,
sizes.legend = NULL,
sizes.legend.labels = NULL,
sizes.legend.text = "Abc",
n = 5,
style = ifelse(is.null(breaks), "pretty", "fixed"),
breaks = NULL,
interval.closure = "left",
palette = NULL,
labels = NULL,
labels.text = NA,
midpoint = NULL,
stretch.palette = TRUE,
contrast = NA,
colorNA = NA,
textNA = "Missing",
showNA = NA,
colorNULL = NA,
fontface = NA,
fontfamily = NA,
alpha = NA,
case = NA,
shadow = FALSE,
bg.color = NA,
bg.alpha = NA,
size.lowerbound = 0.4,
print.tiny = FALSE,
scale = 1,
auto.placement = FALSE,
remove.overlap = FALSE,
along.lines = FALSE,
overwrite.lines = FALSE,
just = "center",
xmod = 0,
ymod = 0,
title.size = NA,
title.col = NA,
legend.size.show = TRUE,
legend.col.show = TRUE,
legend.format = list(),
legend.size.is.portrait = FALSE,
legend.col.is.portrait = TRUE,
legend.size.reverse = FALSE,
legend.col.reverse = FALSE,
legend.hist = FALSE,
legend.hist.title = NA,
legend.size.z = NA,
legend.col.z = NA,
legend.hist.z = NA,
zindex = NA,
group = NA,
auto.palette.mapping = NULL,
max.categories = NULL
)

Arguments

- **text**: name of the variable in the shape object that contains the text labels
- **size**: relative size of the text labels (see note). Either one number, a name of a numeric variable in the shape data that is used to scale the sizes proportionally, or the value "AREA", where the text size is proportional to the area size of the polygons.
- **col**: color of the text labels. Either a color value or a data variable name. If multiple values are specified, small multiples are drawn (see details).
- **root**: root number to which the font sizes are scaled. Only applicable if size is a variable name or "AREA". If root=2, the square root is taken, if root=3, the cube root etc.
- **clustering**: value that determines whether the text labels are clustered in "view" mode. One of: TRUE, FALSE, or the output of markerClusterOptions.
- **size.lim**: vector of two limit values of the size variable. Only text labels are drawn whose value is greater than or equal to the first value. Text labels whose values exceed the second value are drawn at the size of the second value. Only applicable when size is the name of a numeric variable of shp. See also size.lowerbound which is a threshold of the relative font size.
- **sizes.legend**: vector of text sizes that are shown in the legend. By default, this is determined automatically.
- **sizes.legend.labels**: vector of labels for that correspond to sizes.legend.
- **sizes.legend.text**: vector of example text to show in the legend next to sizes.legend.labels. By default "Abc". When NA, examples from the data variable whose sizes are close to the sizes.legend are taken and "NA" for classes where no match is found.
- **n**: preferred number of color scale classes. Only applicable when col is a numeric variable name.
- **style**: method to process the color scale when col is a numeric variable. Discrete options are "cat", "fixed", "sd", "equal", "pretty", "quantile", "kmeans", "hclust", "bclust", "fisher", "jenks", and "log10_pretty". A numeric variable is processed as a categorical variable when using "cat", i.e. each unique value will correspond to a distinct category. For the other discrete options (except "log10_pretty"), see the details in classIntervals. Continuous options are "cont", "order", and "log10". The first maps the values of col to a smooth gradient, the second maps the order of values of col to a smooth gradient, and the third uses a logarithmic transformation.
breaks in case style=="fixed", breaks should be specified. The breaks argument can also be used when style="cont". In that case, the breaks are mapped evenly to the sequential or diverging color palette.

interval.closure
value that determines whether where the intervals are closed: "left" or "right". Only applicable if col is a numeric variable.

palette a palette name or a vector of colors. See tmaptools::palette_explorer() for the named palettes. Use a "-" as prefix to reverse the palette. The default palette is taken from tm_layout's argument aes.palette, which typically depends on the style. The type of palette from aes.palette is automatically determined, but can be overwritten: use "seq" for sequential, "div" for diverging, and "cat" for categorical.

labels labels of the color classes, applicable if col is a data variable name

labels.text Example text to show in the legend next to the labels. When NA (default), examples from the data variable are taken and "NA" for classes where they don't exist.

midpoint The value mapped to the middle color of a diverging palette. By default it is set to 0 if negative and positive values are present. In that case, the two sides of the color palette are assigned to negative respectively positive values. If all values are positive or all values are negative, then the midpoint is set to NA, which means that the value that corresponds to the middle color class (see style) is mapped to the middle color. Only applies when col is a numeric variable. If it is specified for sequential color palettes (e.g. "Blues"), then this color palette will be treated as a diverging color palette.

stretch.palette Logical that determines whether the categorical color palette should be stretched if there are more categories than colors. If TRUE (default), interpolated colors are used (like a rainbow). If FALSE, the palette is repeated.

contrast vector of two numbers that determine the range that is used for sequential and diverging palettes (applicable when auto.palette.mapping=TRUE). Both numbers should be between 0 and 1. The first number determines where the palette begins, and the second number where it ends. For sequential palettes, 0 means the brightest color, and 1 the darkest color. For diverging palettes, 0 means the middle color, and 1 both extremes. If only one number is provided, this number is interpreted as the endpoint (with 0 taken as the start).

colorNA colour for missing values. Use NULL for transparency.
textNA text used for missing values.
showNA logical that determines whether missing values are named in the legend. By default (NA), this depends on the presence of missing values.
colorNULL colour for polygons that are shown on the map that are out of scope

fontface font face of the text labels. By default, determined by the fontface argument of tm_layout.

fontfamily font family of the text labels. By default, determined by the fontfamily argument of tm_layout.
alpha  transparency number between 0 (totally transparent) and 1 (not transparent). By default, the alpha value of the fontcolor is used (normally 1).
case  case of the font. Use "upper" to generate upper-case text, "lower" to generate lower-case text, and NA to leave the text as is.
shadow  logical that determines whether a shadow is depicted behind the text. The color of the shadow is either white or yellow, depending of the fontcolor.
bg.color  background color of the text labels. By default, bg.color=NA, so no background is drawn.
bg.alpha  number between 0 and 1 that specifies the transparency of the text background (0 is totally transparent, 1 is solid background).
size.lowerbound  lowerbound for size. Only applicable when size is not a constant. If print.tiny is TRUE, then all text labels which relative text is smaller than size.lowerbound are depicted at relative size size.lowerbound. If print.tiny is FALSE, then text labels are only depicted if their relative sizes are at least size.lowerbound (in other words, tiny labels are omitted).
print.tiny  boolean, see size.lowerbound
scale  text size multiplier, useful in case size is variable or "AREA".
auto.placement  logical (or numeric) that determines whether the labels are placed automatically. If TRUE, the labels are placed next to the coordinate points with as little overlap as possible using the simulated annealing algorithm. Therefore, it is recommended for labeling spatial dots or symbols. If a numeric value is provided, this value acts as a parameter that specifies the distance between the coordinate points and the text labels in terms of text line heights.
remove.overlap  logical that determines whether the overlapping labels are removed
along.lines  logical that determines whether labels are rotated along the spatial lines. Only applicable if a spatial lines shape is used.
overwrite.lines  logical that determines whether the part of the lines below the text labels is removed. Only applicable if a spatial lines shape is used.
just  justification of the text relative to the point coordinates. Either one of the following values: "left", "right", "center", "bottom", and "top", or a vector of two values where first value specifies horizontal and the second value vertical justification. Besides the mentioned values, also numeric values between 0 and 1 can be used. 0 means left justification for the first value and bottom justification for the second value. Note that in view mode, only one value is used.
xmod  horizontal position modification of the text (relatively): 0 means no modification, and 1 corresponds to the height of one line of text. Either a single number for all polygons, or a numeric variable in the shape data specifying a number for each polygon. Together with ymod, it determines position modification of the text labels. In most coordinate systems (projections), the origin is located at the bottom left, so negative xmod move the text to the left, and negative ymod values to the bottom.
ymod  vertical position modification. See xmod.
title.size  title of the legend element regarding the text sizes

title.col   title of the legend element regarding the text colors

legend.size.show logical that determines whether the legend for the text sizes is shown

legend.col.show logical that determines whether the legend for the text colors is shown

legend.format list of formatting options for the legend numbers. Only applicable if labels is undefined. Parameters are:

  fun Function to specify the labels. It should take a numeric vector, and should return a character vector of the same size. By default it is not specified. If specified, the list items scientific, format, and digits (see below) are not used.

  scientific Should the labels be formatted scientifically? If so, square brackets are used, and the format of the numbers is "g". Otherwise, format="f", and text.separator, text.less.than, and text.or.more are used. Also, the numbers are automatically rounded to millions or billions if applicable.

  format By default, "f", i.e. the standard notation xxx.xxx, is used. If scientific=TRUE then "g", which means that numbers are formatted scientifically, i.e. n.dddE+nn if needed to save space.

  digits Number of digits after the decimal point if format="f", and the number of significant digits otherwise.

  big.num.abbr Vector that defines whether and which abbreviations are used for large numbers. It is a named numeric vector, where the name indicated the abbreviation, and the number the magnitude (in terms on numbers of zero). Numbers are only abbreviation when they are large enough. Set it to NA to disable abbrevations. The default is c("mln" = 6,"bln" = 9). For layers where style is set to log10 or log10_pretty, the default is NA.

  prefix Prefix of each number

  suffix Suffix of each number

  prefix Prefix of each number

  suffix Suffix of each number

  text.separator Character string to use to separate numbers in the legend (default: "to").

  text.less.than Character value(s) to use to translate "Less than". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

  text.or.more Character value(s) to use to translate "or more". When a character vector of length 2 is specified, one for each word, these words are aligned when text.to.columns = TRUE

  text.align Value that determines how the numbers are aligned, "left", "center" or "right". By default "left" for legends in portrait format (legend.is.portrait = TRUE), and "center" otherwise.

  text.to.columns Logical that determines whether the text is aligned to three columns (from, text.separator, to). By default FALSE.

... Other arguments passed on to formatC
legend.size.is.portrait
logical that determines whether the legend element regarding the text sizes is in portrait mode (TRUE) or landscape (FALSE)

legend.col.is.portrait
logical that determines whether the legend element regarding the text colors is in portrait mode (TRUE) or landscape (FALSE)

legend.size.reverse
logical that determines whether the items of the legend regarding the text sizes are shown in reverse order, i.e. from bottom to top when legend.size.is.portrait = TRUE and from right to left when legend.size.is.portrait = FALSE

legend.col.reverse
logical that determines whether the items of the legend regarding the text colors are shown in reverse order, i.e. from bottom to top when legend.col.is.portrait = TRUE and from right to left when legend.col.is.portrait = FALSE

legend.hist
logical that determines whether a histogram is shown regarding the text colors

legend.hist.title
title for the histogram. By default, one title is used for both the histogram and the normal legend for text colors.

legend.size.z
index value that determines the position of the legend element regarding the text sizes with respect to other legend elements. The legend elements are stacked according to their z values. The legend element with the lowest z value is placed on top.

legend.col.z
index value that determines the position of the legend element regarding the text colors. (See legend.size.z)

legend.hist.z
index value that determines the position of the histogram legend element. (See legend.size.z)

zindex
zindex of the pane in view mode. By default, it is set to the layer number plus 400. By default, the tmap layers will therefore be placed in the custom panes "tmap401", "tmap402", etc., except for the base tile layers, which are placed in the standard "tile". This parameter determines both the name of the pane and the z-index, which determines the pane order from bottom to top. For instance, if zindex is set to 500, the pane will be named "tmap500".

group
ame of the group to which this layer belongs in view mode. Each group can be selected or deselected in the layer control item. Set group = NULL to hide the layer in the layer control item. By default, it will be set to the name of the shape (specified in `tm_shape`).

auto.palette.mapping
deprecated. It has been replaced by midpoint for numeric variables and stretch.palette for categorical variables.

max.categories
deprecated. It has moved to `tmap_options`.

Value

`tmap-element`
Note

The absolute fontsize (in points) is determined by the (ROOT) viewport, which may depend on the graphics device.

References


See Also

vignette("tmap-getstarted")

Examples

current.mode <- tmap_mode("plot")
data(World, metro)

tm_shape(World) +
  tm_text("name", size="AREA")

tm_shape(World) +
  tm_text("name", size="pop_est", col="continent", palette="Dark2",
  title.size = "Population", title.col="Continent") +
  tm_legend(outside = TRUE)

tmap_mode("view")

## Not run:
require(tmaptools)
metro_aus <- crop_shape(metro, bb("Australia"))

tm_shape(metro_aus) +
  tm_dots() +
  tm_text("name", just = "top")

# alternative
tm_shape(metro_aus) +
  tm_markers(text = "name")

## End(Not run)

# restore current mode
tmap_mode(current.mode)

---

**tm_view** Options for the interactive tmap viewer
Description

Set the options for the interactive tmap viewer. Some of these options can also be set with `tm_layout`, since they are style dependent (e.g., the choice of basemaps). The function `tm_view` overrides these options when specified.

Usage

```r
tm_view(
  alpha,
  colorNA,
  projection,
  symbol.size.fixed,
  dot.size.fixed,
  text.size.variable,
  bbox,
  set.bounds,
  set.view,
  set.zoom.limits,
  view.legend.position,
  control.position,
  popup.all.data,
  legend.position,
  basemaps = NULL,
  basemaps.alpha = NULL
)
```

Arguments

- **alpha**: transparency (opacity) parameter applied to whole map. By default, it is set to 0.7 if basemaps are used, and 1 otherwise.
- **colorNA**: default color for missing values in interactive mode. If the color of missing values is not defined in the layer functions (e.g. `tm_fill`), then the default color is taken from the na value of the `aes.color` argument in `tm_layout`. This `colorNA` argument (if not NA itself) overrides that default value. For interactive maps, it can be useful to set `colorNA` to NULL, which means transparent.
- **projection**: projection. Either a EPSG number, or a `leaflet_crs` object created with `leafletCRS`. By default, the Web Mercator (3857) is used, since the vast majority of basemaps are rendered accordingly. Other standards are EPSG numbers 4326 (WGS84) and 3395 (Mercator). If set to 0, the projection of the master shape is used (see `tm_shape`) provided that a EPSG number can be extracted.
- **symbol.size.fixed**: should symbol sizes be fixed while zooming?
- **dot.size.fixed**: should dot sizes be fixed while zooming?
- **text.size.variable**: should text size variables be allowed in view mode? By default FALSE, since in many applications, the main reason to vary text size is to prevent occlusion in plot mode, which is often not a problem in view mode due to the ability to zoom in.
bbox: bounding box. One of the following:

- A bounding box (an sf bbox object, see `st_bbox`, a 2 by 2 matrix (used by the sp package), or an Extent object used by the raster package).
- Open Street Map search query. The bounding is automatically generated by querying q from Open Street Map Nominatim. See http://wiki.openstreetmap.org/wiki/Nominatim.

If set, it overrides `set.view` and all bbox arguments of `tm_shape`.

set.bounds: logical that determines whether maximum bounds are set, or a numeric vector of four values that specify the lng1, lat1, lng2, and lat2 coordinates (see `setMaxBounds`).

set.view: numeric vector that determines the view. Either a vector of three: lng, lat, and zoom, or a single value: zoom. See `setView`. Only applicable if bbox is not specified.

set.zoom.limits: numeric vector of two that set the minimum and maximum zoom levels (see `tileOptions`).

view.legend.position: Character vector of two values, specifying the position of the legend. Use "left" or "right" for the first value and "top" or "bottom" for the second value. It overrides the value of legend.position of `tm_layout`, unless set to NA.

control.position: Character vector of two values, specifying the position of the layer control UI. Use "left" or "right" for the first value and "top" or "bottom" for the second value.

popup.all.data: not used anymore. As of version 1.6, the popups are specified by the argument `popup.vars` in the layer functions `tm_fill`, `tm_symbols`, and `tm_lines`.

legend.position: not used anymore, renamed to `view.legend.position`.

basemaps: Deprecated. Use `tm_basemap` instead, or set the default basemaps in `tmap_options`.

basemaps.alpha: Deprecated. See basemaps.

References


See Also

vignette("tmap-getstarted")

Examples

```r
# world choropleth/bubble map of the world
data(World, metro)
metro$growth <- (metro$pop2020 - metro$pop2010) / (metro$pop2010 * 10) * 100

map1 <- tm_shape(metro) +
tm_bubbles("pop2010", col = "growth")
```
tm_xlab

Axis labels

Description

Add axis labels

Usage

tm_xlab(text, size = 0.8, rotation = 0, space = 0)
tm_ylab(text, size = 0.8, rotation = 90, space = 0)

Arguments

text text for the axis

size fontsize, by default 0.8

rotation rotation angle in degrees. By default, 0 for the x axis label and 90 for the y axis label.

space space between labels and the map in numbers of line heights. By default, it is 0, unless grid labels are plotted outside the frame (i.e., tm_grid is called with labels.inside.frame = FALSE). In that case, space corresponds to the height of one line, taking the grid label size into account.
Examples

```r
data(World)

qtm(World, fill="#FFF8DC", projection=4326, inner.margins=0) +
tm_grid(x = seq(-180, 180, by=20), y=seq(-90,90,by=10), col = "gray70") +
tm_xlab("Longitude") +
tm_ylab("Latitude")
```

Description

Maps of the world and the Netherlands (province and municipality level), class `sf`

Usage

```r
data(World)

data(NLD_prov)

data(NLD_muni)
```

Details

The default projections for these maps are Eckhart IV (World) and Rijksdriehoekstelsel (Netherlands). See below. The projection can be changed temporarily for plotting purposes by using the projection argument of `tm_shape` (or `qtm`).

**World** World map. The default projection for this world map is Eckhart IV since area sizes are preserved, which is a very important property for choropleths.

**NLD_prov and NLD_muni**, maps of the Netherlands at province and municipality level of 2013. The used projection is the Rijksdriehoekstelsel projection. **Important**: publication of these maps is only allowed when cited to Statistics Netherlands (CBS) and Kadaster Nederland as source.

Source

- [http://www.naturalearthdata.com](http://www.naturalearthdata.com) for World
- [http://www.happyplanetindex.org](http://www.happyplanetindex.org) for World
- [http://www.cbs.nl](http://www.cbs.nl) for NLD_prov and NLD_muni.

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