

networkD3:

D3 JavaScript Network Graphs from R

CRAN 0.4 Dev-version: 0.4

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[Christopher Gandrud](#), [JJ Allaire](#), [Kent Russell](#), & CJ Yetman

Issues/suggestions 

2017-03-18

About

This started as a port of Christopher Gandrud's R package [d3Network](#) for creating [D3](#) network graphs to the [htmlwidgets](#) framework. The [htmlwidgets](#) framework greatly simplifies the package's syntax for exporting the graphs, improves integration with [RStudio's](#) Viewer Pane, [RMarkdown](#), and [Shiny web apps](#). See [below](#) for examples.

It currently supports the following types of network graphs:

- **Force directed networks** with [simpleNetwork](#) and [forceNetwork](#)
- **Sankey diagrams** with [sankeyNetwork](#)
- **Radial networks** with [radialNetwork](#)
- **Dendro networks** with [dendroNetwork](#)

Install

networkD3 works very well with the most recent version of [RStudio](#) ($\geq v0.99$, [download](#)). When you use this version of RStudio, graphs will appear in the Viewer Pane. Not only does this give you a handy way of seeing and tweaking your graphs, but you can also export the graphs to the clipboard or a PNG/JPEG/TIFF/etc. file.

The package can be downloaded from [CRAN](#).

</> Usage

For a full set of examples for each of the functions see [this page](#).

Note: You are probably used to R's 1-based numbering (i.e. counting in R starts from 1). However, **networkD3** plots are created using JavaScript, which is **0-based**. So, your data links will need to start from 0. See [this data set](#) for example. You can also use [igraph](#) to build your graph data and then use the [igraph_to_networkD3](#) function to convert this data to a suitable object for **networkD3** plotting.

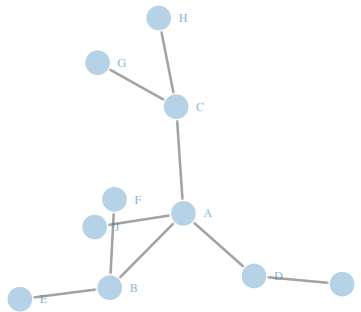
> simpleNetwork

For very basic **force directed network** graphics you can use `simpleNetwork`. For example:

```
# Load package
library(networkD3)

# Create fake data
src <- c("A", "A", "A", "A",
        "B", "B", "C", "C", "D")
target <- c("B", "C", "D", "J",
            "E", "F", "G", "H", "I")
networkData <- data.frame(src, target)

# Plot
simpleNetwork(networkData)
```

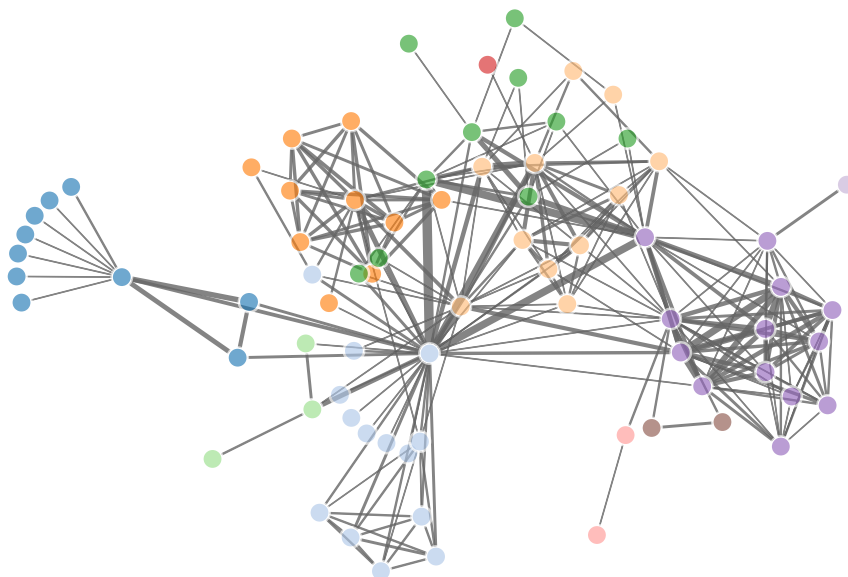


> forceNetwork

Use `forceNetwork` to have more control over the appearance of the forced directed network and to plot more complicated networks. Here is an example:

```
# Load data
data(MisLinks)
data(MisNodes)

# Plot
forceNetwork(Links = MisLinks, Nodes = MisNodes,
             Source = "source", Target = "target",
             Value = "value", NodeID = "name",
             Group = "group", opacity = 0.8)
```

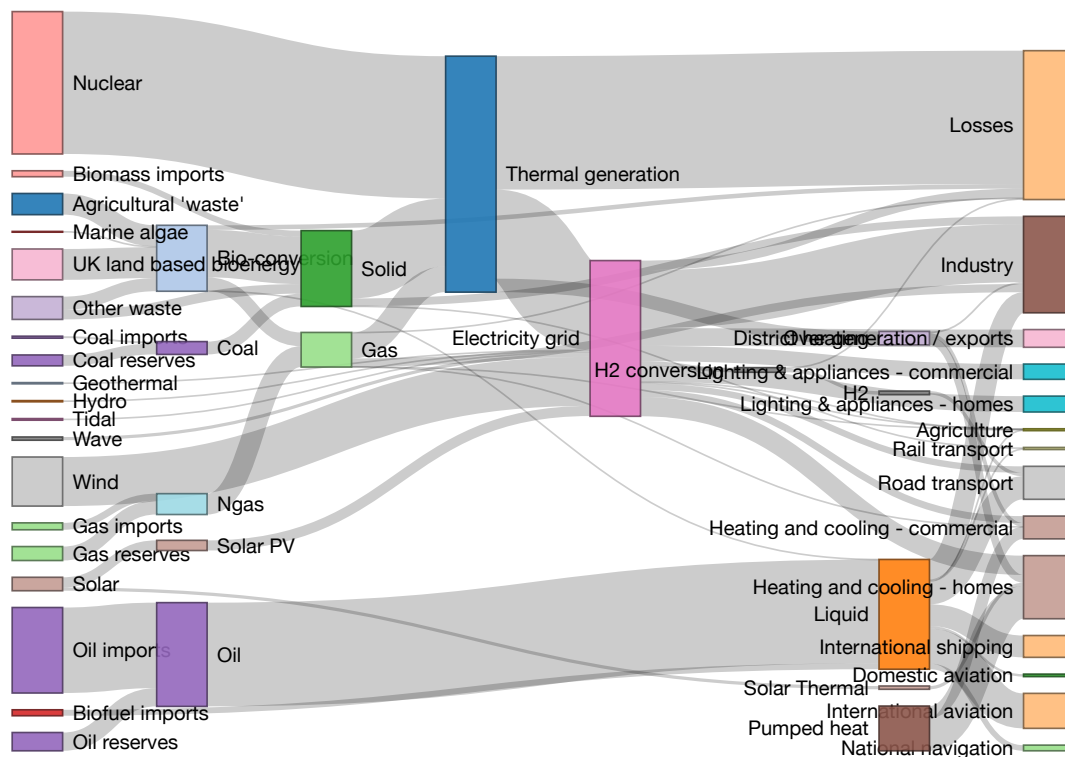


From version 0.1.3 you can also allow scroll-wheel zooming by setting `zoom = TRUE`.

> sankeyNetwork

You can also create [Sankey diagrams](#) with `sankeyNetwork`. Here is an example using downloaded JSON data:

```
# Load energy projection data
# Load energy projection data
URL <- paste0(
  "https://cdn.rawgit.com/christophergandrud/networkD3/",
  "master/JSONdata/energy.json")
Energy <- jsonlite::fromJSON(URL)
# Plot
sankeyNetwork(Links = Energy$links, Nodes = Energy$nodes, Source = "s",
  Target = "target", Value = "value", NodeID = "name",
  units = "TWh", fontSize = 12, nodeWidth = 30)
```



> radialNetwork

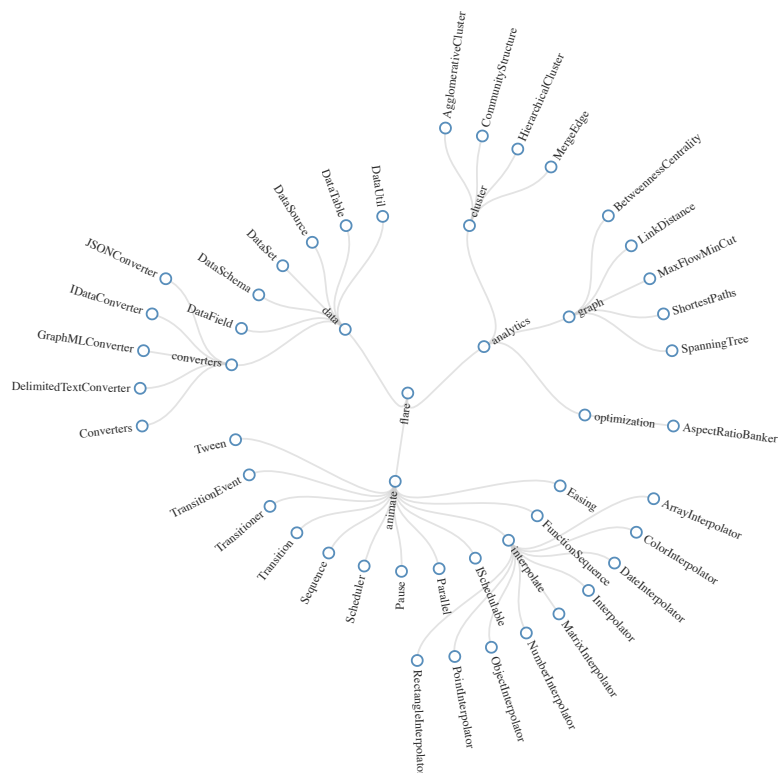
From version 0.2, tree diagrams can be created using `radialNetwork` or `diagonalNetwork`.

```
URL <- paste0(
  "https://cdn.rawgit.com/christophergandrud/networkD3/",
  "master/JSONdata//flare.json")

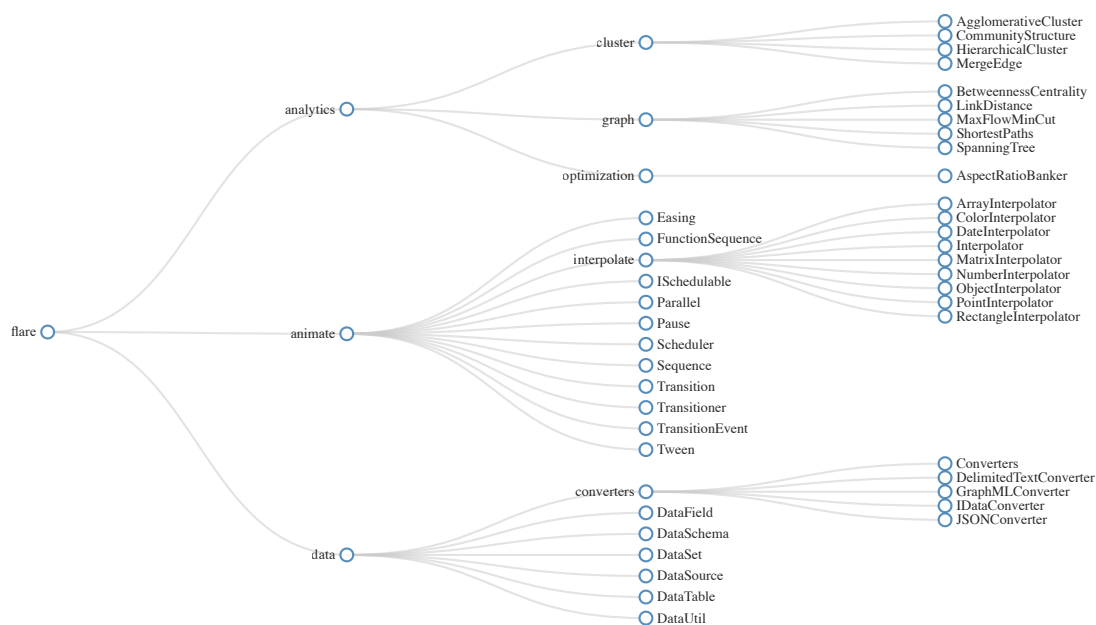
## Convert to list format
Flare <- jsonlite::fromJSON(URL, simplifyDataFrame = FALSE)

# Use subset of data for more readable diagram
Flare$children = Flare$children[1:3]

radialNetwork(List = Flare, fontSize = 10, opacity = 0.9)
```



```
diagonalNetwork(List = Flare, fontSize = 10, opacity = 0.9)
```

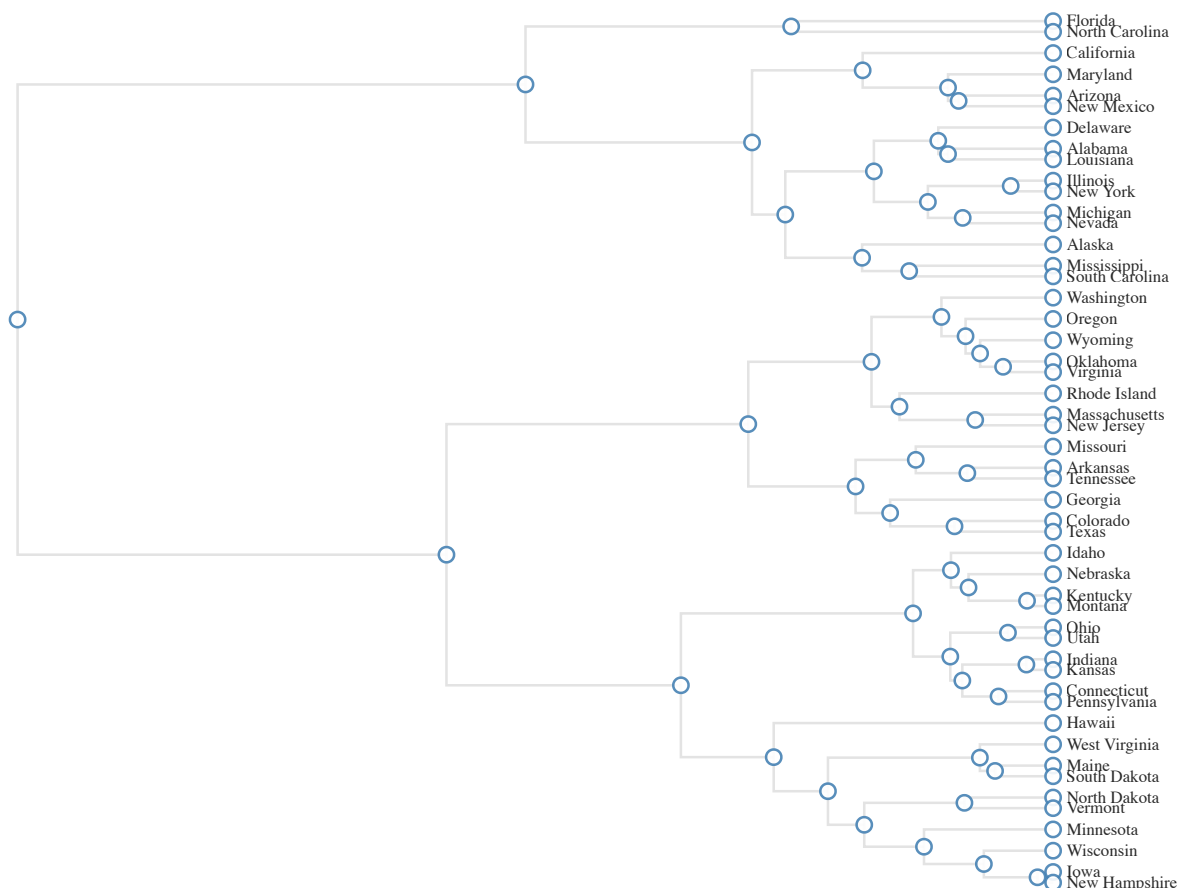


> **dendroNetwork**

From version 0.2, it is also possible to create dendrograms using **dendroNetwork**.

```
hc <- hclust(dist(USArrests), "ave")

dendroNetwork(hc, height = 600)
```



Interacting with igraph

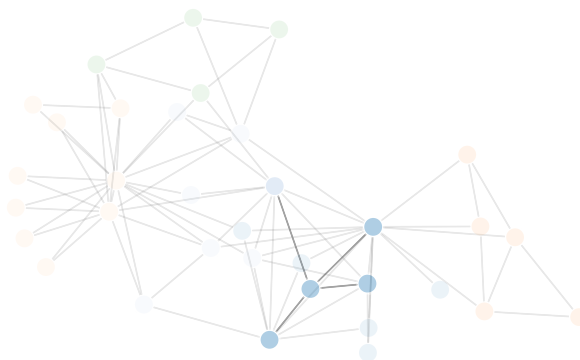
You can use **igraph** to create network graph data that can be plotted with **networkD3**. The **igraph_to_networkD3** function converts igraph graphs to lists that work well with **networkD3**. For example:

```
# Load igraph
library(igraph)

# Use igraph to make the graph and find membership
karate <- make_graph("Zachary")
wc <- cluster_walktrap(karate)
members <- membership(wc)

# Convert to object suitable for networkD3
karate_d3 <- igraph_to_networkD3(karate, group = members)

# Create force directed network plot
forceNetwork(Links = karate_d3$links, Nodes = karate_d3$nodes,
             Source = 'source', Target = 'target',
             NodeID = 'name', Group = 'group')
```



Output

Saving to an external stand alone HTML file

Use `saveNetwork` to save a network to a stand alone HTML file:

```
library(magrittr)

simpleNetwork(networkData) %>%
  saveNetwork(file = 'Net1.html')
```

Including in an RMarkdown file

It is simple to include a **networkD3** graphic in an [RMarkdown](#) file. Simply place the code to create the graph in a code chunk the same way you would any other plot. Checkout this [simple example](#).

Including in Shiny web apps

You can also easily include **networkD3** graphs in [Shiny web apps](#).

In the *server.R* file create the graph by placing the function inside of `render*Network`, where the `*` is either `Simple`, `Force`, or `Sankey` depending on the graph type. For example:

```
output$force <- renderForceNetwork({
  forceNetwork(Links = MisLinks, Nodes = MisNodes,
               Source = "source", Target = "target",
               Value = "value", NodeID = "name",
               Group = "group", opacity = input$opacity)
})
```

In the *shinyUI* part of your *app.R* file (for [single-file Shiny apps](#)) include `*NetworkOutput` (with `*` as before, but starting with a lowercase letter). The argument placed in this function should be the element specified with `output`, e.g.:

```
forceNetworkOutput("force")
```

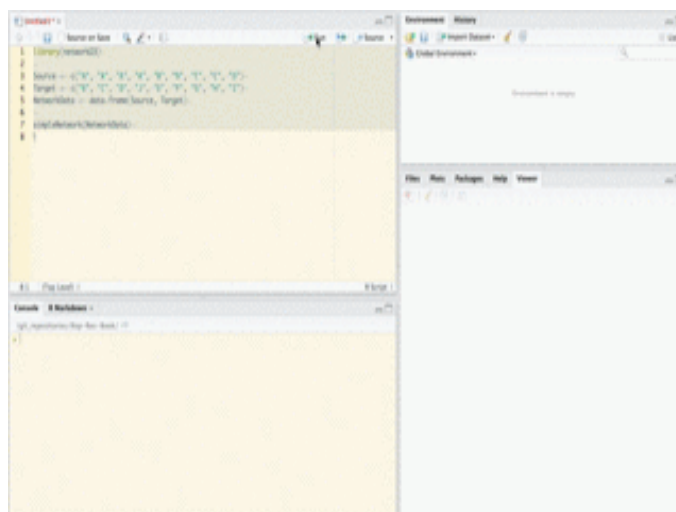
You can run a simple example with the following code:

```
shiny::runGitHub('christophergandrud/networkD3-shiny-example')
```

Full source code for this example can be found [here](#).

Saving as static PNG image

You can use RStudio to save static images of **networkD3** plots as PNG files. Simply create your plot as usual in RStudio. The output should appear in the *Viewer* pane. Then click *Export > Save as Image....* A new window will appear. You can use this window to manipulate the plot, resize it, and save the result as a PNG file.



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M

[march](#)

8 years ago

Can I change the link in `simpleNetwork()` or `forceNetwork()` to arrow, and show numbers in the link ?

55 0 Reply • Share ›

[ChrisGandrud](#)

Mod

→ [march](#)

6 years ago

This is now possible. Please see the arrows argument.

1 0 Reply • Share ›

[ChrisGandrud](#)

Mod

→ [march](#)

6 years ago

The first is now available with the arrows argument. I don't believe the second is possible currently.

0 0 Reply • Share ›

[Rafael](#)→ [ChrisGandrud](#)

5 years ago

Old question but I must ask: besides arrow is it possible to change the node icon? Would be nice to have a specific node icon replaced by an image, logo or anything else.

0 0 Reply • Share ›

[Carine Emer](#)→ [Rafael](#)

5 years ago

Indeed - I would be happy with that as well! Many times we want to distinguish different types of nodes within the network and such argument would be very, very helpful. ")

0 0 Reply • Share ›

[CJ Yetman](#)→ [Carine Emer](#)

5 years ago

Changing the node shape to a different image is currently not possible, and would require very significant changes to the underlying JavaScript code.

0 0 Reply • Share ›

**jjmerelo**

6 years ago

The link to "force" and other pages seems to be 404.

21 0 Reply • Share ›

**CJ Yetman**

→ jjmerelo

6 years ago

Thanks. There's supposed to be a '#' in there. It doesn't open another page, just anchors to the forceNetwork part of this page.

this:

<https://christophergandrud....>

should be:

<https://christophergandrud....>

Did you see find any others that don't work? I only see the forceNetwork link not working.

1 0 Reply • Share ›

**Basil Ahamed**

6 years ago

Hi Chris!

I have a data of movement of patients from one district to another. The frequency of movement in one direction and reverse may vary. So, Is there a way to represent a bi-directional Sankey chart.

Thank You

10 0 Reply • Share ›

**CJ Yetman**

→ Basil Ahamed

6 years ago

I think you're talking about a network with cycles, but it's hard to tell. There's an example of that here which works in the currently released version of networkD3.

<https://github.com/christop...>

It would probably be easier to assist you with an issue like this if you posted a question with a minimal reproducible example on Stack Overflow.

minimal reproducible example:

<https://stackoverflow.com/q...>

Ask a question on Stack Overflow with the networkD3 tag:

<https://stackoverflow.com/q...>

0 0 Reply • Share ›

B**Bhanuchander Udhuakumar**

5 years ago

Awesome post . . . Used in my simple R app [Network viewer](#) .

7 0 Reply • Share ›

W

Wesley Bernegger

8 years ago

Hi Chris. Thanks for the package - i'm really liking the results so far. I'm making a Sankey diagram and looking to customize some additional aspects of it, such as node shape or link color. When I open the resulting HTML file from 'saveNetwork' I'm not able to see or change any of the elements i'm interested in. Is there a way to open and edit the javascript? I have very little experience with javascript so excuse me if I'm missing something obvious. Thank you!

2 0 Reply • Share ›

**ChrisGandrud**

Mod

→ Wesley Bernegger

7 years ago

Using selfcontained = FALSE with saveNetwork should do what you're asking for.

1 0 Reply • Share ›

A

Ali Shetab Boushehri

7 years ago

Hi Chris,
Thanks a lot for your efforts and awesome Package. I would like to ask, if it is possible to plot a decision tree using this Library? In general, something like this would be perfect for me:
<http://www.nytimes.com/inte...>

Thanks a lot

1 0 Reply • Share ›

**ChrisGandrud**

Mod

→ Ali Shetab Boushehri

7 years ago

I think this could be accomplished with something like dendroNetowk

0 0 Reply • Share ›

A

Ali Shetab Boushehri

→ ChrisGandrud

7 years ago

I also would like to put for example the probabilities and some conditions on each node. Would it be still possible?

0 0 Reply • Share ›

**ChrisGandrud**

Mod

→ Ali Shetab Boushehri

7 years ago

Maybe if you put them in the node name?

0 0 Reply • Share ›

**Bryan Kauder**

8 years ago

This is awesome thanks so much. I'm running into an issue with linkDistance when i use anything but a single value. i.e.

```
simpleNetwork(MisLinks, linkDistance = MisLinks$value)
```

Gives me the attached. Is this a KP or do you have a suggestion to fix?





1 0 Reply • Share ›



CJ Yetman

→ Bryan Kauder

— 🚩

7 years ago

linkDistance needs to be a single value, not a vector of values (or a JavaScript string if you're using forceNetwork)

0 0 Reply • Share ›



Florian May

→ Bryan Kauder

— 🚩

7 years ago

Late to the party, but try "Value = 1"!

0 0 Reply • Share ›



Mark Haworth

→ Bryan Kauder

— 🚩

7 years ago

linkDistance = JS("function(d){return d.value * 10}")

0 0 Reply • Share ›



Parmutia Makui™

— 🚩

8 years ago

Hi Chris. Thanks for this package. Just learned of it at the right time. I usually use igraph and its great that your package adds the interactivity part of it. loaded networkD3 from CRAN and tried to use the igraph_to_networkD3 function but this function could not be found..

1 0 Reply • Share ›



ChrisGandrud

Mod

→ Parmutia Makui™

— 🚩

8 years ago

Make sure you have version 0.2.10 (it may not have been built by CRAN for your system yet, this sometimes takes a few days)

0 0 Reply • Share ›



Parmutia Makui™

→ ChrisGandrud

— 🚩

8 years ago

Thank you. I just installed the package from github, and the function works well as per the example given in the documentation. I wanted to plot my igraph function with the radialNetwork function or the diagonalNetwork function. Any pointers on how to achieve the above will be highly appreciated..

0 0 Reply • Share ›

K

keshri nandan

— 🚩

8 years ago

Hi Chris! Thanks for the package! I am using it in a R script to be run via Alteryx's R tool. However I am not able to capture the output via the tool's output connection. would you have some ideas around it?

1 0 Reply • Share ›

M

Mar Benavides

a year ago

Hi

I'm struggling to organize my data to make a Sankey plot.

Basically I have abundance of 10 different organisms, sampled at 4 different depths in the ocean.

I want to plot how many of the organisms of a given species at depth0 are found at depth1-2-3. Seems most Sankey plots are based on categorical data with a single column showing a weight value, so I'm struggling to format my data to make this plot.

Any help appreciated!

Thanks

0 0 Reply • Share ›

**CJ Yetman**

→ Mar Benavides

a year ago

Try posting a question on [the issues page](#) or on [StackOverflow](#) with a reproducible example (minimally an example dataset demonstrating what you mean). It will be easier to help you that way.

0 0 Reply • Share ›

M

Mar Benavides

a year ago

Hi

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I want to plot how many of the organisms of a given species at depth0 are found at depth1-2-3. Seems most Sankey plots are based on categorical data with a single column showing a weight value, so I'm struggling to format my data to make this plot.

Any hel appreciated!

Thanks

0 0 Reply • Share ›

M

Mallika

2 years ago

Any pointers on how I can incorporate self-links that is source==target in the forceNetwork? Currently no link/edge turns up. <https://stackoverflow.com/q...> Shows how this can be done in Javascript. How do I achieve the same with the current implementation of ForceNetwork?

0 0 Reply • Share ›

**CJ Yetman**

→ Mallika

2 years ago

This can not be achieved with the current implementation of `networkD3::forceNetwork()`

0 0 Reply • Share ›

S

Sam

2 years ago

Can I create a the same sankey plot but keeping my nodes size constant and make my links as lines?

0 0 Reply • Share ›

**CJ Yetman**

→ Sam

2 years ago

no

0 0 Reply • Share ›

R**Ruan Spies**

3 years ago

Hi there! Thanks for the awesome package!

I am trying to add labels to the links between nodes but can't seem to get it right... I have attempted the methods from different Stack Overflow questions by including additional JavaScript.

I have tried:

```
function(el, x) {
  d3.selectAll(".link").append("svg:title")
  .text(function(d) { return d.source.name + " -> " + d.target.name; })
}
```

and

```
function(el, x) {
  d3.selectAll(".link").select("svg:title")
  .text(function(d) { return d.source.name + " -> " + d.target.name; })
}
```

I have also tried using "title" rather than "svg:title" but still not having success. Would appreciate assistance :)

0 0 Reply • Share ›

**CJ Yetman**

→ Ruan Spies

3 years ago

It would be helpful to know which type of plot you're using, since networkD3 makes a few of them, and they do not all work the same way. It would be even more helpful if you provided a minimal reproducible example.

0 0 Reply • Share ›

R**Ruan Spies**

→ CJ Yetman

3 years ago

Thanks for the quick reply. This is for the forceNetwork.

I would like to add a label for an edge as an attribute.

Here is a simple example of how I have tried to approach it:

```
links <- data.frame(
  src = c(0, 0, 1, 2),
  target = c(2, 3, 2, 4),
  value = 1,
  linkName = c("results in", "contributes to", "results in", "is part of")
)
```



```
nodes <- data.frame(  
  name = c("one", "two", "three", "four", "five"),  
  group = 1  
)
```

[see more](#)

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R

[Ruan Spies](#)

→ Ruan Spies

— 🚩

3 years ago

Here is a quick mock up picture for the example.



0 0 Reply • Share ›

[CJ Yetman](#)

→ Ruan Spies

— 🚩

3 years ago

Your example code works, just maybe not as you expected it to. When you add a title to an SVG element, the title displays when you hover the mouse over that element (different browsers do/handle this slightly differently).

[see more](#)

0 0 Reply • Share ›

R

[Ruan Spies](#)

→ CJ Yetman

— 🚩

3 years ago

That makes sense - thanks for the help.

As a work around, I have attempted to use link colors to represent these attributes. I am able to change the colors but can't seem to enable that these appear in the legend along with the node colors?

ie. in the below example, that the legend would include the linkName to show what each colour represents?

```
links <- data.frame(
  src = c(0, 0, 1, 2),
  target = c(2, 3, 2, 4),
  value = 3,
  linkName = c("first", "second", "third", "fourth"),
  simCode = c("#FF6F61", "#EFC050", "#FF6F61", "#6B5B95")
)
```

[see more](#)

1 0 Reply • Share ›

R

Ruan Spies

→ CJ Yetman

3 years ago

Hi CJ - please see my previous reply to your post. Would appreciate assistance :)

0 0 Reply • Share ›



CJ Yetman

→ Ruan Spies

3 years ago

Currently, forceNetwork does not include link colors in the legend

0 0 Reply • Share ›

E

ella

4 years ago

Hi. Thank you for making a brilliant package! I have downloaded sankeyD3, but when I run the sankeyNetwork command to produce my sankey diagram I get this error: "could not find function "sankeyNetwork". However when I use the command d3Sankey I am able to produce a graph, but many options have to be omitted, so I would prefer to use the sankeyNetwork command. How come I get this error?

0 0 Reply • Share ›



CJ Yetman

→ ella

4 years ago

Sounds like you're using the `d3Network` package instead of the `networkD3` package. They are similar, but not the same.

0 0 Reply • Share ›



SunjaeLee

4 years ago

hello!

is there anyone who knows change the order of layout in sankey network?

to move any one node to change the order of its parent's children.

for example in attached figure,

I wish to move N3 to below V2; M1 above V2, M2 above V3.

I googled it many times, but I couldn't find good solutions

here I also attached my codes:

```
Nodes = data.frame(name = c("V1", "N2", "M1", "V2", "N3", "M2", "V3", "N4", "M3", "V4"),
  group= c("V", "N", "M", "V", "N", "M", "V", "N", "M", "V"),
  stringsAsFactors = F)
```

```
interactions = data.frame(source = c("V1", "V1", "N2", "V2", "V2", "N3", "V3", "V3", "N4"),
  target = c("M1", "V2", "V2", "M2", "V3", "V3", "M3", "V4", "V4"),
  linkGroup = c("M", "T", "N", "M", "T", "N", "M", "T", "N"),
  value = c(12.1, 87.9, 13.1, 13.8, 85.5, 15.6, 15.6, 84.5, 14.9),
  stringsAsFactors=FALSE)
```

see more

0 0 Reply • Share ›



CJ Yetman

→ SunjaeLee



4 years ago

Using the `sinksRight = FALSE` argument will do most of what you want, but it will not move your `N*` nodes rightward. For that you would need to add (false) parent nodes to your `N*` nodes.

0 0 Reply • Share ›



SunjaeLee

→ SunjaeLee



4 years ago



here is my plot screenshot

0 1 Reply • Share ›



Nicola Pirastu



**Nicola Pirastu**

4 years ago

Is there a way to force a specific node order in sankeyNetwork?
It keeps producing plots where the edges overlap where no overlap would actually be necessary.
Thanks

0 0 Reply • Share ›

**CJ Yetman**

→ Nicola Pirastu

4 years ago

<https://stackoverflow.com/a...>

0 0 Reply • Share ›

K**K Sarvani**

5 years ago

I am unable to install networkD3 package

0 0 Reply • Share ›

**CJ Yetman**

→ K Sarvani

5 years ago

how come?

0 0 Reply • Share ›

D**daniele biscontini**

5 years ago

Hello everyone! Is it possible to insert Hyperlink during the interaction with igraph? I would like to connect each network graph nodes to webpage. Thanks in advance!

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