

# Package: ggmagnify (via r-universe)

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**Title** Create a Magnified Inset of Part of a ``Ggplot" Object

**Version** 0.4.2

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**Description** Creates a magnified inset of a ggplot, with projection lines and borders around the target area and inset, plus optional shadow. Rectangular, elliptical or arbitrary regions can be magnified. Works with facets and maps. Geoms can optionally be recomputed within the inset area.

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**URL** <https://github.com/hughjonesd/ggmagnify>,  
<https://hughjonesd.github.io/ggmagnify/>

**BugReports** <https://github.com/hughjonesd/ggmagnify/issues>

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'geom-magnify-tile.R' 'ggplot-utils.R' 'helpers.R'  
'inset-theme.R' 'projection.R'

**Remotes** thomasp85/ggforce

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geom_magnify	<i>Create a magnified inset of a plot</i>
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## Description

geom\_magnify() creates a magnified inset of part of a ggplot. Optional borders are drawn around the target and inset, along with projection lines from one to the other. from gives the location of the target area, and to gives the location of the inset. Usually, these are specified as c(xmin, xmax, ymin, ymax).

## Usage

```
geom_magnify(
  mapping = NULL,
  data = NULL,
  stat = StatMagnify,
  position = "identity",
  ...,
  shape = c("rect", "ellipse", "outline"),
  expand = 0.1,
  aspect = c("free", "fixed"),
  axes = "",
  proj = c("facing", "corresponding", "single"),
  shadow = FALSE,
  corners = 0,
  colour = "black",
  linetype = 1,
  target.linetype = linetype,
  inset.linetype = linetype,
  proj.linetype = 2,
  alpha = 1,
  linewidth = 0.4,
  proj.fill = NULL,
```

```

plot = NULL,
shadow.args = list(sigma = 5, colour = "grey40", x_offset = 5, y_offset = 5),
recompute = FALSE,
scale.inset = 1,
proj.combine = TRUE,
na.rm = FALSE,
inherit.aes = TRUE
)

geom_magnify_tile(
  mapping = NULL,
  data = NULL,
  stat = StatMagnifyTile,
  position = "identity",
  ...,
  shape = c("rect", "ellipse", "outline"),
  expand = 0.1,
  aspect = c("free", "fixed"),
  axes = "",
  proj = "facing",
  shadow = FALSE,
  corners = 0,
  colour = "black",
  linetype = 1,
  target.linetype = linetype,
  inset.linetype = linetype,
  proj.linetype = 2,
  alpha = 1,
  linewidth = 0.4,
  proj.fill = NULL,
  plot = NULL,
  shadow.args = list(sigma = 5, colour = "grey40", x_offset = 5, y_offset = 5),
  recompute = FALSE,
  scale.inset = 1,
  proj.combine = TRUE,
  na.rm = FALSE,
  inherit.aes = FALSE
)

```

### Arguments

mapping, data, stat, position, ..., na.rm  
 See e.g. [ggplot2::geom\\_point\(\)](#).

shape            Shape of the area to be magnified. "rect" for a rectangle. "ellipse" for an ellipse. "outline" for the convex hull of points in the target area, or for map polygons.

expand           Number. Expand the target area and inset proportionally by this amount.

aspect            String. "fixed" to fix the aspect ratio (overrides ymax).

axes	String. Which axes to plot in the inset? "", "x", "y" or "xy".
proj	String. What style of projection lines to draw? "facing" (the default), "corresponding" or "single". Can be abbreviated. See below.
shadow	Logical. Draw a shadow behind the inset plot? Requires the "ggfx" package.
corners	Numeric between 0 and 1. Radius of rounded corners for the target area and inset. Only used if shape is "rect". 0.1 is a good starting value.
linetype, colour, alpha, linewidth	Linetype, colour, alpha and linewidth for borders and projection lines.
target.linetype, inset.linetype, proj.linetype	Linetypes for specific components. Set to 0 for no lines.
proj.fill	Colour to fill between the projection lines. NULL for no fill. Add alpha using e.g. <code>scales::alpha()</code> . Ignored when <code>proj = "single"</code> .
plot	Ggplot object to plot in the inset. If NULL, defaults to the ggplot object to which <code>geom_magnify()</code> is added. Overrides axes if set. Use <code>inset_theme()</code> to give plot an appropriate theme.
shadow.args	List. Arguments to <code>ggfx::with_shadow()</code> .
recompute	Logical. If TRUE, use <code>lims()</code> to replot the inset. Statistics, e.g. smoothing lines, will be recomputed using only the data in the target area. If FALSE, use <code>coord_cartesian()</code> to replot the inset, keeping all the data.
scale.inset	Length 1 or 2 numeric. Normally, exactly the target area is shown on the inset. Sometimes you may wish to rescale the plot in the inset. Use 2 numbers to scale width and height separately.
proj.combine	Logical. How to draw projection lines when more than one polygon/map area is magnified? FALSE draws one set of projection lines for each area. TRUE draws a single set of lines for all the areas.
inherit.aes	If FALSE, overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <code>borders()</code> .

## Details

### Aesthetics:

`geom_magnify` understand the following aesthetics (required aesthetics are in bold):

- **from**
- **to**

`from` and `to` can be vectors of length 4, like `list(xmin, xmax, ymin, ymax)`. These specify the bottom left and top right corners of the target area to magnify, and the area for the magnified inset. The lists can optionally be named: `list(xmin = 1, xmax = 2, ymin = 3, ymax = 4)`.

**Note:** it is correct to use a `list()` for `from` and `to`, because `x` and `y` scales may be different types, e.g. if `x` is a `Date`. However, if `x` and `y` are both the same type, you may safely use `c()` instead of `list()`.

**Note:** very early versions of `ggmagnify` used a different order of coordinates: `list(xmin, ymin, xmax, ymax)`.

Alternatively, `from` can be:

- A data frame of points with two columns for x and y, or a `grid:grob()` object. Points within the grob region (a polygon spanned by the data frame) will be magnified. Points should be on the same scale as the data, with `default.units = "native"` in the grob. shape will be ignored.
- A logical vector. Points in the data where `from` is TRUE will be surrounded by a rectangle, ellipse or outline.

Normally you'll set `from` and `to` in the call to `geom_magnify()`. You can specify them as aesthetics, e.g. if you want different areas per facet. If so, you may need to wrap them in a `list()` to make sure they are length one per row of data. Only the first row per panel is used. (To magnify multiple areas in one panel, use multiple calls to `geom_magnify()`.)

### Shapes:

If `shape = "ellipse"` an elliptical area is magnified. This may not include all points within the target area given by `from`.

If `shape = "outline"` then a convex hull will be drawn around points in the target area. This only works if you are using `ggplot2::geom_point()` or some other geom with aesthetics x and y; or with maps constructed by e.g. `ggplot2::geom_sf()`. In this case "outline" magnifies exactly the map features selected by `from`.

### Projection lines:

- `proj = "corresponding"` or `"facing"` draws projection lines from the corners of the target to the corners of the inset.
  - "corresponding" always projects each corner of the target to the same corner of the inset.
  - "facing" sometimes draws lines between facing corners, when this looks cleaner.
  - For non-rectangular insets, "facing" and "corresponding" are the same.
- "single" draws a single line from the midpoint of facing sides.
- To draw no lines, set `proj.linetype = 0`.

### Limitations:

- `geom_magnify()` uses masks. This requires R version 4.1.0 or higher, and a graphics device that supports masking. If you are using knitr, you may have luck with the `ragg_png` device. If your device doesn't support masks, only `shape = "rect"` will work, and the plot inset will not be clipped to the panel area.
- R graphics devices are not very predictable. My current recommendations are: `ragg_png` for knitr; `cairo_pdf` for PDF output; RStudio AGG backend for interactive output. Your mileage may vary.
- `geom_magnify()` uses dark magic to deal with faceting. It may break with older, or newer, versions of `ggplot2`. If you don't need faceting, and want your code to be robust to upgrades, set `options(ggmagnify.safe_mode = TRUE)` to use slightly less magic.
- By design, `geom_magnify()` replots the original plot using new limits. It does not directly copy the target area pixels. The advantage is that you can e.g. add axes, plot points at an appropriate size, zoom in on data that's invisible in the main plot, or recompute derived graphics. If you want an exact pixel-by-pixel copy, use a different tool.
- `geom_magnify()` may break with discrete scales. This is a limitation in `ggplot2` for now.
- Find a bug? Report it at <https://github.com/hughjonesd/ggmagnify/issues/>.

`geom_magnify_tile()`:  
`geom_magnify_tile()` is a version of `geom_magnify()` which uses different aesthetics. Set `x`, `width`, `y`, `height` and `to_x`, `to_width`, `to_y`, `to_height` to specify the target and inset location.

### Examples

```
library(ggplot2)
ggp <- ggplot(iris, aes(Sepal.Width, Sepal.Length, colour = Species)) +
  geom_point() + xlim(c(2, 6))
from <- list(2.5, 3.5, 6, 7)
to <- list(4, 6, 5, 7)

# Basic magnification
ggp + geom_magnify(from = from, to = to)

# Convex hull of points
ggp + geom_magnify(aes(from = Species == "setosa"), to = c(3, 5, 6, 8),
  shape = "outline")

# Order matters

# `geom_magnify()` stores the plot when it is added to it:
ggp +
  scale_color_brewer() +
  geom_magnify(from = from, to = to)

# This will print the inset without the new scale:
ggp +
  geom_magnify(from = from, to = to) +
  scale_color_brewer()

# For more examples see https://github.com/hughjonesd/ggmagnify
```

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GeomMagnify

*Internals*

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### Description

Internals

---

grob\_where

*Create a grob from a subset of sf data*

---

### Description

Create a grob from a subset of sf data

**Usage**

```
grob_where(where, sf, crs = NULL)
```

**Arguments**

where            Logical condition to be evaluated in sf.  
 sf                An object of class sf.  
 crs               Optional [coordinate reference system](#).

**Value**

A `grid::grob()` which you can pass to `from`.

**Examples**

```
library(ggplot2)
if (requireNamespace("sf", quietly = TRUE) &&
    requireNamespace("maps", quietly = TRUE)) {
  usa <- sf::st_as_sf(maps::map("state", fill=TRUE, plot = FALSE))
  texas <- grob_where(ID == "texas", usa, crs = sf::st_crs(4326))
  ggplot(usa) + coord_sf(crs = sf::st_crs(4326)) + geom_sf() +
    geom_magnify(from = texas, to = c(-90, -70, 25, 35), colour = "red",
                 aspect = "fixed", expand = 0)
}
```

---

inset\_theme

*Create a theme suitable for an inset ggplot*


---

**Description**

Use `inset_theme()` to add a suitable theme to a manually-created inset plot. Use `inset_blanks()` to customize the default list of elements to blank in the inset.

**Usage**

```
inset_theme(
  blank = inset_blanks(axes = axes),
  axes = c("", "x", "y", "xy"),
  margin = if (axes == "") 0 else 8
)
```

```
inset_blanks(..., axes = c("", "x", "y", "xy"))
```

**Arguments**

blank            Character vector of theme elements to blank. See `ggplot2::theme()`.  
 axes            String. Which axes to plot in the inset? "", "x", "y" or "xy".  
 margin          Margin around the plot. See `plot.margin` in `ggplot2::theme()`.  
 ...             Character vector of extra elements to blank.

**Value**

inset\_theme() returns a ggplot theme object. inset\_blanks() returns a character vector of theme element names.

**Examples**

```
library(ggplot2)
ggp <- ggplot(iris, aes(Sepal.Width, Sepal.Length, colour = Species)) +
  geom_point() + xlim(c(2, 6))
from <- list(2.5, 3.5, 6, 7)
to <- list(4, 6, 5, 7)

blanks <- inset_blanks("panel.grid")
inset <- ggp + geom_density2d() + inset_theme(axes = "", blank = blanks)
ggp + geom_magnify(from = from, to = to, plot = inset)
```

---

rect\_around

*Helper functions to find rectangles or convex hulls of data*


---

**Description**

Helper functions to find rectangles or convex hulls of data

**Usage**

```
rect_around(x, y, data = NULL, expand = 0)
```

```
hull_around(x, y, data = NULL, expand = 0)
```

**Arguments**

x, y	Unquoted names or expressions
data	A data frame
expand	Amount to expand the data around its midpoint. Default is 10 per cent.

**Value**

rect\_around() returns a list with names xmin, xmax, ymin, and ymax. hull\_around() returns a data frame with columns x and y.

**Examples**

```
library(ggplot2)
to <- c(2, 4.5, 6, 8)
setosas <- iris[iris$Species == "setosa", ]
rect_around(Sepal.Width, Sepal.Length, data = setosas)
hull_around(Sepal.Width, Sepal.Length, data = setosas)
```

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