

# Package ‘shiny.gosling’

April 1, 2025

**Title** A Grammar-based Toolkit for Scalable and Interactive Genomics  
Data Visualization for R and Shiny

**Version** 1.2.0

**Language** en-US

**Description** A Grammar-based Toolkit for Scalable and Interactive Genomics Data Visualization. <http://gosling-lang.org/>. This R package is based on gosling.js. It uses R functions to create gosling plots that could be embedded onto R Shiny apps.

**License** LGPL-3

**Encoding** UTF-8

**Roxygen** list(markdown = TRUE)

**RoxygenNote** 7.2.1

**biocViews** ShinyApps, Genetics, Visualization

**Imports** htmltools, jsonlite, rlang, shiny, shiny.react, fs, digest,  
rjson

**Suggests** config, covr, knitr, lintr, mockery (>= 0.4.3), rcmdcheck,  
rmarkdown, sessioninfo, spelling, testthat (>= 3.0.0),  
GenomicRanges, VariantAnnotation, StructuralVariantAnnotation,  
biovizBase, ggbio

**VignetteBuilder** knitr

**Config/testthat/edition** 3

**git\_url** <https://git.bioconductor.org/packages/shiny.gosling>

**git\_branch** RELEASE\_3\_20

**git\_last\_commit** 892dca2

**git\_last\_commit\_date** 2024-10-29

**Repository** Bioconductor 3.20

**Date/Publication** 2025-03-31

**Author** Appsilon [aut, cre],  
Anirban Shaw [aut] (<<https://orcid.org/0000-0003-4021-513X>>),  
Federico Rivadeneira [aut] (<<https://orcid.org/0000-0001-7818-1225>>),  
Vedha Viyash [aut]

**Maintainer** Appsilon <[opensource@appsilon.com](mailto:opensource@appsilon.com)>

## Contents

add_file_to_resource_path . . . . .	3
add_mark . . . . .	3
add_multi_tracks . . . . .	4
add_single_track . . . . .	6
arrange_views . . . . .	9
atomic_values_to_list . . . . .	12
brush_styles . . . . .	13
build_json . . . . .	13
component . . . . .	14
compose_view . . . . .	14
default_track_styles . . . . .	17
event_styles . . . . .	21
export_pdf . . . . .	22
export_png . . . . .	24
get_file_track_data . . . . .	26
gosling . . . . .	27
GoslingComponent . . . . .	29
goslingDependency . . . . .	30
goslingOutput . . . . .	30
is_atomic_field . . . . .	32
json_list . . . . .	32
list_rm_null . . . . .	34
print.gosling . . . . .	35
renderGosling . . . . .	35
run_example . . . . .	37
track_data . . . . .	38
track_data_csv . . . . .	41
track_data_gr . . . . .	43
track_data_transform . . . . .	45
track_data_transforms . . . . .	48
use_gosling . . . . .	48
visual_channel . . . . .	50
visual_channel_color . . . . .	51
visual_channel_opacity . . . . .	54
visual_channel_row . . . . .	55
visual_channel_size . . . . .	57
visual_channel_stroke . . . . .	58
visual_channel_stroke_width . . . . .	61
visual_channel_text . . . . .	62
visual_channel_tooltip . . . . .	65
visual_channel_tooltips . . . . .	67
visual_channel_x . . . . .	69
visual_channel_y . . . . .	71
zoom_to . . . . .	74
zoom_to_extent . . . . .	77

---

`add_file_to_resource_path`*Track data object builder for local csv files*

---

**Description**

Get an object for using local csv to build plots

**Usage**

```
add_file_to_resource_path(file_path = NULL, object = NULL)
```

**Arguments**

<code>file_path</code>	A character. Specify the <code>file_path</code> to the local csv file.
<code>object</code>	A gr ranges object.

**Value**

list of data specs for a local csv file

---

`add_mark`*Visual marks*

---

**Description**

Visual marks (e.g., points, lines, and bars) are the basic graphical elements of a visualization.

**Usage**

```
add_mark(  
  x = NULL,  
  xe = NULL,  
  x1 = NULL,  
  x1e = NULL,  
  y = NULL,  
  strokeWidth = NULL,  
  opacity = NULL,  
  row = NULL,  
  size = NULL,  
  color = NULL,  
  stroke = NULL  
)
```

**Arguments**

x	An object returned by <code>visual_channel_x()</code> .
xe	An object returned by <code>visual_channel_x()</code> .
x1	An object returned by <code>visual_channel_x()</code> .
x1e	An object returned by <code>visual_channel_x()</code> .
y	An object returned by <code>visual_channel_y()</code> .
strokeWidth	A number or an object returned by <code>visual_channel_stroke_width()</code> .
opacity	A number or an object returned by <code>visual_channel_opacity()</code> .
row	A factor data column Channel row is used with channel y to stratify a visualization with categorical values.
size	A number or an object returned by <code>visual_channel_size()</code> .
color	A character or an object returned by <code>visual_channel_color()</code> .
stroke	A number or an object returned by <code>visual_channel_stroke()</code> .

**Details**

For info visit <http://gosling-lang.org/docs/mark>

**Value**

list of mark specifications

---

add_multi_tracks	<i>Combine single tracks.</i>
------------------	-------------------------------

---

**Description**

Combine single tracks.

**Usage**

```
add_multi_tracks(...)
```

**Arguments**

... Multiple tracks from `add_single_track()` function.

**Value**

json list.

**Examples**

```

if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  track5_styles <- default_track_styles(
    legendTitle = "SV Class"
  )
  track5_data <- track_data(
    url = "https://s3.amazonaws.com/gosling-lang.org/data/cancer/rearrangement.PD35930a.csv",
    type = "csv",
    genomicFieldsToConvert = json_list(
      json_list(
        chromosomeField = "chr1",
        genomicFields = c("start1", "end1")
      ),
      json_list(
        chromosomeField = "chr2",
        genomicFields = c("start2", "end2")
      )
    )
  )
  track5_tracks <- add_multi_tracks(
    add_single_track(
      mark = "rect"
    ),
    add_single_track(
      mark = "withinLink", x = visual_channel_x(linkingId = "mid-scale"),
      strokeWidth = 0
    )
  )
  track5_color <- visual_channel_color(
    field = "svclass",
    type = "nominal",
    legend = TRUE,
    domain = json_list(
      "tandem-duplication", "translocation", "deletion", "inversion"
    ),
    range = json_list(
      "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
    )
  )
  track5_stroke <- visual_channel_stroke(
    field = "svclass",
    type = "nominal",
    domain = json_list(
      "tandem-duplication", "translocation", "deletion", "inversion"
    ),
    range = json_list(
      "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
    )
  )
  track5_x <- visual_channel_x(field = "start1", type = "genomic")
  track5_xe <- visual_channel_x(field = "end2", type = "genomic")
  track5 <- add_single_track(
    id = "track5", title = "Structural Variant",

```

```

    data = track5_data, mark = "withinLink",
    x = track5_x, xe = track5_xe,
    color = track5_color, width = 500, height = 80, stroke = track5_stroke,
    strokeWidth = 1, opacity = 0.6, style = track5_styles
  )

  composed_track <- compose_view(
    multi = TRUE,
    tracks = add_multi_tracks(
      track5
    ),
    xOffset = 190, layout = "circular", spacing = 1
  )

  composed_views <- arrange_views(
    views = composed_track,
    arrangement = "vertical"
  )

  ui <- fluidPage(
    use_gosling(),
    fluidRow(
      column(6, goslingOutput("gosling_plot"))
    )
  )

  server <- function(input, output, session) {
    output$gosling_plot <- renderGosling({
      gosling(
        component_id = "component_2",
        composed_views, clean_braces = FALSE
      )
    })
  }

  shinyApp(ui, server)
}

```

---

add\_single\_track

*Add a single track*


---

### Description

Add a single track to the plot of a mark type ( plot type ). This function constructs a single track from the inputs. The inputs can be id, data, mark etc. Please check gosling.js documentation for usage.

### Usage

```

add_single_track(
  id = NULL,
  data = NULL,

```

```

    mark = NULL,
    assembly = NULL,
    row = NULL,
    size = NULL,
    color = NULL,
    strokeWidth = NULL,
    opacity = NULL,
    x = NULL,
    xe = NULL,
    x1 = NULL,
    x1e = NULL,
    y = NULL,
    stroke = NULL,
    width = NULL,
    height = NULL,
    dataTransform = NULL,
    ...
)

```

### Arguments

id	Optional argument to assign an id to the track.
data	An object of from track_data() function.
mark	Type of plot. One of c("point", "line", "rect", "bar", "area", "link", "triangle", "text"). Each mark type has some supported visual channel. Different marks support different visual channels: <ul style="list-style-type: none"> <li>• point: x, y, row, size, color, strokeWidth, opacity</li> <li>• line: x, y, row, color, strokeWidth</li> <li>• rect: x, xe, row, color, strokeWidth, opacity</li> <li>• bar: x, y, row, color, strokeWidth, opacity</li> <li>• area: x, y, row, color, strokeWidth</li> <li>• link: x, xe, x1, x1e, color, opacity</li> <li>• triangle: x, xe, row, size, color, opacity</li> <li>• text: x, xe, row, color, opacity</li> </ul> For more info visit <a href="http://gosling-lang.org/tutorials/">http://gosling-lang.org/tutorials/</a>
assembly	Currently support "hg38", "hg19", "hg18", "hg17", "hg16", "mm10", "mm9". Defaults to "hg38".
row	An object of from visual_channel_row().
size	An object of from visual_channel_size() OR an atomic number.
color	An object of from visual_channel_color() OR and atomic character hex code of the form "#123456".
strokeWidth	An object of from visual_channel_stroke_width() OR an atomic number.
opacity	An object of from visual_channel_opacity() OR and atomic ratio from 0 to 1.
x	An object of from visual_channel_x() OR an atomic value.
xe	An object of from visual_channel_x() OR an atomic value.
x1	An object of from visual_channel_x() OR an atomic value.
x1e	An object of from visual_channel_x() OR an atomic value.

y	An object of from visual_channel_y() OR an atomic value.
stroke	An object of from visual_channel_stroke() function OR a character of hex color code like "#123456".
width	A number interpreted in units of pixel.
height	A number interpreted in units of pixel.
dataTransform	An object of from track_data_transform() function.
...	Any other arguments to be passed onto gosling.js.

### Value

list object.

### Examples

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  cistrome_data <-
    "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec"

  single_track <- add_single_track(
    id = "track1",
    data = track_data(
      url = cistrome_data,
      type = "multivec",
      row = "sample",
      column = "position",
      value = "peak",
      categories = c("sample 1", "sample 2", "sample 3", "sample 4"),
      binSize = 4,
    ),
    mark = "rect",
    x = visual_channel_x(field = "start", type = "genomic", axis = "top"),
    xe = visual_channel_x(field = "end", type = "genomic"),
    row = visual_channel_row(
      field = "sample",
      type = "nominal",
      legend = TRUE
    ),
    color = visual_channel_color(
      field = "peak",
      type = "quantitative",
      legend = TRUE
    ),
    tooltip = visual_channel_tooltips(
      visual_channel_tooltip(field = "start", type = "genomic",
        alt = "Start Position"),
      visual_channel_tooltip(field = "end", type = "genomic",
        alt = "End Position"),
      visual_channel_tooltip(
        field = "peak",
        type = "quantitative",
        alt = "Value",
        format = "0.2"
      )
    )
  )
}
```



```

    )
  ),
  width = 600,
  height = 130
)

single_composed_track <- compose_view(
  tracks = single_track
)

single_composed_views <- arrange_views(
  title = "Single Track",
  subtitle = "This is the simplest single track visualization with a linear layout",
  layout = "circular", #"linear"
  views = single_composed_track,
  xDomain = list(
    chromosome = "chr1",
    interval = c(1, 3000500)
  )
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot")),
    column(
      1, br(), actionButton(
        "download_png",
        "PNG",
        icon = icon("cloud-arrow-down")
      )
    )
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_1",
      single_composed_views,
      clean_braces = TRUE
    )
  })

  observeEvent(input$download_png, {
    export_png(component_id = "component_1")
  })
}

shinyApp(ui, server)
}

```

## Description

Arrange views from `compose_view()` function.

## Usage

```
arrange_views(layout = NULL, views = NULL, listify = TRUE, ...)
```

## Arguments

<code>layout</code>	One of "linear" or "circular".
<code>views</code>	An object from <code>compose_view()</code> function.
<code>listify</code>	A Boolean. Convert views to list..
<code>...</code>	More options passed to <code>gosling.js</code> .

## Value

list object.

## Examples

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  # View 2 Track 3----
  view2_track3_data <- track_data(
    url = "https://server.gosling-lang.org/api/v1/tileset_info/?d=NC_045512_2-multivec",
    type = "multivec",
    row = "base",
    column = "position",
    value = "count",
    categories = c("A", "T", "G", "C"),
    start = "start",
    end = "end"
  )

  view2_track3a <- add_single_track(
    mark = "bar",
    y = visual_channel_y(
      field = "count", type = "quantitative", axis = "none"
    )
  )

  view2_track3b <- add_single_track(
    dataTransform = track_data_transform(
      type = "filter",
      field = "count",
      oneOf = list(),
      not = TRUE
    ),
    mark = "text",
    x = visual_channel_x(
      field = "start", type = "genomic"
    ),
    xe = visual_channel_x(
```

```
      field = "end", type = "genomic"
    ),
    size = 24,
    color = "white",
    visibility = list(list(
      operation = "less-than",
      measure = "width",
      threshold = "|xe-x|",
      transitionPadding = 30,
      target = "mark"
    ),
    list(
      operation = "LT",
      measure = "zoomLevel",
      threshold = 40,
      target = "track"
    ))
  )

view2_track3_x <- visual_channel_x(
  field = "position", type = "genomic"
)

view2_track3_color <- visual_channel_color(
  field = "base",
  type = "nominal",
  domain = c("A", "T", "G", "C"),
  legend = TRUE
)

view2_track3_text <- visual_channel_text(
  field = "base", type = "nominal"
)

view2_track3_style <- default_track_styles(
  inlineLegend = TRUE
)

view2_track3 <- add_single_track(
  title = "NC_045512.2 Sequence",
  alignment = "overlay",
  data = view2_track3_data,
  tracks = add_multi_tracks(
    view2_track3a, view2_track3b
  ),
  x = view2_track3_x,
  color = view2_track3_color,
  text = view2_track3_text,
  style = view2_track3_style,
  width = 800, height = 40
)

view2 <- compose_view(
  multi = TRUE,
  centerRadius = 0,
  xDomain = list(interval = c(1, 29903)),
  linkingId = "detail",
```

```

    alignment = "stack",
    tracks = add_multi_tracks(
      view2_track3
    )
  )

combined_view <- arrange_views(
  title = "SARS-CoV-2",
  subtitle = "Data Source: WashU Virus Genome Browser, NCBI, GISAID",
  assembly = list(list("NC_045512.2", 29903)),
  layout = "linear",
  spacing = 50,
  views = list(view2),
  listify = FALSE
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot"))
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "sars_cov2",
      combined_view
    )
  })
}

shinyApp(ui, server)
}

```

---

atomic\_values\_to\_list *atomic\_values\_to\_list*

---

### Description

atomic\_values\_to\_list

### Usage

```
atomic_values_to_list(property_list)
```

### Arguments

`property_list` A character or number or another atomic value.

### Value

List.

---

brush_styles	<i>style of the brush mark</i>
--------------	--------------------------------

---

**Description**

Customize the style of the brush mark in the rangeSelect mouse event.

**Usage**

```
brush_styles(
  strokeWidth = NULL,
  strokeOpacity = NULL,
  stroke = NULL,
  opacity = NULL,
  color = NULL
)
```

**Arguments**

strokeWidth	A number. stroke width of the marks when mouse events are triggered.
strokeOpacity	A number.
stroke	A character. Stroke color of the marks when mouse events are triggered.
opacity	A number. Opacity of the marks when mouse events are triggered.
color	A character. Color of the marks when mouse events are triggered.

**Details**

For more info visit <http://gosling-lang.org/docs/visual-channel/#type-brush>

**Value**

List object with brush styles.

---

build_json	<i>Build gosling spec from R list</i>
------------	---------------------------------------

---

**Description**

Build gosling spec from R list

**Usage**

```
build_json(r_list, clean_braces = TRUE, pretty = TRUE, auto_unbox = TRUE)
```

**Arguments**

r_list	R list object built with other gosling functions
clean_braces	Whether to remove extra square brackets from the json string.
pretty	Whether to get json with indentation, line breaks etc.
auto_unbox	If TRUE will automatically unbox() all atomic vectors of length 1.

**Value**

json spec for the gosling output

---

component	<i>Create react component</i>
-----------	-------------------------------

---

**Description**

Create react component

**Usage**

component(name)

**Arguments**

name	name of the react component
------	-----------------------------

**Value**

function to create react element

---

compose_view	<i>Compose views</i>
--------------	----------------------

---

**Description**

Compose views from add\_single\_track() and add\_multi\_tracks() functions.

**Usage**

```
compose_view(
  multi = FALSE,
  layout = NULL,
  width = NULL,
  height = NULL,
  centerRadius = NULL,
  tracks,
  ...
)
```

**Arguments**

multi	Whether multiple tracks in the view.
layout	One of "linear" or "circular".
width	A number interpreted in units of pixel.
height	A number interpreted in units of pixel.
centerRadius	Specify the proportion of the radius of the center white space. A number between c(0,1), default=0.3
tracks	The tracks with add_multi_tracks() function.
...	More arguments passed along with view to gosling.js.

**Value**

list object.

**Examples**

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  # View 2 Track 3----
  view2_track3_data <- track_data(
    url = "https://server.gosling-lang.org/api/v1/tileset_info/?d=NC_045512_2-multivec",
    type = "multivec",
    row = "base",
    column = "position",
    value = "count",
    categories = c("A", "T", "G", "C"),
    start = "start",
    end = "end"
  )

  view2_track3a <- add_single_track(
    mark = "bar",
    y = visual_channel_y(
      field = "count", type = "quantitative", axis = "none"
    )
  )

  view2_track3b <- add_single_track(
    dataTransform = track_data_transform(
      type = "filter",
      field = "count",
      oneOf = list(),
      not = TRUE
    ),
    mark = "text",
    x = visual_channel_x(
      field = "start", type = "genomic"
    ),
    xe = visual_channel_x(
      field = "end", type = "genomic"
    ),
    size = 24,
    color = "white",
    visibility = list(list(
      operation = "less-than",
      measure = "width",
      threshold = "|xe-x|",
      transitionPadding = 30,
      target = "mark"
    )),
    list(
      operation = "LT",
      measure = "zoomLevel",
      threshold = 40,
      target = "track"
    )
  )
}
```

```

    ))
  )

view2_track3_x <- visual_channel_x(
  field = "position", type = "genomic"
)

view2_track3_color <- visual_channel_color(
  field = "base",
  type = "nominal",
  domain = c("A", "T", "G", "C"),
  legend = TRUE
)

view2_track3_text <- visual_channel_text(
  field = "base", type = "nominal"
)

view2_track3_style <- default_track_styles(
  inlineLegend = TRUE
)

view2_track3 <- add_single_track(
  title = "NC_045512.2 Sequence",
  alignment = "overlay",
  data = view2_track3_data,
  tracks = add_multi_tracks(
    view2_track3a, view2_track3b
  ),
  x = view2_track3_x,
  color = view2_track3_color,
  text = view2_track3_text,
  style = view2_track3_style,
  width = 800, height = 40
)

view2 <- compose_view(
  multi = TRUE,
  centerRadius = 0,
  xDomain = list(interval = c(1, 29903)),
  linkingId = "detail",
  alignment = "stack",
  tracks = add_multi_tracks(
    view2_track3
  )
)

combined_view <- arrange_views(
  title = "SARS-CoV-2",
  subtitle = "Data Source: WashU Virus Genome Browser, NCBI, GISAID",
  assembly = list(list("NC_045512.2", 29903)),
  layout = "linear",
  spacing = 50,
  views = list(view2),
  listify = FALSE
)

```



```
ui <- fluidPage(  
  use_gosling(),  
  fluidRow(  
    column(6, goslingOutput("gosling_plot"))  
  )  
)  
  
server <- function(input, output, session) {  
  output$gosling_plot <- renderGosling({  
    gosling(  
      component_id = "sars_cov2",  
      combined_view  
    )  
  })  
}  
  
shinyApp(ui, server)  
}
```

---

default\_track\_styles *Default styles for tracks*

---

## Description

Default styles for tracks

## Usage

```
default_track_styles(  
  textStrokeWidth = NULL,  
  textStroke = NULL,  
  textFontWeight = NULL,  
  textFontSize = NULL,  
  textAnchor = NULL,  
  select = NULL,  
  outlineWidth = NULL,  
  outline = NULL,  
  mouseOver = NULL,  
  matrixExtent = NULL,  
  linkStyle = NULL,  
  linkMinHeight = NULL,  
  linkConnectionType = NULL,  
  linePattern = NULL,  
  legendTitle = NULL,  
  inlineLegend = NULL,  
  enableSmoothPath = NULL,  
  dy = NULL,  
  dx = NULL,  
  dashed = NULL,  
  curve = NULL,
```

```

brush = NULL,
backgroundOpacity = NULL,
background = NULL,
align = NULL,
...
)

```

## Arguments

textStrokeWidth	A number. Specify the stroke width of text marks. Can also be specified using the strokeWidth channel option of text marks.
textStroke	A character. Specify the stroke of text marks. Can also be specified using the stroke channel option of text marks.
textFontWeight	A character. One of "bold", "normal". Specify the font weight of text marks.
textFontSize	A number. Specify the font size of text marks. Can also be specified using the size channel option of text marks.
textAnchor	A character. One of "start", "middle", "end". Specify the alignment of text marks to a given point.
select	An object returned by event_styles(). Customize visual effects of rangeSelect events on marks.
outlineWidth	A number.
outline	A character.
mouseOver	An object returned by event_styles(). Customize visual effects of mouseOver events on marks.
matrixExtent	A character. One of "full", "upper-right", "lower-left". Determine to show only one side of the diagonal in a HiGlass matrix. Default: "full".
linkStyle	A character. One of "elliptical", "circular", "straight", "experimentalEdgeBundling". The style of withinLink and betweenLink marks. Default: 'circular' 'elliptical' will be used as a default option.
linkMinHeight	A number. The minimum height of withinLink and betweenLink marks. Unit is a percentage Default: 0.5.
linkConnectionType	A character. One of "straight", "curve", "corner". Specify the connection type of betweenLink marks. Default: "corner".
linePattern	A list of the form list(size="number",type="string"). One of "triangleLeft", "triangleRight".) Specify the pattern of dashes and gaps for rule marks.
legendTitle	A character. If defined, show legend title on the top or left.
inlineLegend	A Boolean. Specify whether to show legend in a single horizontal line?
enableSmoothPath	A Boolean. Whether to enable smooth paths when drawing curves. Default: FALSE.
dy	A number. Offset the position of marks in y direction. This property is currently only supported for text marks.
dx	A number. Offset the position of marks in x direction. This property is currently only supported for text marks.
dashed	An vector of number like c(1, 2). Specify the pattern of dashes and gaps for rule marks.

curve	A character. One of "top", "bottom", "left", "right". Specify the curve of rule marks.
brush	An object returned by brush_styles(). Customize the style of the brush mark in the rangeSelect mouse event.
backgroundOpacity	A number.
background	A character.
align	A character. One of "left", "right". Specify the alignment of marks. This property is currently only supported for triangle marks.
...	Any other styles to be passed to gosling.js.

### Details

For more info visit <http://gosling-lang.org/docs/visual-channel/#style-related-properties>

### Value

List object with default styles.

### Examples

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  track5_styles <- default_track_styles(
    legendTitle = "SV Class"
  )
  track5_data <- track_data(
    url = "https://s3.amazonaws.com/gosling-lang.org/data/cancer/rearrangement.PD35930a.csv",
    type = "csv",
    genomicFieldsToConvert = json_list(
      json_list(
        chromosomeField = "chr1",
        genomicFields = c("start1", "end1")
      ),
      json_list(
        chromosomeField = "chr2",
        genomicFields = c("start2", "end2")
      )
    )
  )
  track5_tracks <- add_multi_tracks(
    add_single_track(
      mark = "rect"
    ),
    add_single_track(
      mark = "withinLink", x = visual_channel_x(linkingId = "mid-scale"),
      strokeWidth = 0
    )
  )
  track5_color <- visual_channel_color(
    field = "svclass",
    type = "nominal",
    legend = TRUE,
  )
}
```

```

domain = json_list(
  "tandem-duplication", "translocation", "deletion", "inversion"
),
range = json_list(
  "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
)
)
)
track5_stroke <- visual_channel_stroke(
  field = "svclass",
  type = "nominal",
  domain = json_list(
    "tandem-duplication", "translocation", "deletion", "inversion"
  ),
  range = json_list(
    "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
  )
)
)
track5_x <- visual_channel_x(field = "start1", type = "genomic")
track5_xe <- visual_channel_x(field = "end2", type = "genomic")
track5 <- add_single_track(
  id = "track5", title = "Structural Variant",
  data = track5_data, mark = "withinLink",
  x = track5_x, xe = track5_xe,
  color = track5_color, width = 500, height = 80, stroke = track5_stroke,
  strokeWidth = 1, opacity = 0.6, style = track5_styles
)
)

composed_track <- compose_view(
  multi = TRUE,
  tracks = add_multi_tracks(
    track5
  ),
  xOffset = 190, layout = "circular", spacing = 1
)
)

composed_views <- arrange_views(
  views = composed_track,
  arrangement = "vertical"
)
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot"))
  )
)
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_2",
      composed_views, clean_braces = FALSE
    )
  })
}
}

```

```
    shinyApp(ui, server)
  }
```

---

event\_styles      *Mouse event styles*

---

### Description

The styles defined here will be applied to the targets of mouse events, such as a point mark after user click mouse.

### Usage

```
event_styles(  
  strokeWidth = NULL,  
  strokeOpacity = NULL,  
  stroke = NULL,  
  opacity = NULL,  
  color = NULL,  
  arrange = NULL  
)
```

### Arguments

strokeWidth	A number. stroke width of the marks when mouse events are triggered.
strokeOpacity	A number.
stroke	A character. Stroke color of the marks when mouse events are triggered.
opacity	A number. Opacity of the marks when mouse events are triggered.
color	A character. Color of the marks when mouse events are triggered.
arrange	A character. One of "behind", "front". Show event effects behind or in front of marks.

### Details

For more info visit <http://gosling-lang.org/docs/visual-channel/#type-eventstyle>

### Value

List object with event styles.

---

`export_pdf`*Export PDF*

---

**Description**

Exports PDF

**Usage**

```
export_pdf(  
  component_id,  
  transparent_background = FALSE,  
  session = getDefaultReactiveDomain()  
)
```

**Arguments**

`component_id` A character. The id of the `component_id` prop passed to the `GoslingComponent` function.

`transparent_background` A Boolean. Determine if the background should be transparent or not (Default: `false`).

`session` A shiny session object.

**Value**

None.

**Examples**

```
if(interactive()) {  
  library(shiny)  
  library(shiny.gosling)  
  
  cistrome_data <-  
    "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec"  
  
  single_track <- add_single_track(  
    id = "track1",  
    data = track_data(  
      url = cistrome_data,  
      type = "multivec",  
      row = "sample",  
      column = "position",  
      value = "peak",  
      categories = c("sample 1", "sample 2", "sample 3", "sample 4"),  
      binSize = 4,  
    ),  
    mark = "rect",  
    x = visual_channel_x(field = "start", type = "genomic", axis = "top"),  
    xe = visual_channel_x(field = "end", type = "genomic"),  
    row = visual_channel_row(  
      field = "sample",
```

```

    type = "nominal",
    legend = TRUE
  ),
  color = visual_channel_color(
    field = "peak",
    type = "quantitative",
    legend = TRUE
  ),
  tooltip = visual_channel_tooltips(
    visual_channel_tooltip(field = "start", type = "genomic",
                          alt = "Start Position"),
    visual_channel_tooltip(field = "end", type = "genomic",
                          alt = "End Position"),
    visual_channel_tooltip(
      field = "peak",
      type = "quantitative",
      alt = "Value",
      format = "0.2"
    )
  ),
  width = 600,
  height = 130
)

single_composed_track <- compose_view(
  tracks = single_track
)

single_composed_views <- arrange_views(
  title = "Single Track",
  subtitle = "This is the simplest single track visualization with a linear layout",
  layout = "circular", #"linear"
  views = single_composed_track,
  xDomain = list(
    chromosome = "chr1",
    interval = c(1, 3000500)
  )
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot")),
    column(
      1, br(), actionButton(
        "download_pdf",
        "PDF",
        icon = icon("cloud-arrow-down")
      )
    )
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(

```

```

      component_id = "component_1",
      single_composed_views,
      clean_braces = TRUE
    )
  })

  observeEvent(input$download_pdf, {
    export_pdf(component_id = "component_1")
  })
}

shinyApp(ui, server)
}

```

---

 export\_png

*Export PNG*


---

### Description

Exports PNG

### Usage

```

export_png(
  component_id,
  transparent_background = FALSE,
  session = getDefaultReactiveDomain()
)

```

### Arguments

component_id	A character. The id of the component_id prop passed to the GoslingComponent function.
transparent_background	A Boolean. Determine if the background should be transparent or not (Default: false).
session	A shiny session object.

### Value

None.

### Examples

```

if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  cistrome_data <-
    "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec"

```



```

single_track <- add_single_track(
  id = "track1",
  data = track_data(
    url = cistrome_data,
    type = "multivec",
    row = "sample",
    column = "position",
    value = "peak",
    categories = c("sample 1", "sample 2", "sample 3", "sample 4"),
    binSize = 4,
  ),
  mark = "rect",
  x = visual_channel_x(field = "start", type = "genomic", axis = "top"),
  xe = visual_channel_x(field = "end", type = "genomic"),
  row = visual_channel_row(
    field = "sample",
    type = "nominal",
    legend = TRUE
  ),
  color = visual_channel_color(
    field = "peak",
    type = "quantitative",
    legend = TRUE
  ),
  tooltip = visual_channel_tooltips(
    visual_channel_tooltip(field = "start", type = "genomic",
      alt = "Start Position"),
    visual_channel_tooltip(field = "end", type = "genomic",
      alt = "End Position"),
    visual_channel_tooltip(
      field = "peak",
      type = "quantitative",
      alt = "Value",
      format = "0.2"
    )
  ),
  width = 600,
  height = 130
)

single_composed_track <- compose_view(
  tracks = single_track
)

single_composed_views <- arrange_views(
  title = "Single Track",
  subtitle = "This is the simplest single track visualization with a linear layout",
  layout = "circular", #"linear"
  views = single_composed_track,
  xDomain = list(
    chromosome = "chr1",
    interval = c(1, 3000500)
  )
)

ui <- fluidPage(
  use_gosling(),

```

```

fluidRow(
  column(6, goslingOutput("gosling_plot")),
  column(
    1, br(), actionButton(
      "download_png",
      "PNG",
      icon = icon("cloud-arrow-down")
    )
  )
)
)
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_1",
      single_composed_views,
      clean_braces = TRUE
    )
  })

  observeEvent(input$download_png, {
    export_png(component_id = "component_1")
  })
}

shinyApp(ui, server)
}

```

---

get\_file\_track\_data    *Track data object builder for local csv files*

---

### Description

Get an object for using local csv to build plots

### Usage

```

get_file_track_data(
  file_name,
  chromosomeField = NULL,
  genomicFields = NULL,
  separator = ",",
  sampleLength = 1000,
  headerNames = NULL,
  ...
)

```

**Arguments**

<code>file_name</code>	A character. Specify the <code>file_name</code> .
<code>chromosomeField</code>	A character. Specify the name of chromosome data fields.
<code>genomicFields</code>	A character vector. Specify the name of genomic data fields.
<code>separator</code>	A character. Specify file separator, Default: <code>'</code>
<code>sampleLength</code>	A number. Specify the number of rows loaded from the URL. Default: 1000
<code>headerNames</code>	A character vector. Specify the names of data fields if a CSV file does not have header row.
<code>...</code>	Any other parameters passed to json data object.

**Value**

list of data specs for a local csv file

---

<code>gosling</code>	<i>Build gosling plot object</i>
----------------------	----------------------------------

---

**Description**

Build gosling plot object

**Usage**

```
gosling(component_id, composed_views, clean_braces = TRUE)
```

**Arguments**

<code>component_id</code>	Assign a component id to use other api like zoom.
<code>composed_views</code>	The views composed with <code>arrange_views</code> .
<code>clean_braces</code>	Whether to remove extra square brackets from the json string.

**Value**

Gosling component for rendering on R shiny apps

**Examples**

```
if (interactive()) {
  library(shiny)
  library(shiny.gosling)

  # Circular track 1 ----
  circular_track1_data <- track_data(
    url = "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec",
    type = "multivec",
    row = "sample",
    column = "position",
    value = "peak",
    categories = c("sample 1", "sample 2", "sample 3", "sample 4"),
```

```

    binSize = 4
  )

  circular_track1_x <- visual_channel_x(field = "start", type = "genomic")
  circular_track1_xe <- visual_channel_x(field = "end", type = "genomic")

  circular_track1_y <- visual_channel_y(field = "peak", type = "quantitative")

  circular_track1_row <- visual_channel_row(
    field = "sample", type = "nominal"
  )

  circular_track1_color <- visual_channel_color(
    field = "sample", type = "nominal"
  )

  circular_track1_tracks <- add_multi_tracks(
    add_single_track(
      mark = "bar"
    ),
    add_single_track(
      mark = "brush",
      x = visual_channel_x(linkingId = "detail-1"),
      color = "blue"
    ),
    add_single_track(
      mark = "brush",
      x = visual_channel_x(linkingId = "detail-2"),
      color = "red"
    )
  )

  circular_track1_styles <- default_track_styles(
    outlineWidth = 0
  )

  circular_track1 <- add_single_track(
    id = "circular_track1", alignment = "overlay", data = circular_track1_data,
    x = circular_track1_x, xe = circular_track1_xe,
    y = circular_track1_y, row = circular_track1_row,
    color = circular_track1_color,
    stroke = "black", strokeWidth = 0.3,
    tracks = circular_track1_tracks,
    style = circular_track1_styles,
    width = 500, height = 100
  )

  # Compose Circular track ----
  circular_composed_view <- compose_view(
    multi = TRUE,
    tracks = add_multi_tracks(
      circular_track1
    ),
    static = TRUE, layout = "circular", alignment = "stack"
  )

  # Arrange final view

```

```
circular_linear_view <- arrange_views(  
  arrangement = "horizontal",  
  views = list(circular_composed_view)  
)  
  
ui <- fluidPage(  
  use_gosling(),  
  fluidRow(  
    column(6, goslingOutput("gosling_plot"))  
  )  
)  
  
server <- function(input, output, session) {  
  output$gosling_plot <- renderGosling({  
    gosling(  
      component_id = "circular_component",  
      circular_linear_view, clean_braces = FALSE  
    )  
  })  
}  
  
shinyApp(ui, server)  
}
```

---

GoslingComponent	<i>Create Gosling component</i>
------------------	---------------------------------

---

## Description

Create Gosling component

## Usage

```
GoslingComponent(...)
```

## Arguments

...                    Name of component.

## Value

A function to create the gosling component.

---

goslingDependency      *Setup gosling dependencies*

---

**Description**

Setup gosling dependencies

**Usage**

```
goslingDependency()
```

**Value**

list of dependencies for Gosling

---

goslingOutput      *gosling output function*

---

**Description**

gosling output function for shiny use. Must use this function instead of shiny output functions.

**Usage**

```
goslingOutput(outputId)
```

**Arguments**

outputId      ID of the output element

**Value**

reactOutput HTML for UI render

**Examples**

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  track5_styles <- default_track_styles(
    legendTitle = "SV Class"
  )
  track5_data <- track_data(
    url = "https://s3.amazonaws.com/gosling-lang.org/data/cancer/rearrangement.PD35930a.csv",
    type = "csv",
    genomicFieldsToConvert = json_list(
      json_list(
        chromosomeField = "chr1",
        genomicFields = c("start1", "end1")
      ),
    ),
```

```

    json_list(
      chromosomeField = "chr2",
      genomicFields = c("start2", "end2")
    )
  )
)
track5_tracks <- add_multi_tracks(
  add_single_track(
    mark = "rect"
  ),
  add_single_track(
    mark = "withinLink", x = visual_channel_x(linkingId = "mid-scale"),
    strokeWidth = 0
  )
)
track5_color <- visual_channel_color(
  field = "svclass",
  type = "nominal",
  legend = TRUE,
  domain = json_list(
    "tandem-duplication", "translocation", "deletion", "inversion"
  ),
  range = json_list(
    "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
  )
)
track5_stroke <- visual_channel_stroke(
  field = "svclass",
  type = "nominal",
  domain = json_list(
    "tandem-duplication", "translocation", "deletion", "inversion"
  ),
  range = json_list(
    "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
  )
)
track5_x <- visual_channel_x(field = "start1", type = "genomic")
track5_xe <- visual_channel_x(field = "end2", type = "genomic")
track5 <- add_single_track(
  id = "track5", title = "Structural Variant",
  data = track5_data, mark = "withinLink",
  x = track5_x, xe = track5_xe,
  color = track5_color, width = 500, height = 80, stroke = track5_stroke,
  strokeWidth = 1, opacity = 0.6, style = track5_styles
)

composed_track <- compose_view(
  multi = TRUE,
  tracks = add_multi_tracks(
    track5
  ),
  xOffset = 190, layout = "circular", spacing = 1
)

composed_views <- arrange_views(
  views = composed_track,
  arrangement = "vertical"
)

```

```

)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot"))
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_2",
      composed_views, clean_braces = FALSE
    )
  })
}

shinyApp(ui, server)
}

```

---

is_atomic_field	<i>is_atomic_field</i>
-----------------	------------------------

---

**Description**

is\_atomic\_field

**Usage**

```
is_atomic_field(field_name)
```

**Arguments**

field\_name      A character or number or another atomic value.

**Value**

List.

---

json_list	<i>Create list</i>
-----------	--------------------

---

**Description**

Create list

**Usage**

```
json_list(...)
```



**Arguments**

...                   Items to be put in a list

**Value**

list of items

**Examples**

```
if (interactive()) {
  library(shiny)
  library(shiny.gosling)

  track5_styles <- default_track_styles(
    legendTitle = "SV Class"
  )
  track5_data <- track_data(
    url = "https://s3.amazonaws.com/gosling-lang.org/data/cancer/rearrangement.PD35930a.csv",
    type = "csv",
    genomicFieldsToConvert = json_list(
      json_list(
        chromosomeField = "chr1",
        genomicFields = c("start1", "end1")
      ),
      json_list(
        chromosomeField = "chr2",
        genomicFields = c("start2", "end2")
      )
    )
  )
  track5_tracks <- add_multi_tracks(
    add_single_track(
      mark = "rect"
    ),
    add_single_track(
      mark = "withinLink", x = visual_channel_x(linkingId = "mid-scale"),
      strokeWidth = 0
    )
  )
  track5_color <- visual_channel_color(
    field = "svclass",
    type = "nominal",
    legend = TRUE,
    domain = json_list(
      "tandem-duplication", "translocation", "deletion", "inversion"
    ),
    range = json_list(
      "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
    )
  )
  track5_stroke <- visual_channel_stroke(
    field = "svclass",
    type = "nominal",
    domain = json_list(
      "tandem-duplication", "translocation", "deletion", "inversion"
    ),
  )
}
```

```

    range = json_list(
      "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
    )
  )
  track5_x <- visual_channel_x(field = "start1", type = "genomic")
  track5_xe <- visual_channel_x(field = "end2", type = "genomic")
  track5 <- add_single_track(
    id = "track5", title = "Structural Variant",
    data = track5_data, mark = "withinLink",
    x = track5_x, xe = track5_xe,
    color = track5_color, width = 500, height = 80, stroke = track5_stroke,
    strokeWidth = 1, opacity = 0.6, style = track5_styles
  )

  composed_track <- compose_view(
    multi = TRUE,
    tracks = add_multi_tracks(
      track5
    ),
    xOffset = 190, layout = "circular", spacing = 1
  )

  composed_views <- arrange_views(
    views = composed_track,
    arrangement = "vertical"
  )

  ui <- fluidPage(
    use_gosling(),
    fluidRow(
      column(6, goslingOutput("gosling_plot"))
    )
  )

  server <- function(input, output, session) {
    output$gosling_plot <- renderGosling({
      gosling(
        component_id = "component_2",
        composed_views, clean_braces = FALSE
      )
    })
  }

  shinyApp(ui, server)
}

```

---

list\_rm\_null

*Remove null from list*


---

### Description

Remove null from list

**Usage**

```
list_rm_null(r_list)
```

**Arguments**

`r_list` An r list with NULL values

**Value**

r list without NULL values

---

print.gosling	<i>Print method for the gosling component</i>
---------------	---

---

**Description**

Print method for the gosling component

**Usage**

```
## S3 method for class 'gosling'
print(x, ...)
```

**Arguments**

`x` A gosling object  
`...` further arguments passed to or from other methods.

**Value**

r list without NULL values

---

renderGosling	<i>gosling render function</i>
---------------	--------------------------------

---

**Description**

gosling render function for shiny use

**Usage**

```
renderGosling(expr, env = parent.frame(), quoted = FALSE)
```

**Arguments**

`expr` Expression returning the HTML / 'React' to render.  
`env` Environment in which to evaluate expr.  
`quoted` Is expr a quoted expression?

**Value**

A function which can be assigned to an output in a Shiny server function.

**Examples**

```

if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  track5_styles <- default_track_styles(
    legendTitle = "SV Class"
  )
  track5_data <- track_data(
    url = "https://s3.amazonaws.com/gosling-lang.org/data/cancer/rearrangement.PD35930a.csv",
    type = "csv",
    genomicFieldsToConvert = json_list(
      json_list(
        chromosomeField = "chr1",
        genomicFields = c("start1", "end1")
      ),
      json_list(
        chromosomeField = "chr2",
        genomicFields = c("start2", "end2")
      )
    )
  )
  track5_tracks <- add_multi_tracks(
    add_single_track(
      mark = "rect"
    ),
    add_single_track(
      mark = "withinLink", x = visual_channel_x(linkingId = "mid-scale"),
      strokeWidth = 0
    )
  )
  track5_color <- visual_channel_color(
    field = "svclass",
    type = "nominal",
    legend = TRUE,
    domain = json_list(
      "tandem-duplication", "translocation", "deletion", "inversion"
    ),
    range = json_list(
      "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
    )
  )
  track5_stroke <- visual_channel_stroke(
    field = "svclass",
    type = "nominal",
    domain = json_list(
      "tandem-duplication", "translocation", "deletion", "inversion"
    ),
    range = json_list(
      "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
    )
  )
}

```

```

track5_x <- visual_channel_x(field = "start1", type = "genomic")
track5_xe <- visual_channel_x(field = "end2", type = "genomic")
track5 <- add_single_track(
  id = "track5", title = "Structural Variant",
  data = track5_data, mark = "withinLink",
  x = track5_x, xe = track5_xe,
  color = track5_color, width = 500, height = 80, stroke = track5_stroke,
  strokeWidth = 1, opacity = 0.6, style = track5_styles
)

composed_track <- compose_view(
  multi = TRUE,
  tracks = add_multi_tracks(
    track5
  ),
  xOffset = 190, layout = "circular", spacing = 1
)

composed_views <- arrange_views(
  views = composed_track,
  arrangement = "vertical"
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot"))
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_2",
      composed_views, clean_braces = FALSE
    )
  })
}

shinyApp(ui, server)
}

```

---

run\_example

*Runs a shiny.gosling example*


---

### Description

Runs a shiny.gosling example

### Usage

```
run_example(example = NA)
```

**Arguments**

example            A character indicating a valid example.

**Value**

A Shiny App is launched.

**Examples**

```
if (interactive()) {
  run_example("circularLinearWithBrush")
}
```

---

track\_data

*Data object builder*

---

**Description**

Build the data object for gosling plots

**Usage**

```
track_data(
  url = NULL,
  type,
  separator = NULL,
  sampleLength = NULL,
  headerNames = NULL,
  genomicFields = NULL,
  chromosomeField = NULL,
  genomicFieldsToConvert = NULL,
  ...
)
```

**Arguments**

url            A character. Specify the URL address of the data file.

type           A character. Type of data. One of "csv", "json", "bigwig", "bam", "vcf", "vector", "multivec" and "beddb". For usage refer to <http://gosling-lang.org/docs/data#supported-data-formats>.

separator      A character. Specify file separator, Default: ','

sampleLength   A number. Specify the number of rows loaded from the URL. Default: 1000

headerNames    A character vector. Specify the names of data fields if a CSV file does not have header row.

genomicFields   A character vector. Specify the name of genomic data fields.

chromosomeField   A character. Specify the name of chromosome data fields.

genomicFieldsToConvert   Define the genomic fields from the data in list format. Experimental Property. Each object follows the format "chromosomeField":"string","genomicFields":"string[]"

( )

...            Any other parameters passed to json data object.

**Details**

For info visit <http://gosling-lang.org/docs/data>. Check the various supported data formats and their parameters. All of them can be constructed using this function.

**Value**

list of data specs

**Examples**

```
if (interactive()) {
  library(shiny)
  library(shiny.gosling)

  # View 2 Track 3----
  view2_track3_data <- track_data(
    url = "https://server.gosling-lang.org/api/v1/tileset_info/?d=NC_045512_2-multivec",
    type = "multivec",
    row = "base",
    column = "position",
    value = "count",
    categories = c("A", "T", "G", "C"),
    start = "start",
    end = "end"
  )

  view2_track3a <- add_single_track(
    mark = "bar",
    y = visual_channel_y(
      field = "count", type = "quantitative", axis = "none"
    )
  )

  view2_track3b <- add_single_track(
    dataTransform = track_data_transform(
      type = "filter",
      field = "count",
      oneOf = list(),
      not = TRUE
    ),
    mark = "text",
    x = visual_channel_x(
      field = "start", type = "genomic"
    ),
    xe = visual_channel_x(
      field = "end", type = "genomic"
    ),
    size = 24,
    color = "white",
    visibility = list(
      list(
        operation = "less-than",
        measure = "width",
        threshold = "|xe-x|",
        transitionPadding = 30,
        target = "mark"
      )
    )
  )
}
```

```

    ),
    list(
      operation = "LT",
      measure = "zoomLevel",
      threshold = 40,
      target = "track"
    )
  )
)

view2_track3_x <- visual_channel_x(
  field = "position", type = "genomic"
)

view2_track3_color <- visual_channel_color(
  field = "base",
  type = "nominal",
  domain = c("A", "T", "G", "C"),
  legend = TRUE
)

view2_track3_text <- visual_channel_text(
  field = "base", type = "nominal"
)

view2_track3_style <- default_track_styles(
  inlineLegend = TRUE
)

view2_track3 <- add_single_track(
  title = "NC_045512.2 Sequence",
  alignment = "overlay",
  data = view2_track3_data,
  tracks = add_multi_tracks(
    view2_track3a, view2_track3b
  ),
  x = view2_track3_x,
  color = view2_track3_color,
  text = view2_track3_text,
  style = view2_track3_style,
  width = 800, height = 40
)

view2 <- compose_view(
  multi = TRUE,
  centerRadius = 0,
  xDomain = list(interval = c(1, 29903)),
  linkingId = "detail",
  alignment = "stack",
  tracks = add_multi_tracks(
    view2_track3
  )
)

combined_view <- arrange_views(
  title = "SARS-CoV-2",
  subtitle = "Data Source: WashU Virus Genome Browser, NCBI, GISAID",

```



```

    assembly = list(list("NC_045512.2", 29903)),
    layout = "linear",
    spacing = 50,
    views = list(view2),
    listify = FALSE
  )

  ui <- fluidPage(
    use_gosling(),
    fluidRow(
      column(6, goslingOutput("gosling_plot"))
    )
  )

  server <- function(input, output, session) {
    output$gosling_plot <- renderGosling({
      gosling(
        component_id = "sars_cov2",
        combined_view
      )
    })
  }

  shinyApp(ui, server)
}

```

---

track\_data\_csv

*Data object builder for a csv file*


---

## Description

Build the data object for gosling plots

## Usage

```

track_data_csv(
  file,
  genomicFields = NULL,
  chromosomeField = NULL,
  separator = ",",
  sampleLength = 1000,
  headerNames = NULL,
  ...
)

```

## Arguments

file	A character. Specify the URL address or local file name in the www directory of the data file.
genomicFields	A character vector. Specify the name of genomic data fields.
chromosomeField	A character. Specify the name of chromosome data fields.

separator	A character. Specify file separator, Default: ','
sampleLength	A number. Specify the number of rows loaded from the URL. Default: 1000
headerNames	A character vector. Specify the names of data fields if a CSV file does not have header row.
...	Any other parameters passed to json data object.

### Value

list of data specs for a csv file

### Examples

```

if (interactive()) {
  library(shiny.gosling)
  library(shiny)
  library(GenomicRanges)

  url <- "https://rb.gy/7y3fx"
  temp_file <- file.path(tempdir(), "GSM1295076_CBX6_BF_ChipSeq_mergedReps_peaks.bed.gz")
  download.file(url, destfile = temp_file)
  df <- read.delim(
    temp_file,
    header = FALSE,
    comment.char = "#"
  )
  gr <- GRanges(
    seqnames = df$V1,
    ranges = IRanges(df$V2, df$V3)
  )

  if (!dir.exists("data")) {
    dir.create("data")
  }
  utils::write.csv(gr, "data/ChipSeqPeaks.csv", row.names = FALSE)

  ui <- fluidPage(
    use_gosling(clear_files = FALSE),
    goslingOutput("gosling_plot")
  )

  track_1 <- add_single_track(
    width = 800,
    height = 180,
    data = track_data_csv(
      "data/ChipSeqPeaks.csv", chromosomeField = "seqnames",
      genomicFields = c("start", "end")
    ),
    mark = "bar",
    x = visual_channel_x(
      field = "start", type = "genomic", axis = "bottom"
    ),
    xe = visual_channel_x(field = "end", type = "genomic"),
    y = visual_channel_y(
      field = "width", type = "quantitative", axis = "right"
    ),
    size = list(value = 5)
  )

```

```

)

composed_view <- compose_view(
  layout = "linear",
  tracks = track_1
)

arranged_view <- arrange_views(
  title = "Basic Marks: bar",
  subtitle = "Tutorial Examples",
  views = composed_view
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_1",
      arranged_view
    )
  })
}

shiny::shinyApp(ui, server)
}

```

---

track\_data\_gr

*Data object builder for a GRanges object by locally saving it*


---

## Description

Build the data object for gosling plots

## Usage

```

track_data_gr(
  granges,
  chromosomeField = NULL,
  genomicFields = NULL,
  separator = ",",
  sampleLength = 1000,
  headerNames = NULL,
  ...
)

```

## Arguments

granges	A GRanges object from the GenomicRanges package with seqnames and ranges
chromosomeField	A character. Specify the name of chromosome data fields.
genomicFields	A character vector. Specify the name of genomic data fields.
separator	A character. Specify file separator, Default: ','

sampleLength	A number. Specify the number of rows loaded from the URL. Default: 1000
headerNames	A character vector. Specify the names of data fields if a CSV file does not have header row.
...	Any other parameters passed to json data object.

**Value**

list of data specs for a csv file

**Examples**

```

if (interactive()) {
  library(shiny.gosling)
  library(shiny)
  library(GenomicRanges)

  url <- "https://rb.gy/7y3fx"
  temp_file <- file.path(tempdir(), "GSM1295076_CBX6_BF_ChipSeq_mergedReps_peaks.bed.gz")
  download.file(url, destfile = temp_file)
  df <- read.delim(
    temp_file,
    header = FALSE,
    comment.char = "#"
  )
  gr <- GRanges(
    seqnames = df$V1,
    ranges = IRanges(df$V2, df$V3)
  )

  ui <- fluidPage(
    use_gosling(clear_files = FALSE),
    goslingOutput("gosling_plot")
  )

  track_1 <- add_single_track(
    width = 800,
    height = 180,
    data = track_data_gr(
      gr, chromosomeField = "seqnames",
      genomicFields = c("start", "end")
    ),
    mark = "bar",
    x = visual_channel_x(
      field = "start", type = "genomic", axis = "bottom"
    ),
    xe = visual_channel_x(field = "end", type = "genomic"),
    y = visual_channel_y(
      field = "width", type = "quantitative", axis = "right"
    ),
    size = list(value = 5)
  )

  composed_view <- compose_view(
    layout = "linear",
    tracks = track_1
  )
}

```

```

arranged_view <- arrange_views(
  title = "Basic Marks: bar",
  subtitle = "Tutorial Examples",
  views = composed_view
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_1",
      arranged_view
    )
  })
}

shiny::shinyApp(ui, server)
}

```

---

track\_data\_transform *Data transformer*

---

## Description

Do data transformations

## Usage

```
track_data_transform(type = NULL, field = NULL, oneOf = NULL, not = NULL, ...)
```

## Arguments

type	A character. One of "filter", "concat", "replace", "log", "displace", "exonSplit", "coverage", "genomicLength", "svType" and "subjson". Check usage details at <a href="http://gosling-lang.org/docs/data/#data-transform">http://gosling-lang.org/docs/data/#data-transform</a> .
field	A character. filter is applied based on the values of the specified data field.
oneOf	A vector of characters or numbers. Check whether the value is an element in the provided list.
not	A Boolean. When "not": true, apply a NOT logical operation to the filter. Default: false.
...	Any other parameters to pass to gosling.js.

## Details

For info visit <http://gosling-lang.org/docs/data#data-transform> There are multiple ways to transform data. Check documentation for details of usage.

## Value

list of data transformations specs

**Examples**

```

if (interactive()) {
  library(shiny)
  library(shiny.gosling)

  # View 2 Track 3----
  view2_track3_data <- track_data(
    url = "https://server.gosling-lang.org/api/v1/tileset_info/?d=NC_045512_2-multivec",
    type = "multivec",
    row = "base",
    column = "position",
    value = "count",
    categories = c("A", "T", "G", "C"),
    start = "start",
    end = "end"
  )

  view2_track3a <- add_single_track(
    mark = "bar",
    y = visual_channel_y(
      field = "count", type = "quantitative", axis = "none"
    )
  )

  view2_track3b <- add_single_track(
    dataTransform = track_data_transform(
      type = "filter",
      field = "count",
      oneOf = list(),
      not = TRUE
    ),
    mark = "text",
    x = visual_channel_x(
      field = "start", type = "genomic"
    ),
    xe = visual_channel_x(
      field = "end", type = "genomic"
    ),
    size = 24,
    color = "white",
    visibility = list(
      list(
        operation = "less-than",
        measure = "width",
        threshold = "|xe-x|",
        transitionPadding = 30,
        target = "mark"
      ),
      list(
        operation = "LT",
        measure = "zoomLevel",
        threshold = 40,
        target = "track"
      )
    )
  )
}

```

```
view2_track3_x <- visual_channel_x(  
  field = "position", type = "genomic"  
)  
  
view2_track3_color <- visual_channel_color(  
  field = "base",  
  type = "nominal",  
  domain = c("A", "T", "G", "C"),  
  legend = TRUE  
)  
  
view2_track3_text <- visual_channel_text(  
  field = "base", type = "nominal"  
)  
  
view2_track3_style <- default_track_styles(  
  inlineLegend = TRUE  
)  
  
view2_track3 <- add_single_track(  
  title = "NC_045512.2 Sequence",  
  alignment = "overlay",  
  data = view2_track3_data,  
  tracks = add_multi_tracks(  
    view2_track3a, view2_track3b  
  ),  
  x = view2_track3_x,  
  color = view2_track3_color,  
  text = view2_track3_text,  
  style = view2_track3_style,  
  width = 800, height = 40  
)  
  
view2 <- compose_view(  
  multi = TRUE,  
  centerRadius = 0,  
  xDomain = list(interval = c(1, 29903)),  
  linkingId = "detail",  
  alignment = "stack",  
  tracks = add_multi_tracks(  
    view2_track3  
  )  
)  
  
combined_view <- arrange_views(  
  title = "SARS-CoV-2",  
  subtitle = "Data Source: WashU Virus Genome Browser, NCBI, GISAID",  
  assembly = list(list("NC_045512.2", 29903)),  
  layout = "linear",  
  spacing = 50,  
  views = list(view2),  
  listify = FALSE  
)  
  
ui <- fluidPage(  
  use_gosling(),
```

```

    fluidRow(
      column(6, goslingOutput("gosling_plot"))
    )
  )

  server <- function(input, output, session) {
    output$gosling_plot <- renderGosling({
      gosling(
        component_id = "sars_cov2",
        combined_view
      )
    })
  }

  shinyApp(ui, server)
}

```

---

track\_data\_transforms *Combine multiple data transforms*

---

### Description

Combine multiple data transforms

### Usage

```
track_data_transforms(...)
```

### Arguments

... Multiple data transform specs separated by comma.

### Value

list of multiple data transform specs

---

use\_gosling *Initiate gosling*

---

### Description

Add this function at the beginning of ui. This is needed for gosling to work in shiny plots.

### Usage

```
use_gosling(clear_files = TRUE)
```

### Arguments

clear\_files default FALSE. To clear the locally stored csv files created by gosling or not.



**Value**

Gosling initiator HTML.

**Examples**

```

if (interactive()) {
  library(shiny)
  library(shiny.gosling)

  track5_styles <- default_track_styles(
    legendTitle = "SV Class"
  )
  track5_data <- track_data(
    url = "https://s3.amazonaws.com/gosling-lang.org/data/cancer/rearrangement.PD35930a.csv",
    type = "csv",
    genomicFieldsToConvert = json_list(
      json_list(
        chromosomeField = "chr1",
        genomicFields = c("start1", "end1")
      ),
      json_list(
        chromosomeField = "chr2",
        genomicFields = c("start2", "end2")
      )
    )
  )
  track5_tracks <- add_multi_tracks(
    add_single_track(
      mark = "rect"
    ),
    add_single_track(
      mark = "withinLink", x = visual_channel_x(linkingId = "mid-scale"),
      strokeWidth = 0
    )
  )
  track5_color <- visual_channel_color(
    field = "svclass",
    type = "nominal",
    legend = TRUE,
    domain = json_list(
      "tandem-duplication", "translocation", "deletion", "inversion"
    ),
    range = json_list(
      "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
    )
  )
  track5_stroke <- visual_channel_stroke(
    field = "svclass",
    type = "nominal",
    domain = json_list(
      "tandem-duplication", "translocation", "deletion", "inversion"
    ),
    range = json_list(
      "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
    )
  )
}

```

```

track5_x <- visual_channel_x(field = "start1", type = "genomic")
track5_xe <- visual_channel_x(field = "end2", type = "genomic")
track5 <- add_single_track(
  id = "track5", title = "Structural Variant",
  data = track5_data, mark = "withinLink",
  x = track5_x, xe = track5_xe,
  color = track5_color, width = 500, height = 80, stroke = track5_stroke,
  strokeWidth = 1, opacity = 0.6, style = track5_styles
)

composed_track <- compose_view(
  multi = TRUE,
  tracks = add_multi_tracks(
    track5
  ),
  xOffset = 190, layout = "circular", spacing = 1
)

composed_views <- arrange_views(
  views = composed_track,
  arrangement = "vertical"
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot"))
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_2",
      composed_views, clean_braces = FALSE
    )
  })
}

shinyApp(ui, server)
}

```

---

visual\_channel

*Generic visual channel builder*


---

## Description

Generic visual channel builder

## Usage

```
visual_channel(field = NULL, type = NULL, range = NULL, domain = NULL, ...)
```

**Arguments**

field	A character. Name of the data field.
type	A character. Must be "genomic". Specify the data type.
range	A vector of characters or numbers. Values of the visual channel.
domain	A vector of characters or numbers. Values of the data.
...	Any other parameters to pass to gosling.js.

**Details**

For more info visit <http://gosling-lang.org/docs/visual-channel#encode-a-visual-channel>

**Value**

List object.

---

visual\_channel\_color *color visual channel*

---

**Description**

color visual channel

**Usage**

```
visual_channel_color(
  field = NULL,
  title = NULL,
  type = NULL,
  scaleOffset = NULL,
  scale = NULL,
  legend = NULL,
  grid = NULL,
  axis = NULL,
  aggregate = NULL,
  ...
)
```

**Arguments**

field	A character. Name of the data field.
title	A character. Title of the legend. Default: undefined.
type	A character. Must be "genomic". Specify the data type.
scaleOffset	A number vector of the form c(1, 2). Whether to use offset of the domain proportionally. This is bound to brushes on the color legend. Default: c(0, 1).
scale	A character. One of "linear", "log".
legend	A Boolean. Whether to display legend. Default: FALSE.
grid	A Boolean. Whether to display grid. Default: FALSE.

axis	A character. One of "none", "top", "bottom", "left", "right". Specify where should the axis be put.
aggregate	A character. One of "max", "min", "mean", "bin", "count". Specify how to aggregate data. Default: undefined.
...	Any other parameters to pass to gosling.js.

### Details

For more info visit <http://gosling-lang.org/docs/visual-channel#color>

### Value

List object.

### Examples

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  # View 2 Track 3----
  view2_track3_data <- track_data(
    url = "https://server.gosling-lang.org/api/v1/tileset_info/?d=NC_045512_2-multivec",
    type = "multivec",
    row = "base",
    column = "position",
    value = "count",
    categories = c("A", "T", "G", "C"),
    start = "start",
    end = "end"
  )

  view2_track3a <- add_single_track(
    mark = "bar",
    y = visual_channel_y(
      field = "count", type = "quantitative", axis = "none"
    )
  )

  view2_track3b <- add_single_track(
    dataTransform = track_data_transform(
      type = "filter",
      field = "count",
      oneOf = list(),
      not = TRUE
    ),
    mark = "text",
    x = visual_channel_x(
      field = "start", type = "genomic"
    ),
    xe = visual_channel_x(
      field = "end", type = "genomic"
    ),
    size = 24,
    color = "white",
    visibility = list(list(
```

```

        operation = "less-than",
        measure = "width",
        threshold = "|x<-x|",
        transitionPadding = 30,
        target = "mark"
    ),
    list(
        operation = "LT",
        measure = "zoomLevel",
        threshold = 40,
        target = "track"
    ))
)

view2_track3_x <- visual_channel_x(
  field = "position", type = "genomic"
)

view2_track3_color <- visual_channel_color(
  field = "base",
  type = "nominal",
  domain = c("A", "T", "G", "C"),
  legend = TRUE
)

view2_track3_text <- visual_channel_text(
  field = "base", type = "nominal"
)

view2_track3_style <- default_track_styles(
  inlineLegend = TRUE
)

view2_track3 <- add_single_track(
  title = "NC_045512.2 Sequence",
  alignment = "overlay",
  data = view2_track3_data,
  tracks = add_multi_tracks(
    view2_track3a, view2_track3b
  ),
  x = view2_track3_x,
  color = view2_track3_color,
  text = view2_track3_text,
  style = view2_track3_style,
  width = 800, height = 40
)

view2 <- compose_view(
  multi = TRUE,
  centerRadius = 0,
  xDomain = list(interval = c(1, 29903)),
  linkingId = "detail",
  alignment = "stack",
  tracks = add_multi_tracks(
    view2_track3
  )
)

```

```

combined_view <- arrange_views(
  title = "SARS-CoV-2",
  subtitle = "Data Source: WashU Virus Genome Browser, NCBI, GISAID",
  assembly = list(list("NC_045512.2", 29903)),
  layout = "linear",
  spacing = 50,
  views = list(view2),
  listify = FALSE
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot"))
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "sars_cov2",
      combined_view
    )
  })
}

shinyApp(ui, server)
}

```

---

visual\_channel\_opacity

*opacity visual channel*

---

### Description

opacity visual channel

### Usage

```

visual_channel_opacity(
  field = NULL,
  type = NULL,
  range = NULL,
  domain = NULL,
  ...
)

```

**Arguments**

field	A character. Name of the data field.
type	A character. Must be "genomic". Specify the data type.
range	A vector of characters or numbers. Values of the visual channel.
domain	A vector of characters or numbers. Values of the data.
...	Any other parameters to pass to gosling.js.

**Details**

For more info visit <http://gosling-lang.org/docs/visual-channel#opacity>

**Value**

List object.

---

visual_channel_row	<i>row visual channel</i>
--------------------	---------------------------

---

**Description**

row visual channel

**Usage**

```
visual_channel_row(
  field = NULL,
  type = NULL,
  padding = NULL,
  legend = NULL,
  grid = NULL,
  clip = NULL,
  axis = NULL,
  aggregate = NULL,
  ...
)
```

**Arguments**

field	A character. Name of the data field.
type	A character. Must be "genomic". Specify the data type.
padding	A number. Determines the size of inner white spaces on the top and bottom of individual rows. Default: 0.
legend	A Boolean. Whether to display legend. Default: FALSE.
grid	A Boolean. Whether to display grid. Default: FALSE.
clip	A Boolean. Clip row when the actual y value exceeds the max value of the y scale. Used only for bar marks at the moment. Default: TRUE.
axis	A character. One of "none", "top", "bottom", "left", "right". Specify where should the axis be put.
aggregate	A character. One of "max", "min", "mean", "bin", "count". Specify how to aggregate data. Default: undefined.
...	Any other parameters to pass to gosling.js.

**Details**

For more info visit <http://gosling-lang.org/docs/visual-channel#row>

**Value**

List object.

**Examples**

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  # Circular track 1 ----
  circular_track1_data <- track_data(
    url = "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec",
    type = "multivec",
    row = "sample",
    column = "position",
    value = "peak",
    categories = c("sample 1", "sample 2", "sample 3", "sample 4"),
    binSize = 4
  )

  circular_track1_x <- visual_channel_x(field = "start", type = "genomic")
  circular_track1_xe <- visual_channel_x(field = "end", type = "genomic")

  circular_track1_y <- visual_channel_y(field = "peak", type = "quantitative")

  circular_track1_row <- visual_channel_row(
    field = "sample", type = "nominal"
  )

  circular_track1_color <- visual_channel_color(
    field = "sample", type = "nominal"
  )

  circular_track1_tracks <- add_multi_tracks(
    add_single_track(
      mark = "bar"
    ),
    add_single_track(
      mark = "brush",
      x = visual_channel_x(linkingId = "detail-1"),
      color = "blue"
    ),
    add_single_track(
      mark = "brush",
      x = visual_channel_x(linkingId = "detail-2"),
      color = "red"
    )
  )

  circular_track1_styles <- default_track_styles(
    outlineWidth = 0
  )
}
```



```
circular_track1 <- add_single_track(  
  id = "circular_track1", alignment = "overlay", data = circular_track1_data,  
  x = circular_track1_x, xe = circular_track1_xe,  
  y = circular_track1_y, row = circular_track1_row,  
  color = circular_track1_color,  
  stroke = "black", strokeWidth = 0.3,  
  tracks = circular_track1_tracks,  
  style = circular_track1_styles,  
  width = 500, height = 100  
)  
  
# Compose Circular track ----  
circular_composed_view <- compose_view(  
  multi = TRUE,  
  tracks = add_multi_tracks(  
    circular_track1  
  ),  
  static = TRUE, layout = "circular", alignment = "stack"  
)  
  
# Arrange final view  
circular_linear_view <- arrange_views(  
  arrangement = "horizontal",  
  views = list(circular_composed_view)  
)  
  
ui <- fluidPage(  
  use_gosling(),  
  fluidRow(  
    column(6, goslingOutput("gosling_plot"))  
  )  
)  
  
server <- function(input, output, session) {  
  output$gosling_plot <- renderGosling({  
    gosling(  
      component_id = "circular_component",  
      circular_linear_view, clean_braces = FALSE  
    )  
  })  
}  
  
shinyApp(ui, server)  
}
```

**Description**

size visual channel

**Usage**

```
visual_channel_size(
  field = NULL,
  type = NULL,
  range = NULL,
  domain = NULL,
  ...
)
```

**Arguments**

field	A character. Name of the data field.
type	A character. Must be "genomic". Specify the data type.
range	A vector of characters or numbers. Values of the visual channel. Range to be specified like range = c(min_size, max_size)
domain	A vector of characters or numbers. Values of the data.
...	Any other parameters to pass to gosling.js.

**Details**

For more info visit <http://gosling-lang.org/docs/visual-channel#size>

**Value**

List object.

---

visual\_channel\_stroke *stroke visual channel*

---

**Description**

stroke visual channel

**Usage**

```
visual_channel_stroke(
  field = NULL,
  title = NULL,
  type = NULL,
  scaleOffset = NULL,
  legend = NULL,
  grid = NULL,
  axis = NULL,
  aggregate = NULL,
  ...
)
```

**Arguments**

field	A character. Name of the data field.
title	A character. Title of the legend. Default: undefined.
type	A character. Must be "genomic". Specify the data type.
scaleOffset	A number vector of the form c(1, 2). Whether to use offset of the domain proportionally. This is bound to brushes on the color legend. Default: c(0, 1).
legend	A Boolean. Whether to display legend. Default: FALSE.
grid	A Boolean. Whether to display grid. Default: FALSE.
axis	A character. One of "none", "top", "bottom", "left", "right". Specify where should the axis be put.
aggregate	A character. One of "max", "min", "mean", "bin", "count". Specify how to aggregate data. Default: undefined.
...	Any other parameters to pass to gosling.js.

**Details**

For more info visit <http://gosling-lang.org/docs/visual-channel#stroke>

**Value**

List object.

**Examples**

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  track5_styles <- default_track_styles(
    legendTitle = "SV Class"
  )
  track5_data <- track_data(
    url = "https://s3.amazonaws.com/gosling-lang.org/data/cancer/rearrangement.PD35930a.csv",
    type = "csv",
    genomicFieldsToConvert = json_list(
      json_list(
        chromosomeField = "chr1",
        genomicFields = c("start1", "end1")
      ),
      json_list(
        chromosomeField = "chr2",
        genomicFields = c("start2", "end2")
      )
    )
  )
  track5_tracks <- add_multi_tracks(
    add_single_track(
      mark = "rect"
    ),
    add_single_track(
      mark = "withinLink", x = visual_channel_x(linkingId = "mid-scale"),
      strokeWidth = 0
    )
  )
}
```

```

)
track5_color <- visual_channel_color(
  field = "svclass",
  type = "nominal",
  legend = TRUE,
  domain = json_list(
    "tandem-duplication", "translocation", "deletion", "inversion"
  ),
  range = json_list(
    "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
  )
)
track5_stroke <- visual_channel_stroke(
  field = "svclass",
  type = "nominal",
  domain = json_list(
    "tandem-duplication", "translocation", "deletion", "inversion"
  ),
  range = json_list(
    "#569C4D", "#4C75A2", "#DA5456", "#EA8A2A"
  )
)
track5_x <- visual_channel_x(field = "start1", type = "genomic")
track5_xe <- visual_channel_x(field = "end2", type = "genomic")
track5 <- add_single_track(
  id = "track5", title = "Structural Variant",
  data = track5_data, mark = "withinLink",
  x = track5_x, xe = track5_xe,
  color = track5_color, width = 500, height = 80, stroke = track5_stroke,
  strokeWidth = 1, opacity = 0.6, style = track5_styles
)

composed_track <- compose_view(
  multi = TRUE,
  tracks = add_multi_tracks(
    track5
  ),
  xOffset = 190, layout = "circular", spacing = 1
)

composed_views <- arrange_views(
  views = composed_track,
  arrangement = "vertical"
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot"))
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_2",

```

```
        composed_views, clean_braces = FALSE
      )
    })
  }

  shinyApp(ui, server)
}
```

---

visual\_channel\_stroke\_width  
*stroke width visual channel*

---

### Description

stroke width visual channel

### Usage

```
visual_channel_stroke_width(  
  field = NULL,  
  type = NULL,  
  range = NULL,  
  domain = NULL,  
  ...  
)
```

### Arguments

field	A character. Name of the data field.
type	A character. Must be "genomic". Specify the data type.
range	A vector of characters or numbers. Values of the visual channel.
domain	A vector of characters or numbers. Values of the data.
...	Any other parameters to pass to gosling.js.

### Details

For more info visit <http://gosling-lang.org/docs/visual-channel#strokewidth>

### Value

List object.

---

visual\_channel\_text    *text visual channel*

---

### Description

text visual channel

### Usage

```
visual_channel_text(  
  field = NULL,  
  type = NULL,  
  range = NULL,  
  domain = NULL,  
  ...  
)
```

### Arguments

field	A character. Name of the data field.
type	A character. Must be "genomic". Specify the data type.
range	A vector of characters or numbers. Values of the visual channel.
domain	A vector of characters or numbers. Values of the data.
...	Any other parameters to pass to gosling.js.

### Details

For more info visit <http://gosling-lang.org/docs/visual-channel#text>

### Value

List object.

### Examples

```
if(interactive()) {  
  library(shiny)  
  library(shiny.gosling)  
  
  # View 2 Track 3----  
  view2_track3_data <- track_data(  
    url = "https://server.gosling-lang.org/api/v1/tileset_info/?d=NC_045512_2-multivec",  
    type = "multivec",  
    row = "base",  
    column = "position",  
    value = "count",  
    categories = c("A", "T", "G", "C"),  
    start = "start",  
    end = "end"  
  )  
  
  view2_track3a <- add_single_track(  
    view2_track3_data,  
    track3a = view2_track3_data
```

```
mark = "bar",
y = visual_channel_y(
  field = "count", type = "quantitative", axis = "none"
)
)

view2_track3b <- add_single_track(
  dataTransform = track_data_transform(
    type = "filter",
    field = "count",
    oneOf = list(0),
    not = TRUE
  ),
  mark = "text",
  x = visual_channel_x(
    field = "start", type = "genomic"
  ),
  xe = visual_channel_x(
    field = "end", type = "genomic"
  ),
  size = 24,
  color = "white",
  visibility = list(list(
    operation = "less-than",
    measure = "width",
    threshold = "|xe-x|",
    transitionPadding = 30,
    target = "mark"
  )),
  list(
    operation = "LT",
    measure = "zoomLevel",
    threshold = 40,
    target = "track"
  ))
)

view2_track3_x <- visual_channel_x(
  field = "position", type = "genomic"
)

view2_track3_color <- visual_channel_color(
  field = "base",
  type = "nominal",
  domain = c("A", "T", "G", "C"),
  legend = TRUE
)

view2_track3_text <- visual_channel_text(
  field = "base", type = "nominal"
)

view2_track3_style <- default_track_styles(
  inlineLegend = TRUE
)

view2_track3 <- add_single_track(
```

```

    title = "NC_045512.2 Sequence",
    alignment = "overlay",
    data = view2_track3_data,
    tracks = add_multi_tracks(
      view2_track3a, view2_track3b
    ),
    x = view2_track3_x,
    color = view2_track3_color,
    text = view2_track3_text,
    style = view2_track3_style,
    width = 800, height = 40
  )

view2 <- compose_view(
  multi = TRUE,
  centerRadius = 0,
  xDomain = list(interval = c(1, 29903)),
  linkingId = "detail",
  alignment = "stack",
  tracks = add_multi_tracks(
    view2_track3
  )
)

combined_view <- arrange_views(
  title = "SARS-CoV-2",
  subtitle = "Data Source: WashU Virus Genome Browser, NCBI, GISAID",
  assembly = list(list("NC_045512.2", 29903)),
  layout = "linear",
  spacing = 50,
  views = list(view2),
  listify = FALSE
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot"))
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "sars_cov2",
      combined_view
    )
  })
}

shinyApp(ui, server)
}

```



---

visual\_channel\_tooltip  
*tooltip visual channel*

---

## Description

tooltip visual channel

## Usage

```
visual_channel_tooltip(field = NULL, type = NULL, alt = NULL, ...)
```

## Arguments

field	A character. Name of the data field.
type	A character. Must be "genomic". Specify the data type.
alt	A character.
...	Any other parameters to pass to gosling.js.

## Details

For more info visit <https://gosling.js.org/> and check for tooltip implementation

## Value

List object. list object with tooltip list object

## Examples

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  cistrome_data <-
    "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec"

  single_track <- add_single_track(
    id = "track1",
    data = track_data(
      url = cistrome_data,
      type = "multivec",
      row = "sample",
      column = "position",
      value = "peak",
      categories = c("sample 1", "sample 2", "sample 3", "sample 4"),
      binSize = 4,
    ),
    mark = "rect",
    x = visual_channel_x(field = "start", type = "genomic", axis = "top"),
    xe = visual_channel_x(field = "end", type = "genomic"),
    row = visual_channel_row(
      field = "sample",
```

```

    type = "nominal",
    legend = TRUE
  ),
  color = visual_channel_color(
    field = "peak",
    type = "quantitative",
    legend = TRUE
  ),
  tooltip = visual_channel_tooltips(
    visual_channel_tooltip(field = "start", type = "genomic",
      alt = "Start Position"),
    visual_channel_tooltip(field = "end", type = "genomic",
      alt = "End Position"),
    visual_channel_tooltip(
      field = "peak",
      type = "quantitative",
      alt = "Value",
      format = "0.2"
    )
  ),
  width = 600,
  height = 130
)

single_composed_track <- compose_view(
  tracks = single_track
)

single_composed_views <- arrange_views(
  title = "Single Track",
  subtitle = "This is the simplest single track visualization with a linear layout",
  layout = "circular", #"linear"
  views = single_composed_track,
  xDomain = list(
    chromosome = "chr1",
    interval = c(1, 3000500)
  )
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot")),
    column(
      1, br(), actionButton(
        "download_pdf",
        "PDF",
        icon = icon("cloud-arrow-down")
      )
    )
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(

```

```

        component_id = "component_1",
        single_composed_views,
        clean_braces = TRUE
      )
    })

    observeEvent(input$download_pdf, {
      export_pdf(component_id = "component_1")
    })
  }

  shinyApp(ui, server)
}

```

---

visual\_channel\_tooltips

*Combine tooltips into a list*


---

## Description

Combine tooltips into a list

## Usage

```
visual_channel_tooltips(...)
```

## Arguments

... Any other parameters to pass to gosling.js.

## Value

List object. json list with tooltips combined into a single spec

## Examples

```

if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  cistrome_data <-
    "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec"

  single_track <- add_single_track(
    id = "track1",
    data = track_data(
      url = cistrome_data,
      type = "multivec",
      row = "sample",
      column = "position",
      value = "peak",
      categories = c("sample 1", "sample 2", "sample 3", "sample 4"),

```

```

    binSize = 4,
  ),
  mark = "rect",
  x = visual_channel_x(field = "start", type = "genomic", axis = "top"),
  xe = visual_channel_x(field = "end", type = "genomic"),
  row = visual_channel_row(
    field = "sample",
    type = "nominal",
    legend = TRUE
  ),
  color = visual_channel_color(
    field = "peak",
    type = "quantitative",
    legend = TRUE
  ),
  tooltip = visual_channel_tooltips(
    visual_channel_tooltip(field = "start", type = "genomic",
                          alt = "Start Position"),
    visual_channel_tooltip(field = "end", type = "genomic",
                          alt = "End Position"),
    visual_channel_tooltip(
      field = "peak",
      type = "quantitative",
      alt = "Value",
      format = "0.2"
    )
  ),
  width = 600,
  height = 130
)

single_composed_track <- compose_view(
  tracks = single_track
)

single_composed_views <- arrange_views(
  title = "Single Track",
  subtitle = "This is the simplest single track visualization with a linear layout",
  layout = "circular", #"linear"
  views = single_composed_track,
  xDomain = list(
    chromosome = "chr1",
    interval = c(1, 3000500)
  )
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot")),
    column(
      1, br(), actionButton(
        "download_pdf",
        "PDF",
        icon = icon("cloud-arrow-down")
      )
    )
  )
)

```

```

    )
  )

  server <- function(input, output, session) {
    output$gosling_plot <- renderGosling({
      gosling(
        component_id = "component_1",
        single_composed_views,
        clean_braces = TRUE
      )
    })

    observeEvent(input$download_pdf, {
      export_pdf(component_id = "component_1")
    })
  }

  shinyApp(ui, server)
}

```

---

visual\_channel\_x      *x and xe axis visual channel*

---

## Description

x and xe axis visual channel

## Usage

```

visual_channel_x(
  field = NULL,
  type = NULL,
  legend = NULL,
  grid = NULL,
  axis = NULL,
  aggregate = NULL,
  ...
)

```

## Arguments

field	A character. Name of the data field.
type	A character. Must be "genomic". Specify the data type.
legend	A Boolean. Whether to display legend. Default: FALSE.
grid	A Boolean. Whether to display grid. Default: FALSE.
axis	A character. One of "none", "top", "bottom", "left", "right". Specify where should the axis be put.
aggregate	A character. One of "max", "min", "mean", "bin", "count". Specify how to aggregate data. Default: undefined.
...	Any other parameters to pass to gosling.js.

**Details**

For more info visit <http://gosling-lang.org/docs/visual-channel#x-xe>

**Value**

List object.

**Examples**

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  cistrome_data <-
    "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec"

  single_track <- add_single_track(
    id = "track1",
    data = track_data(
      url = cistrome_data,
      type = "multivec",
      row = "sample",
      column = "position",
      value = "peak",
      categories = c("sample 1", "sample 2", "sample 3", "sample 4"),
      binSize = 4,
    ),
    mark = "rect",
    x = visual_channel_x(field = "start", type = "genomic", axis = "top"),
    xe = visual_channel_x(field = "end", type = "genomic"),
    row = visual_channel_row(
      field = "sample",
      type = "nominal",
      legend = TRUE
    ),
    color = visual_channel_color(
      field = "peak",
      type = "quantitative",
      legend = TRUE
    ),
    tooltip = visual_channel_tooltips(
      visual_channel_tooltip(field = "start", type = "genomic",
        alt = "Start Position"),
      visual_channel_tooltip(field = "end", type = "genomic",
        alt = "End Position"),
      visual_channel_tooltip(
        field = "peak",
        type = "quantitative",
        alt = "Value",
        format = "0.2"
      )
    ),
    width = 600,
    height = 130
  )
}
```

```

single_composed_track <- compose_view(
  tracks = single_track
)

single_composed_views <- arrange_views(
  title = "Single Track",
  subtitle = "This is the simplest single track visualization with a linear layout",
  layout = "circular", #"linear"
  views = single_composed_track,
  xDomain = list(
    chromosome = "chr1",
    interval = c(1, 3000500)
  )
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot")),
    column(
      1, br(), actionButton(
        "download_pdf",
        "PDF",
        icon = icon("cloud-arrow-down")
      )
    )
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_1",
      single_composed_views,
      clean_braces = TRUE
    )
  })

  observeEvent(input$download_pdf, {
    export_pdf(component_id = "component_1")
  })
}

shinyApp(ui, server)
}

```

---

visual\_channel\_y

*y and ye axis visual channel*


---

### Description

y and ye axis visual channel

**Usage**

```
visual_channel_y(
  field = NULL,
  zeroBaseline = NULL,
  type = NULL,
  legend = NULL,
  grid = NULL,
  flip = NULL,
  baseline = NULL,
  axis = NULL,
  aggregate = NULL,
  ...
)
```

**Arguments**

field	A character. Name of the data field.
zeroBaseline	A Boolean. Specify whether to use zero baseline. Default: TRUE.
type	A character. Must be "genomic". Specify the data type.
legend	A Boolean. Whether to display legend. Default: FALSE.
grid	A Boolean. Whether to display grid. Default: FALSE.
flip	A Boolean. Whether to flip the y-axis. This is done by inverting the range property. Default: FALSE.
baseline	A character or number. Custom baseline of the y-axis. Default: 0.
axis	A character. One of "none", "top", "bottom", "left", "right". Specify where should the axis be put.
aggregate	A character. One of "max", "min", "mean", "bin", "count". Specify how to aggregate data. Default: undefined.
...	Any other parameters to pass to gosling.js.

**Details**

For more info visit <http://gosling-lang.org/docs/visual-channel#y-ye>

**Value**

List object.

**Examples**

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  # Circular track 1 ----
  circular_track1_data <- track_data(
    url = "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec",
    type = "multivec",
    row = "sample",
    column = "position",
    value = "peak",
```



```
categories = c("sample 1", "sample 2", "sample 3", "sample 4"),
  binSize = 4
)

circular_track1_x <- visual_channel_x(field = "start", type = "genomic")
circular_track1_xe <- visual_channel_x(field = "end", type = "genomic")

circular_track1_y <- visual_channel_y(field = "peak", type = "quantitative")

circular_track1_row <- visual_channel_row(
  field = "sample", type = "nominal"
)

circular_track1_color <- visual_channel_color(
  field = "sample", type = "nominal"
)

circular_track1_tracks <- add_multi_tracks(
  add_single_track(
    mark = "bar"
  ),
  add_single_track(
    mark = "brush",
    x = visual_channel_x(linkingId = "detail-1"),
    color = "blue"
  ),
  add_single_track(
    mark = "brush",
    x = visual_channel_x(linkingId = "detail-2"),
    color = "red"
  )
)

circular_track1_styles <- default_track_styles(
  outlineWidth = 0
)

circular_track1 <- add_single_track(
  id = "circular_track1", alignment = "overlay", data = circular_track1_data,
  x = circular_track1_x, xe = circular_track1_xe,
  y = circular_track1_y, row = circular_track1_row,
  color = circular_track1_color,
  stroke = "black", strokeWidth = 0.3,
  tracks = circular_track1_tracks,
  style = circular_track1_styles,
  width = 500, height = 100
)

# Compose Circular track ----
circular_composed_view <- compose_view(
  multi = TRUE,
  tracks = add_multi_tracks(
    circular_track1
  ),
  static = TRUE, layout = "circular", alignment = "stack"
)
```

```

# Arrange final view
circular_linear_view <- arrange_views(
  arrangement = "horizontal",
  views = list(circular_composed_view)
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot"))
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "circular_component",
      circular_linear_view, clean_braces = FALSE
    )
  })
}

shinyApp(ui, server)
}

```

---

zoom\_to

*Zoom to*


---

## Description

Zooms to a specific genomic position with the animated transition.

## Usage

```

zoom_to(
  component_id,
  view_id,
  position,
  padding = 0,
  duration = 1000,
  session = getDefaultReactiveDomain()
)

```

## Arguments

**component\_id** A character. The id of the component\_id prop passed to the GoslingComponent function.

view_id	A character. The ID of a view that you want to control. This ID is consistent to what you specify as track.id in your spec.
position	A character. The genomic position that your view should be navigated to. You can either specify chromosome (e.g., chr1) or a chromosome and range pair (e.g., chr1:1-10000).
padding	A numeric. This determines the padding around the specified position. The unit of this number is a base pair (Default: 0).
duration	A numeric. A duration of the animated transition in ms (Default: 1000).
session	A shiny session object.

### Value

None.

### Examples

```
if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  chromosome_options <- c(
    "Chr 1" = "chr1",
    "Chr 2" = "chr2",
    "Chr X" = "chrX",
    "Chr Y" = "chrY"
  )

  cistrome_data <-
    "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec"

  single_track <- add_single_track(
    id = "track1",
    data = track_data(
      url = cistrome_data,
      type = "multivec",
      row = "sample",
      column = "position",
      value = "peak",
      categories = c("sample 1", "sample 2", "sample 3", "sample 4"),
      binSize = 4,
    ),
    mark = "rect",
    x = visual_channel_x(field = "start", type = "genomic", axis = "top"),
    xe = visual_channel_x(field = "end", type = "genomic"),
    row = visual_channel_row(
      field = "sample",
      type = "nominal",
      legend = TRUE
    ),
    color = visual_channel_color(
      field = "peak",
      type = "quantitative",
      legend = TRUE
    ),
    tooltip = visual_channel_tooltips(
```

```

visual_channel_tooltip(field = "start", type = "genomic",
                       alt = "Start Position"),
visual_channel_tooltip(field = "end", type = "genomic",
                       alt = "End Position"),
visual_channel_tooltip(
  field = "peak",
  type = "quantitative",
  alt = "Value",
  format = "0.2"
)
),
width = 600,
height = 130
)

single_composed_track <- compose_view(
  tracks = single_track
)

single_composed_views <- arrange_views(
  title = "Single Track",
  subtitle = "This is the simplest single track visualization with a linear layout",
  layout = "circular", #"linear"
  views = single_composed_track,
  xDomain = list(
    chromosome = "chr1",
    interval = c(1, 3000500)
  )
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot")),
    column(
      1, br(), actionButton(
        "zoom_out",
        "Zoom To"
      )
    ),
  ),
  column(
    2,
    selectInput(
      "chromosomes",
      "Chromosome",
      selected = "chr1",
      choices = chromosome_options
    )
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_1",

```

```

        single_composed_views,
        clean_braces = TRUE
      )
    })

    observeEvent(input$zoom_out, {
      zoom_to(
        component_id = "component_1",
        view_id = "track1",
        position = input$chromosomes
      )
    })
  }

  shinyApp(ui, server)
}

```

---

 zoom\_to\_extent

*Zoom to extent*


---

## Description

Zooms out to see the entire view\_id passed to this function.

## Usage

```

zoom_to_extent(
  component_id,
  view_id,
  duration = 1000,
  session = getDefaultReactiveDomain()
)

```

## Arguments

component_id	A character. The id of the component_id prop passed to the GoslingComponent function.
view_id	A character. The ID of a view that you want to control. This ID is consistent to what you specify as track.id in your spec.
duration	A numeric. A duration of the animated transition in ms (Default: 1000).
session	A shiny session object.

## Value

None.

**Examples**

```

if(interactive()) {
  library(shiny)
  library(shiny.gosling)

  cistrome_data <-
    "https://server.gosling-lang.org/api/v1/tileset_info/?d=cistrome-multivec"

  single_track <- add_single_track(
    id = "track1",
    data = track_data(
      url = cistrome_data,
      type = "multivec",
      row = "sample",
      column = "position",
      value = "peak",
      categories = c("sample 1", "sample 2", "sample 3", "sample 4"),
      binSize = 4,
    ),
    mark = "rect",
    x = visual_channel_x(field = "start", type = "genomic", axis = "top"),
    xe = visual_channel_x(field = "end", type = "genomic"),
    row = visual_channel_row(
      field = "sample",
      type = "nominal",
      legend = TRUE
    ),
    color = visual_channel_color(
      field = "peak",
      type = "quantitative",
      legend = TRUE
    ),
    tooltip = visual_channel_tooltips(
      visual_channel_tooltip(field = "start", type = "genomic",
                            alt = "Start Position"),
      visual_channel_tooltip(field = "end", type = "genomic",
                            alt = "End Position"),
      visual_channel_tooltip(
        field = "peak",
        type = "quantitative",
        alt = "Value",
        format = "0.2"
      )
    ),
    width = 600,
    height = 130
  )

  single_composed_track <- compose_view(
    tracks = single_track
  )

  single_composed_views <- arrange_views(
    title = "Single Track",
    subtitle = "This is the simplest single track visualization with a linear layout",
    layout = "circular", #"linear"
  )

```

```
views = single_composed_track,
xDomain = list(
  chromosome = "chr1",
  interval = c(1, 3000500)
)
)

ui <- fluidPage(
  use_gosling(),
  fluidRow(
    column(6, goslingOutput("gosling_plot")),
    column(
      1, br(), actionButton(
        "zoom_out",
        "Zoom Out"
      )
    )
  )
)

server <- function(input, output, session) {
  output$gosling_plot <- renderGosling({
    gosling(
      component_id = "component_1",
      single_composed_views,
      clean_braces = TRUE
    )
  })

  observeEvent(input$zoom_out, {
    zoom_to_extent(
      component_id = "component_1",
      view_id = "track1"
    )
  })
}

shinyApp(ui, server)
}
```

# Index

[add\\_file\\_to\\_resource\\_path](#), 3  
[add\\_mark](#), 3  
[add\\_multi\\_tracks](#), 4  
[add\\_single\\_track](#), 6  
[arrange\\_views](#), 9  
[atomic\\_values\\_to\\_list](#), 12  
  
[brush\\_styles](#), 13  
[build\\_json](#), 13  
  
[component](#), 14  
[compose\\_view](#), 14  
  
[default\\_track\\_styles](#), 17  
  
[event\\_styles](#), 21  
[export\\_pdf](#), 22  
[export\\_png](#), 24  
  
[get\\_file\\_track\\_data](#), 26  
[gosling](#), 27  
[GoslingComponent](#), 29  
[goslingDependency](#), 30  
[goslingOutput](#), 30  
  
[is\\_atomic\\_field](#), 32  
  
[json\\_list](#), 32  
  
[list\\_rm\\_null](#), 34  
  
[print.gosling](#), 35  
  
[renderGosling](#), 35  
[run\\_example](#), 37  
  
[track\\_data](#), 38  
[track\\_data\\_csv](#), 41  
[track\\_data\\_gr](#), 43  
[track\\_data\\_transform](#), 45  
[track\\_data\\_transforms](#), 48  
  
[use\\_gosling](#), 48  
  
[visual\\_channel](#), 50  
[visual\\_channel\\_color](#), 51  
  
[visual\\_channel\\_opacity](#), 54  
[visual\\_channel\\_row](#), 55  
[visual\\_channel\\_size](#), 57  
[visual\\_channel\\_stroke](#), 58  
[visual\\_channel\\_stroke\\_width](#), 61  
[visual\\_channel\\_text](#), 62  
[visual\\_channel\\_tooltip](#), 65  
[visual\\_channel\\_tooltips](#), 67  
[visual\\_channel\\_x](#), 69  
[visual\\_channel\\_y](#), 71  
  
[zoom\\_to](#), 74  
[zoom\\_to\\_extent](#), 77