Backscatter Scripts

Documentation

1.0

How to use the tool

Purpose
Upload a network and apply scripts

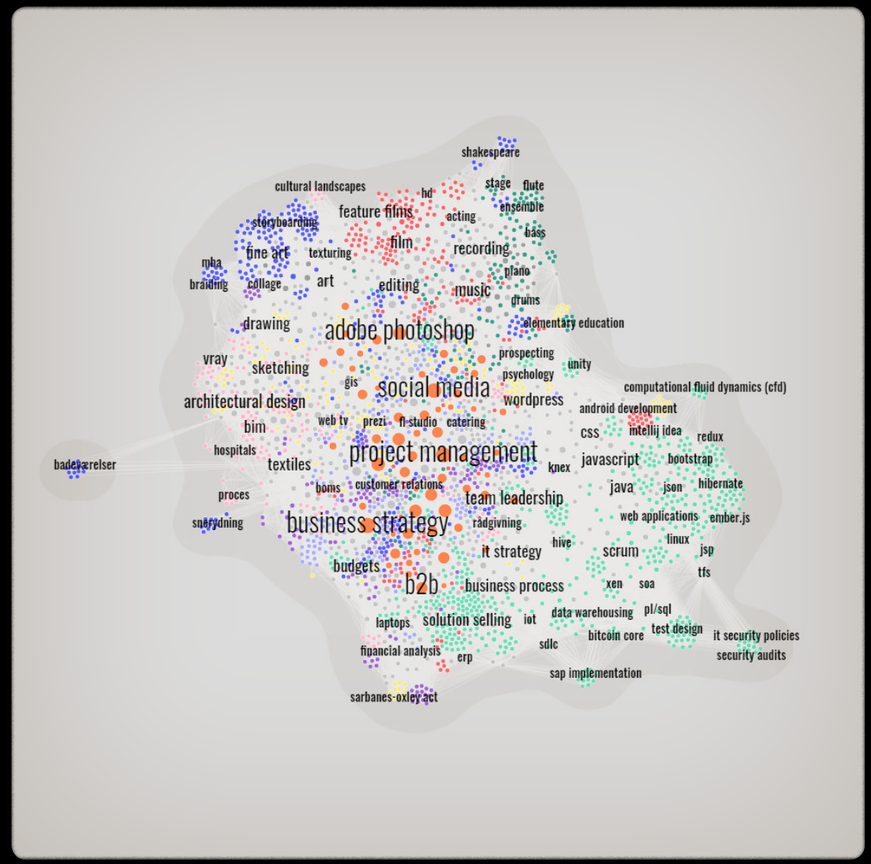
What the scripts do
It depends on the script. They can:
- Generate pictures
- Extract information
- Transform the network

The scripts are Backscatter-tuned.

How to use
1. Upload a network (GEXF file)
2. Edit script settings
3. Apply the script

Why using it
Mostly to generate professional network maps, or sometimes to tinker.

Output example:



General remarks

Use FIREFOX for a more reliable experience (the tool is a web page).
Note: the tool will crash if asked too much. There is no risk, but due to technical constraints, memory errors are not handled grafecully.

Additional informations are displayed in the Javascript console.

When you work on a script for more than five minutes, use an external text editor and save often.

Upload screen

BACKSCATTER

This tool is developed by Copenhagen-based analysis studio Backscatter in collaboration with Mathieu Jacomy of TANTLab. Feel free to explore and use it to visualize your networks.

LOAD GRAPH

CLICK or DRAG A FILE

NORMAL USE: Upload your network

Backscatter Network Scripts

This tool helps you visualize network graphs in different ways.

How to use

Load your network into the tool in the lower-left corner or try the reference network. Then pick and edit a script and enjoy the outcome: a processed network, image, or anything Javascript can produce.

Note: some scripts require editing their set… …twork. See documentation.

Reference network

[TRY ME!] All the scripts work …

TEST TRY: Use the reference network. Scripts will work without editing settings

How to edit scripts

You can edit them in the interface o… …ge is Javascript. The graph library used is Graphology.

Recipes/scripts screen

“WAIT” message

When you run a script, your browser may prompt you like this:

You can ignore it, you don’t need to click on “wait.”

Explanation: the Javascript is not “single-threaded” which means that when a heavy computation is running, the browser tab freezes.

Your browser believes that the web page has a bug, but it is actually normal since we run heavy algorithms. So you can ignore the alert, it does not block the algorithm. If you do not click on “wait,” the warning will disappear by itself when the computation ends, as the browser tab unfrezes.

I.

Overview of the scripts

Prepare

Explore attributes, and get the JSON of clusters and colors

Make a Map

Simple rendering of nodes and edges (1 megapixel).

Make a Map (settings: clusters)

Rendering of nodes and clusters (1 megapixels)

Make a Map (settings: high resolution)

Produces a high quality, 64 megapixel rendering of nodes and edges.

Legend

Produces the legend for your map.

Highlight Modality

Highlights one or more modalities, and mutes or hides the rest.

Orientation Mini-map

A mini-map with highlighted modalities. For integration within maps.

Get Top Nodes

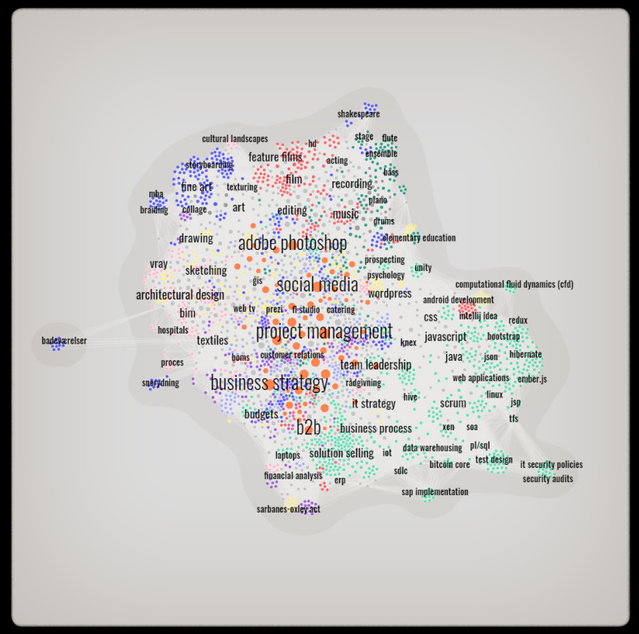
Generate a list of nodes to highlight. Edit this code to fit your needs.

Highlight Nodes

Highlights a list of nodes with thick black lines.

List of scripts

Make a map is the main script. It outputs a high quality map.



This script comes with 3 different settings, but out of that it is exactly the same.

Note: this script requires to run the Prepare script first.

Prepare
Explore attributes, and get the JSON of clusters and colors

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List of scripts

Prepare is required before making a map. It does three things:
- Shows an overview of attributes
- Allows selecting the attribute to visualize
- Set the general color palette

Output example:

15 NODE ATTRIBUTES

modularity_class

```
Attribute ID: modularity_class
Type: integer (1, 2, 3...)
```

Values summary

```
Nodes take 7 different values for this attribute.
The biggest group with the same value has 895 nodes (32%).
The smallest group has 13 nodes.
0 nodes have a specific (non shared) value.
```

Values

```
- 3: 895 nodes
- 7: 574 nodes
- 1: 471 nodes
- 5: 400 nodes
- 4: 300 nodes
- 6: 111 nodes
- 2: 13 nodes
```

Color settings bundle (COPY-PASTABLE JSON)

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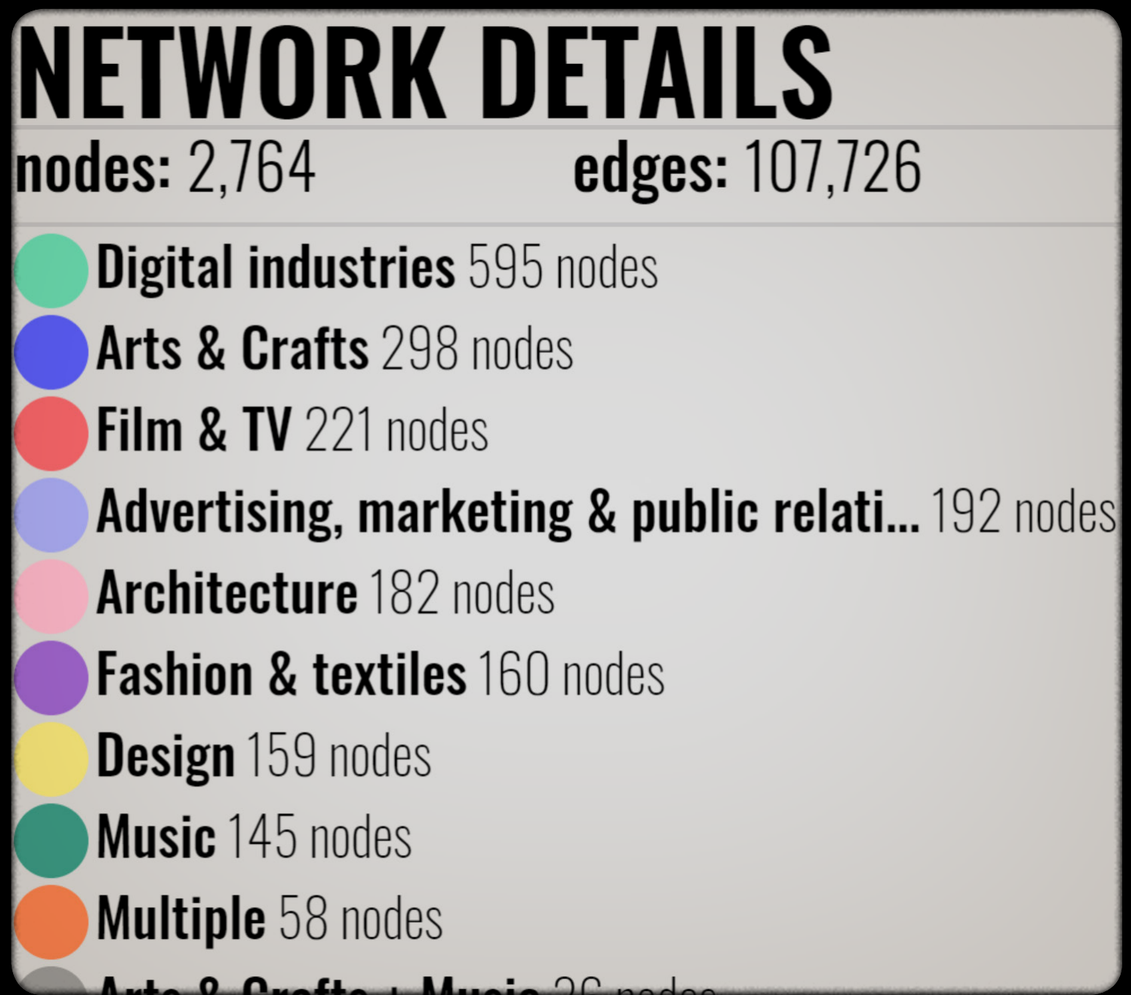
List of scripts

Legend outputs a map legend as multiple images. It also requires to run Prepare.

Output example:



Prepare

Explore attributes, and get the JSON of clusters and colors

Make a Map

Simple rendering of nodes and edges (1 megapixel).

Make a Map (settings: clusters)

Rendering of nodes and clusters (1 megapixels)

Make a Map (settings: high resolution)

Produces a high quality, 64 megapixel rendering of nodes and edges.

Legend

Produces the legend for your map.

Highlight Modality

Highlights one or more modalities, and mutes or hides the rest.

Orientation Mini-map

A mini-map with highlighted modalities. For integration within maps.

Get Top Nodes

Generate a list of nodes to highlight. Edit this code to fit your needs.

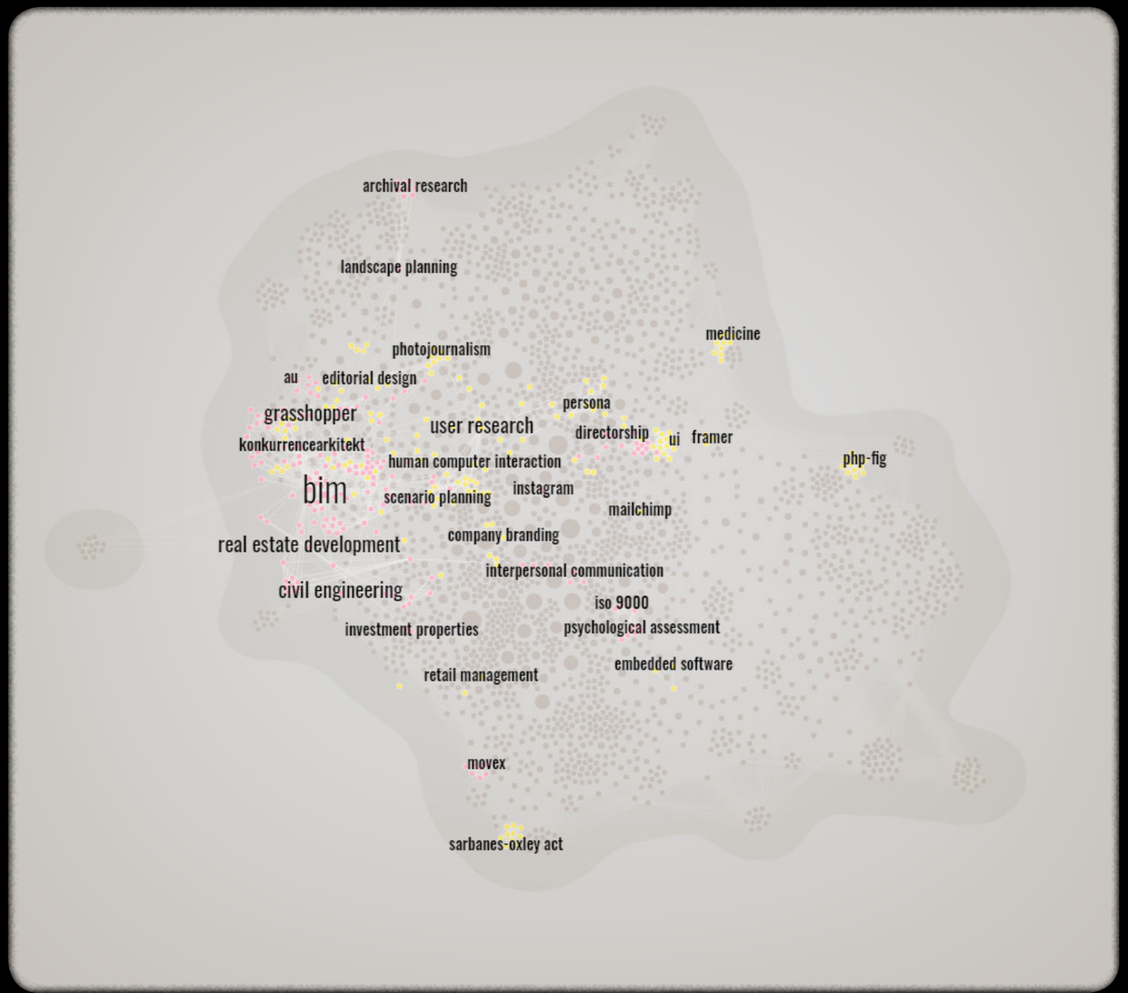
Highlight Nodes

Highlights a list of nodes with thick black lines.

List of scripts

Highlight modality outputs a map only featuring the selected modality(-ies).

Output example:



Prepare
Explore attributes, and get the JSON of clusters and colors

Make a Map
Simple rendering of nodes and edges (1 megapixel).

Make a Map (settings: clusters)
Rendering of nodes and clusters (1 megapixels)

Make a Map (settings: high resolution)
Produces a high quality, 64 megapixel rendering of nodes and edges.

Legend
Produces the legend for your map.

Highlight Modality
Highlights one or more modalities, and mutes or hides the rest.

Orientation Mini-map
A mini-map with highlighted modalities. For integration within maps.

Get Top Nodes
Generate a list of nodes to highlight. Edit this code to fit your needs.

Highlight Nodes
Highlights a list of nodes with thick black lines.

List of scripts

Orientation mini-map outputs a simplified mini-map that you can integrate to your graphical compositions.

Output example:

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Make a Map
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Make a Map (settings: clusters)
Rendering of nodes and clusters (1 megapixels)

Make a Map (settings: high resolution)
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Highlight Modality
Highlights one or more modalities, and mutes or hides the rest.

Orientation Mini-map
A mini-map with highlighted modalities. For integration within maps.

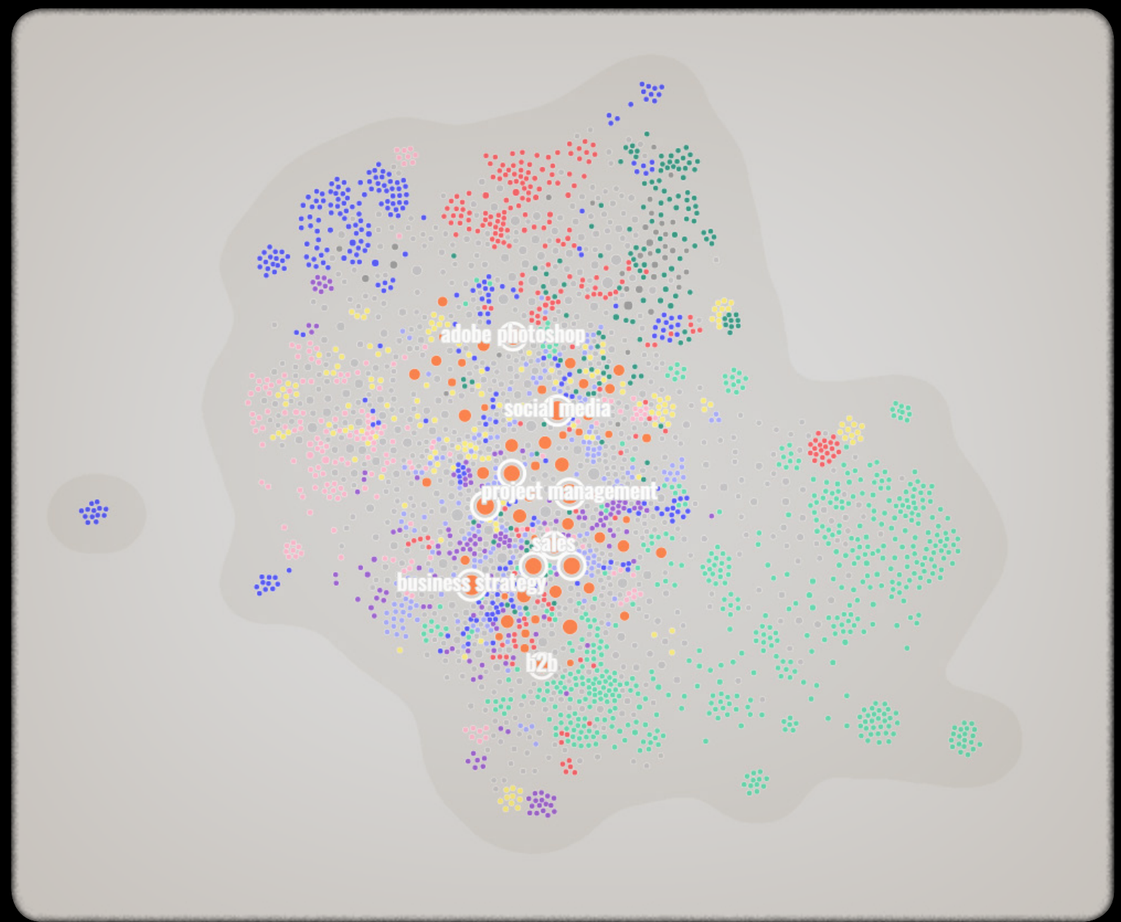
Get Top Nodes
Generate a list of nodes to highlight. Edit this code to fit your needs.

Highlight Nodes
Highlights a list of nodes with thick black lines.

List of scripts

Highlight nodes outputs a map where only certain nodes are highlighted.
It requires using first Get Top Nodes.

Output example:



Prepare
Explore attributes, and get the JSON of clusters and colors

Make a Map
Simple rendering of nodes and edges (1 megapixel).

Make a Map (settings: clusters)
Rendering of nodes and clusters (1 megapixels)

Make a Map (settings: high resolution)
Produces a high quality, 64 megapixel rendering of nodes and edges.

Legend
Produces the legend for your map.

Highlight Modality
Highlights one or more modalities, and mutes or hides the rest.

Orientation Mini-map
A mini-map with highlighted modalities. For integration within maps.

Get Top Nodes
Generate a list of nodes to highlight. Edit this code to fit your needs.

Highlight Nodes
Highlights a list of nodes with thick black lines.

List of scripts

Get Top Nodes outputs a list of nodes selected according to a query coded in Javascript.

Output example:

```
settings.highlighted_nodes = [
  "skillsclen_b76fc4fc73f8aef0dd73508884996698",
  "skillsclen_948d1f30a0fada44d35950f6c3882c1a",
  "skillsclen_56b7bb6871857f290078cf83132bec40",
  "skillsclen_af770060e56bfab1432aa5c4c2f7a5db",
  "skillsclen_02cc8dc4d04d5ef6707cf76dbd9c43d3",
  "skillsclen_d10af457daa1deed54e2c36b5f295e7e",
  "skillsclen_c0089e6579593f104f5cce8f8ca3ed0a",
  "skillsclen_c769c2bd15500dd906102d9be97fdceb",
  "skillsclen_9ed083b1436e5f40ef984b28255eef18",
```

II.

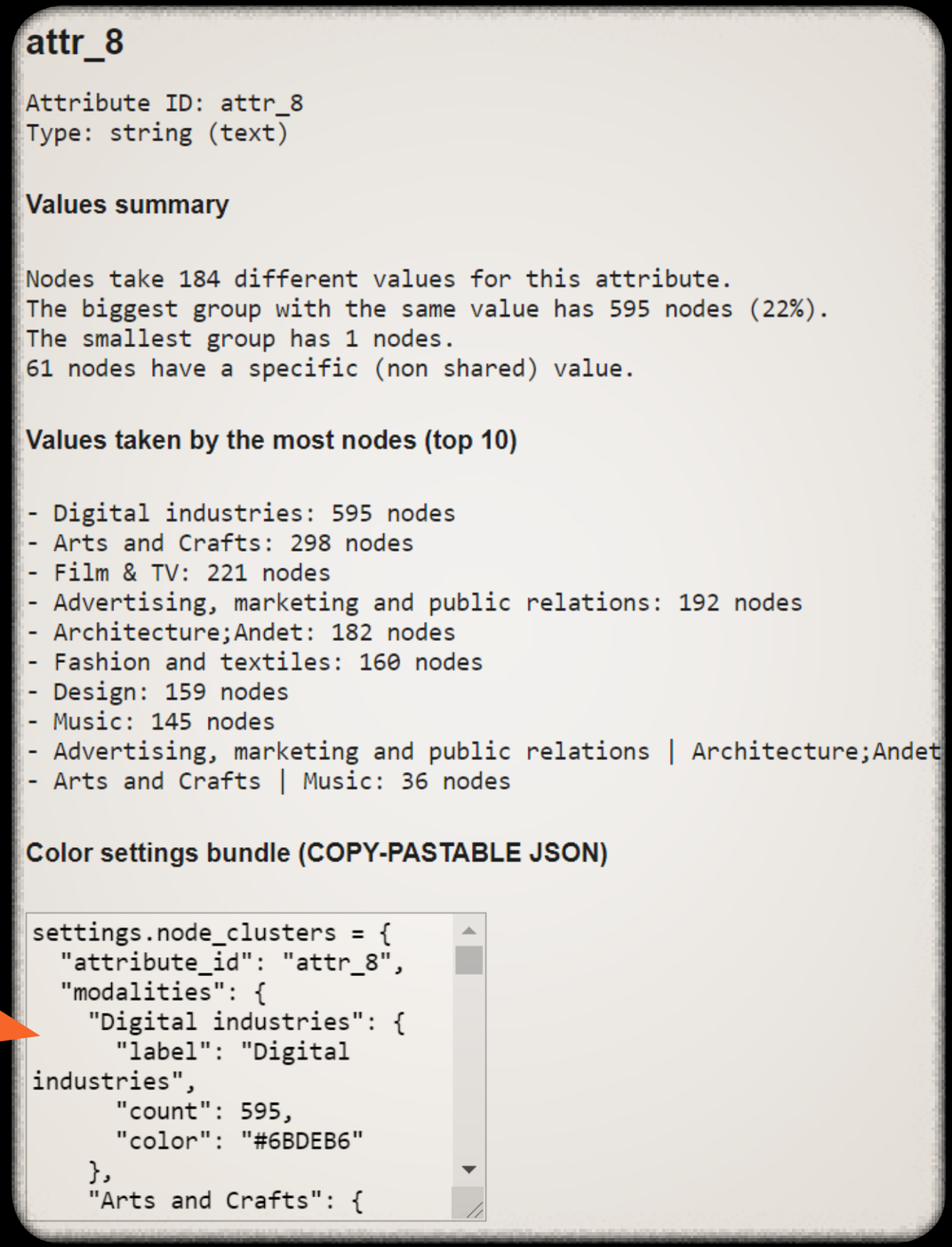
How to use ‘Prepare’ and ‘Make a map’

How to use ‘Prepare’ and ‘Make a map’

The script Prepare outputs informations on node attributes as a list.

For each attribute, you know the most important modalities (the values that nodes have for this attribute).

For each attribute, you also have a text field containing a JSON bundle. This bundle can be copy-pasted to other scripts like Make a Map to pass certain informations. You can also edit it.



attr_8

```
Attribute ID: attr_8
Type: string (text)

Values summary

Nodes take 184 different values for this attribute.
The biggest group with the same value has 595 nodes (22%).
The smallest group has 1 nodes.
61 nodes have a specific (non shared) value.

Values taken by the most nodes (top 10)

- Digital industries: 595 nodes
- Arts and Crafts: 298 nodes
- Film & TV: 221 nodes
- Advertising, marketing and public relations: 192 nodes
- Architecture;Andet: 182 nodes
- Fashion and textiles: 160 nodes
- Design: 159 nodes
- Music: 145 nodes
- Advertising, marketing and public relations | Architecture;Andet
- Arts and Crafts | Music: 36 nodes

Color settings bundle (COPY-PASTABLE JSON)

settings.node_clusters = {
  "attribute_id": "attr_8",
  "modalities": {
    "Digital industries": {
      "label": "Digital
industries",
      "count": 595,
      "color": "#6BDEB6"
    },
    "Arts and Crafts": {
```

How to use ‘Prepare’ and ‘Make a map’

The bundle contains:

- The identifier (ID) of the attribute
- A list of the most important modalities containing for each:
  - A label that you can edit
  - A color that you can edit
  - A count of nodes (leave it as it is)
- A default color for the other modalities (you can edit it too)

You can also remove certain modalities, but pay attention to respect the JSON syntax.

```
settings.node_clusters = {
  "attribute_id": "attr_8",
  "modalities": {
    "Digital industries": {
      "label": "Digital industries",
      "count": 595,
      "color": "#6BDEB6"
    },
    "Arts and Crafts": {
      "label": "Arts and Crafts",
      "count": 298,
      "color": "#5B5FFF"
    },
    "Film & TV": {
      "label": "Film & TV",
      "count": 221,
      "color": "#F8686D"
    },
    "Advertising, marketing and public relations": {
      "label": "Advertising, marketing and public relations",
      "count": 192,
      "color": "#AAAEFB"
    },
    "Architecture;Andet": {
      "label": "Architecture;Andet",
      "count": 182,
      "color": "#FEBBCF"
    },
    "Fashion and textiles": {
      "label": "Fashion and textiles",
      "count": 160,
      "color": "#A067D4"
    }
  },
  "default_color": "#C6C5C7"
}
```

How to use ‘Prepare’ and ‘Make a map’

How does ‘Prepare’ make the bundle?

There can be many modalities (as many as nodes). It can be too many. So the script puts a limit. It only lists the modalities that have the most nodes. The other ones will use the default color.

You can change the limit in the settings.

You can also change the color palette in the settings.

‘Prepare’ settings:

```
21
22  // Modalities the less represented will be omitted
23  // Note: "Infinity" is a valid number here
24  settings.maximum_modalities = 10
25
26  // Backscatter palette
27  // You will be able to modify colors afterwards
28  // Note: the order matters:
29  //       - from biggest to smallest cluster
30  //       - the last color is the default for small/other clusters
31
32  settings.default_palette = [
33    "#6BDEB6", // MINT GREEN
34    "#5B5FFF", // INDIGO BLUE
35    "#F8686D", // RED
36    "#AAAEFB", // VIOLET
37    "#FEBBCF", // PINK
38    "#A067D4", // PURPLE
39    "#FAEC7E", // YELLOW
40    "#3C9E8A", // GREEN
41    "#FC8550", // ORANGE
42    "#9F9F9F", // GREY
43    "#C6C5C7"  // LIGHT GREY
44  ]
```

III.

‘Make a Map’ settings

How settings are structured

```
19  var settings = {}
20
21  // Auto-download the image once it is done
22  settings.save_at_the_end = false
23
24  // Image size and resolution
25  settings.width =  1000 // in pixels
26  settings.height = 1000 // in pixels
27
28  // Zoom:
29  // You can zoon on a given point of the network
30  // to focus on a specific detail. It's not very easy to use
31  // because you must find the right point by trial and error.
32  // By default, a slight unzoom gives a welcome space on the borders
33  settings.zoom_enabled = true
34  settings.zoom_window_size = 1.1 // range from 0 to 1 (dezooms if >1)
35  settings.zoom_point = {x:0.5, y:0.5} // range from 0 to 1
36
37  // Layers:
38  // Decide which layers are drawn.
39  // The settings for each layer are below.
40  settings.draw_background = true
41  settings.draw_network_shape_fill = true
42  settings.draw_network_shape_contour = false
43  settings.draw_cluster_fills = false
44  settings.draw_cluster_contours = false
45  settings.draw_cluster_labels = false
46  settings.draw_edges = true
47  settings.draw_nodes = true
48  settings.draw_node_labels = true
49
50  // Layer order variations:
51  settings.cluster_fill_above_nodes = false
52
53  // Layer: Background
54  settings.background_circle = true
```

The settings of each script are on top of it. They consist of a list of values that you can edit.

The language used is Javascript. It does not matter much, except for the syntax of comments, that start with a double slash:

// this is a comment

Comments often tell you which values are suitable (range etc.)

What settings do
save at the end

```
21  // Auto-download the image once it is done
22  settings.save_at_the_end = false
```

Possible values:
true or false

If set to true, download the image as a file once the script is done.

Note: you can download the image anyway with right click + save as.

If the script is demanding (high resolution, many clusters...) it is safer to enable this, because some memory issues may happen between the end of the script and the manual saving.

What settings do **width and height**

```
24  // Image size and resolution
25  settings.width =  1000 // in pixels
26  settings.height = 1000 // in pixels
```

Sets the pixel size of the generated image.

Note: The other settings take this size into account.

Recommended practice: use a low resolution when you tweak the other settings, and use a high resolution at the end for the final export.

Example values:

Web image
1000 x 1000 (1 megapixel)

Zoomable web image
3000 x 3000 (9 megapixel)

High quality A4 print (300 dpi)
6300 x 8900 (56 megapixel)

Poster (100 x 100 cm, 200 dpi)
8000 x 8000 (64 megapixel)

What settings do **zoom**

```
28  // Zoom:
29  // You can zoon on a given point of the network
30  // to focus on a specific detail. It's not very easy to use
31  // because you must find the right point by trial and error.
32  // By default, a slight unzoom gives a welcome space on the borders
33  settings.zoom_enabled = true
34  settings.zoom_window_size = 1.1 // range from 0 to 1 (dezooms if >1)
35  settings.zoom_point = {x:0.5, y:0.5} // range from 0 to 1
```

Zoom in or zoom out.

By default, the view is slightly zoomed out for convenience.

The center point is expressed as a ratio. x=0.5 means 50% from the left, y=0.5 means 50% from the top.

No zoom:
zoom_window_size = 1

Zoom in: (less than 1)
zoom_window_size = 0.5

Zoom out: (more than 1)
zoom_window_size = 2

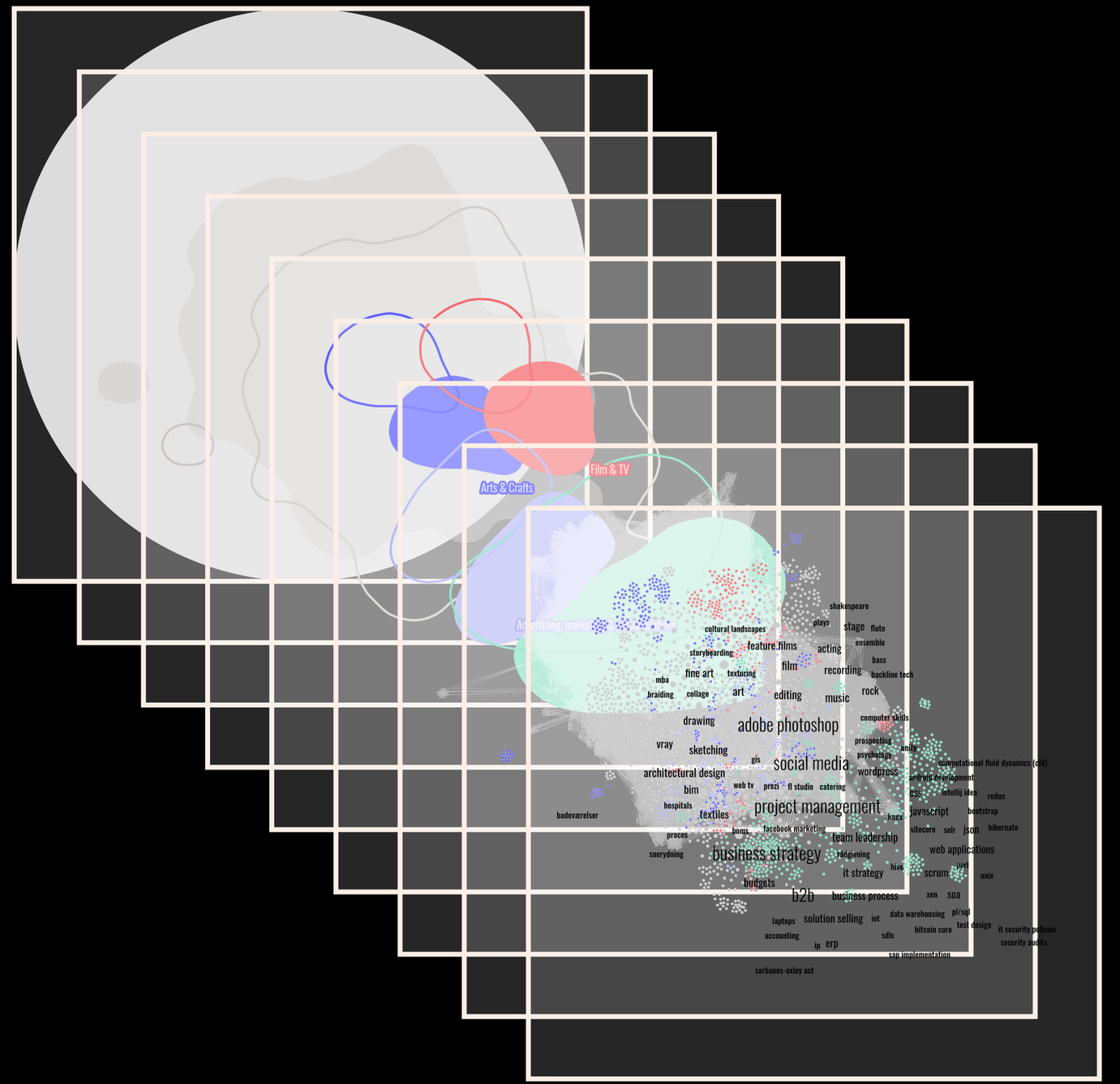
What settings do
layers

```
// Layers:
// Decide which layers are drawn.
// The settings for each layer are below.
settings.draw_background = true
settings.draw_network_shape_fill = true
settings.draw_network_shape_contour = false
settings.draw_cluster_fills = false
settings.draw_cluster_contours = false
settings.draw_cluster_labels = false
settings.draw_edges = true
settings.draw_nodes = true
settings.draw_node_labels = true
```

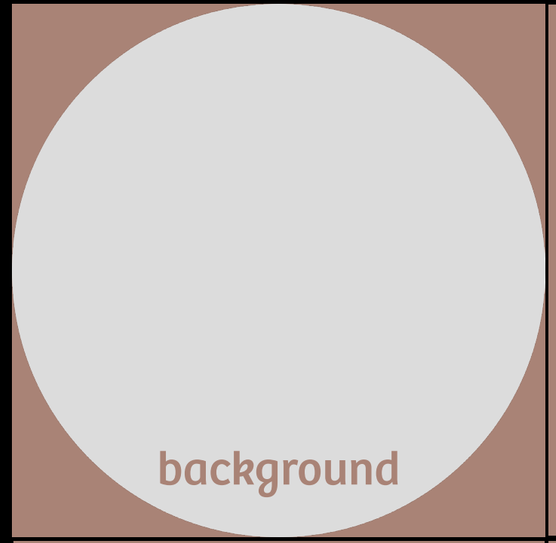
Decide which layers to display.

The final image is composed of layers like in Photoshop. They can be transparent.

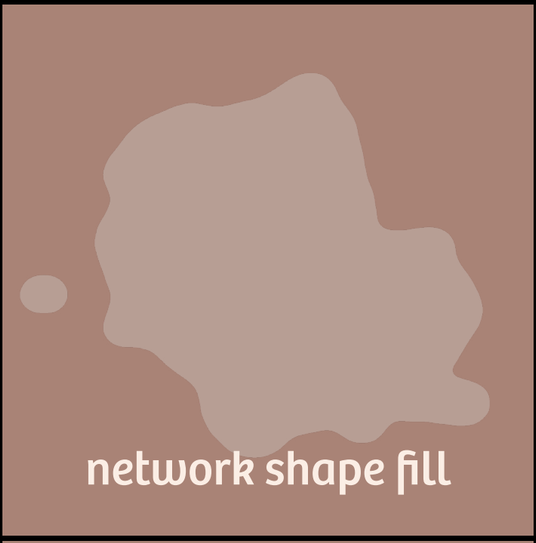
Note: it is sometimes useful to export layers separately.



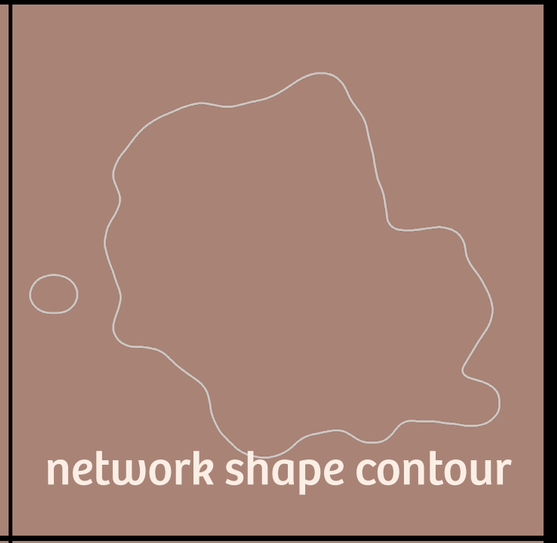
These are all the layers



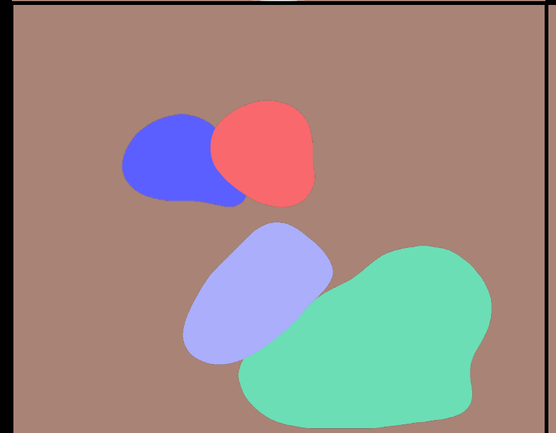
background



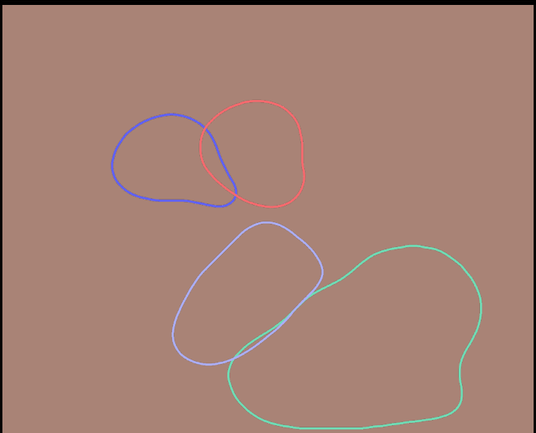
network shape fill



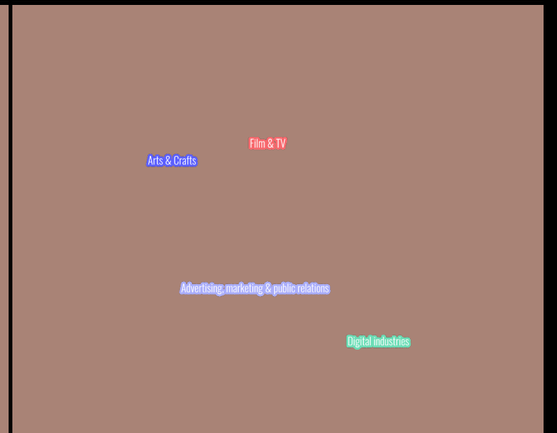
network shape contour



cluster fills



cluster contours



cluster labels

edges

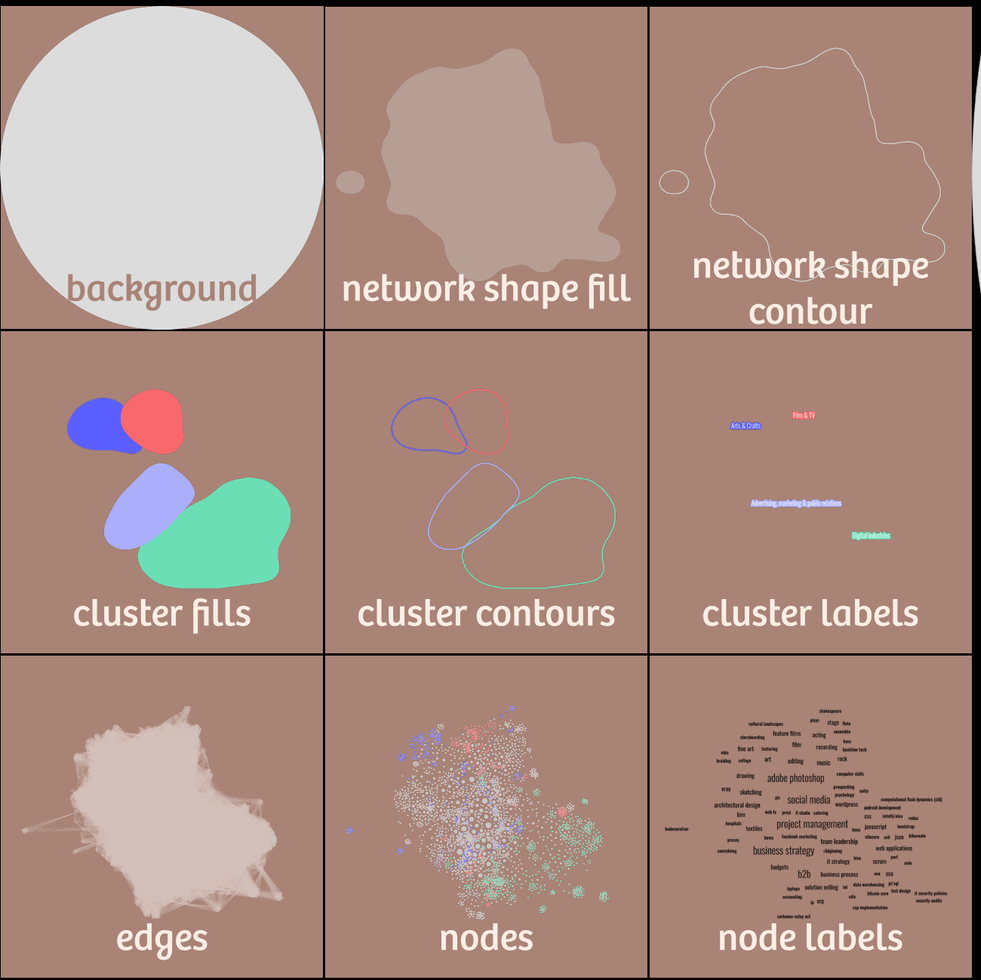
nodes

node labels

Layers

Useful combinations

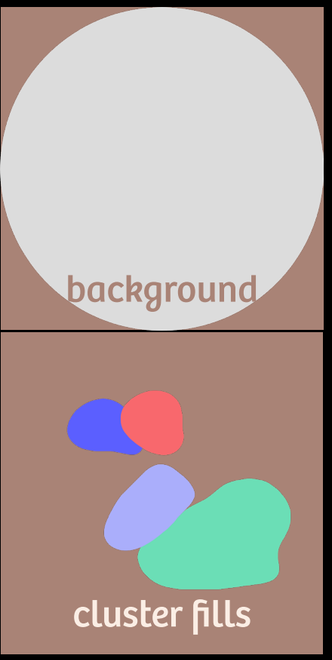
Displaying all layers at once is not recommended...

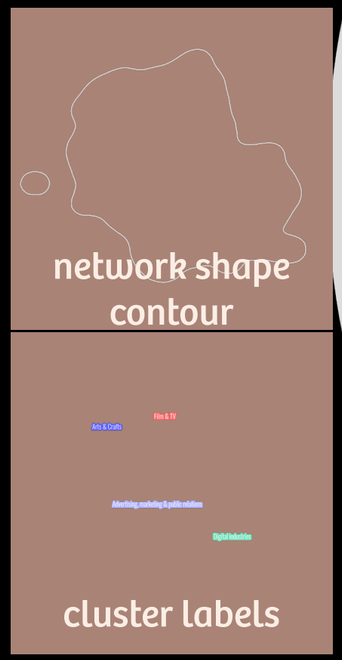


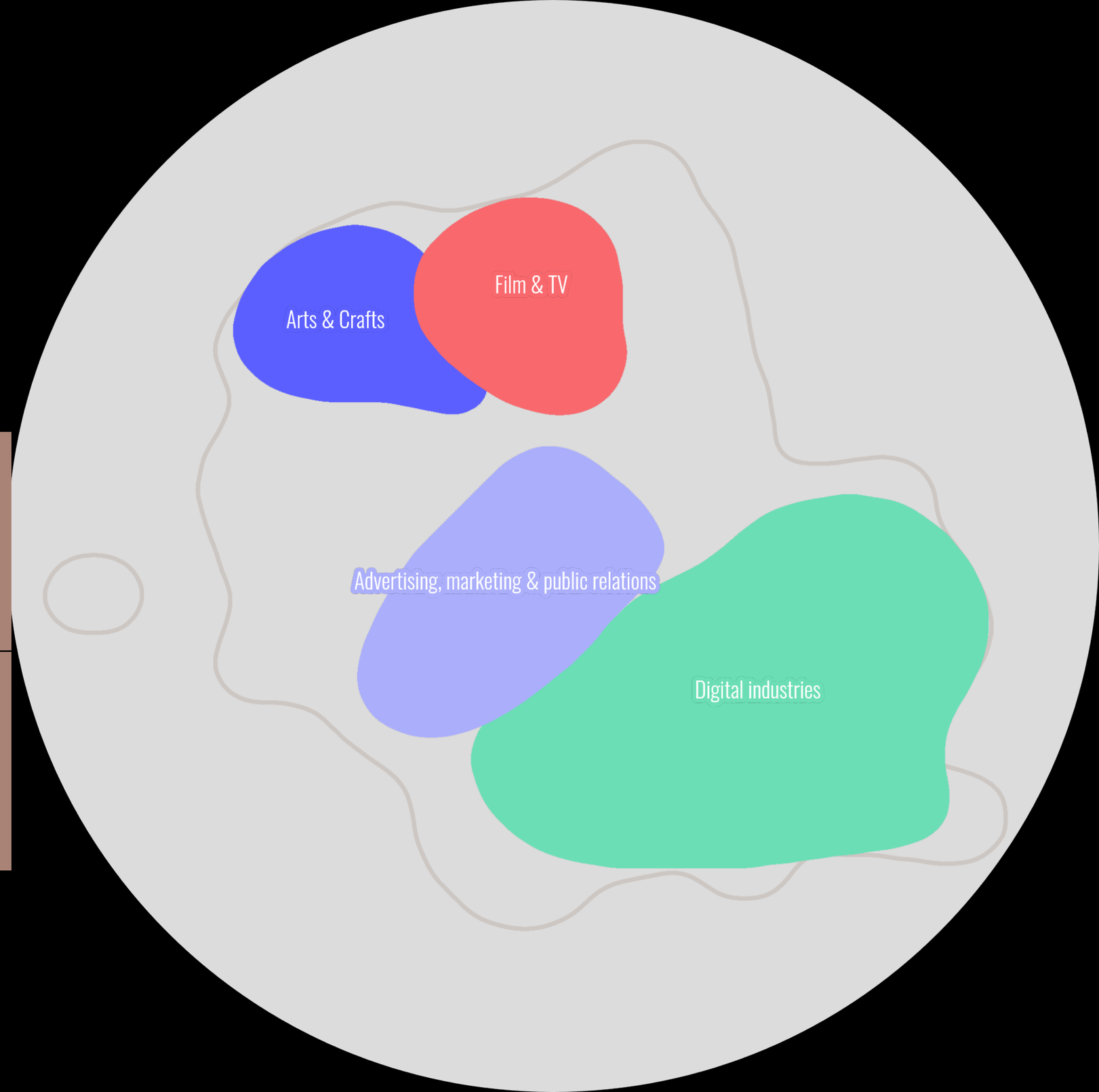
Layers

Useful combinations

Example:
Cluster overview



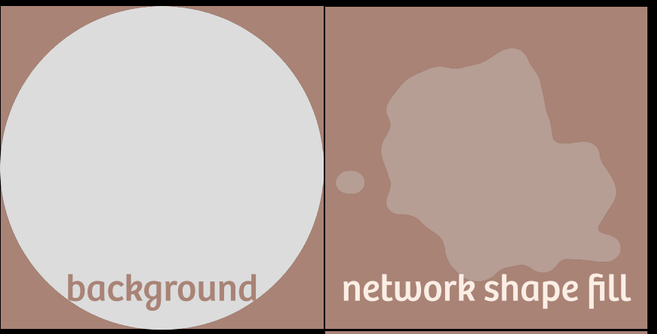


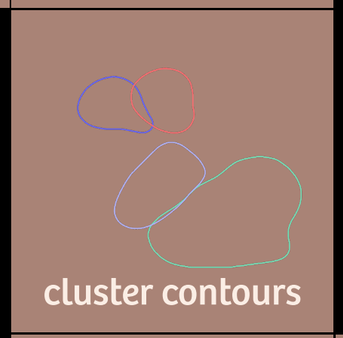


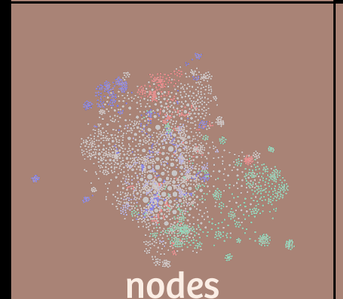
Layers

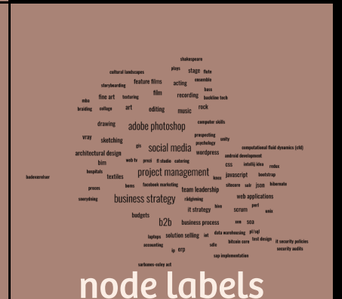
Useful combinations

Example:
Nodes with cluster highlight





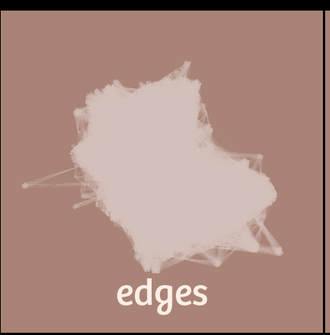


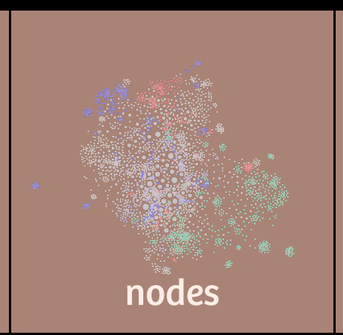


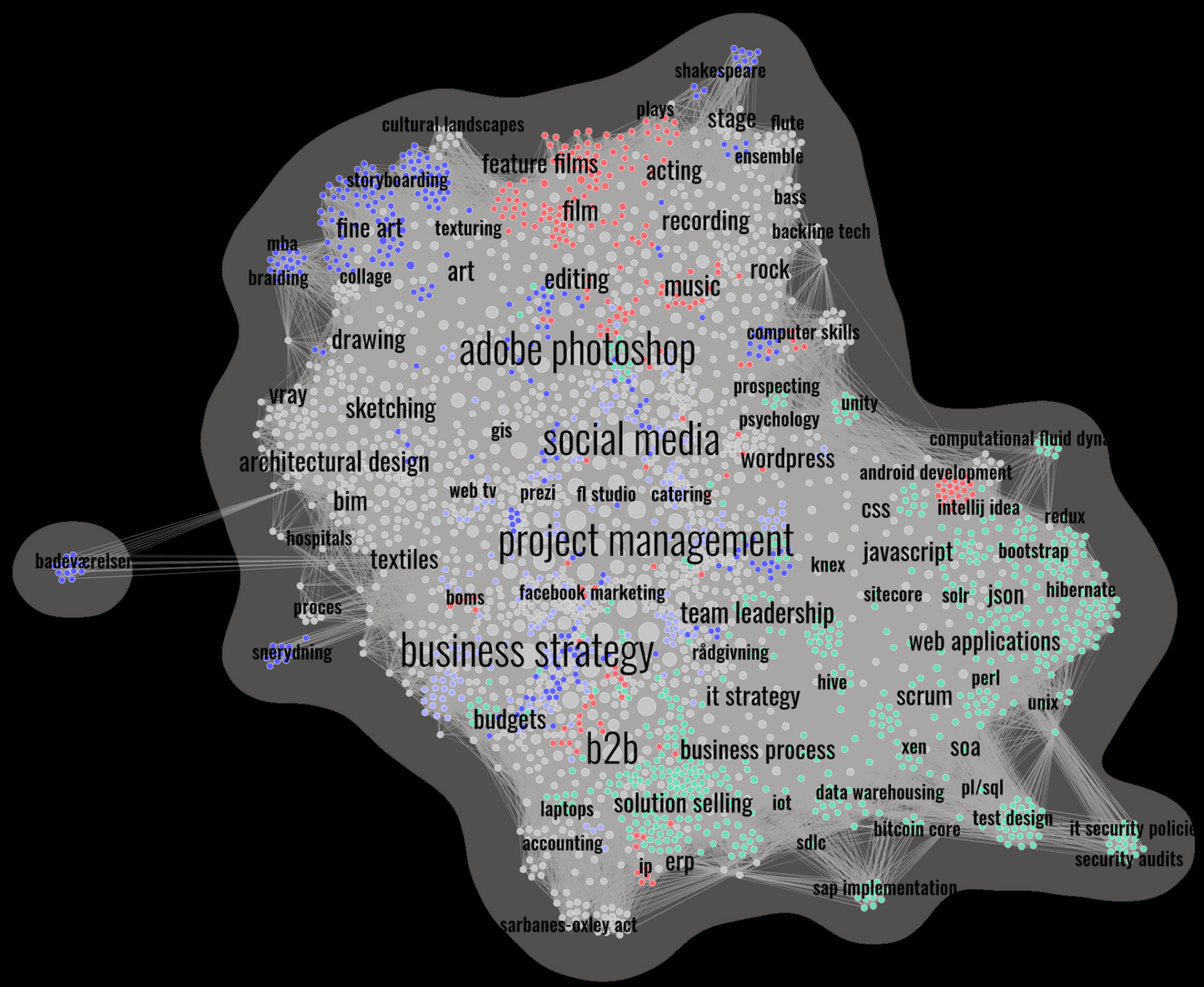
Layers

Useful combinations

Example:
Simple network



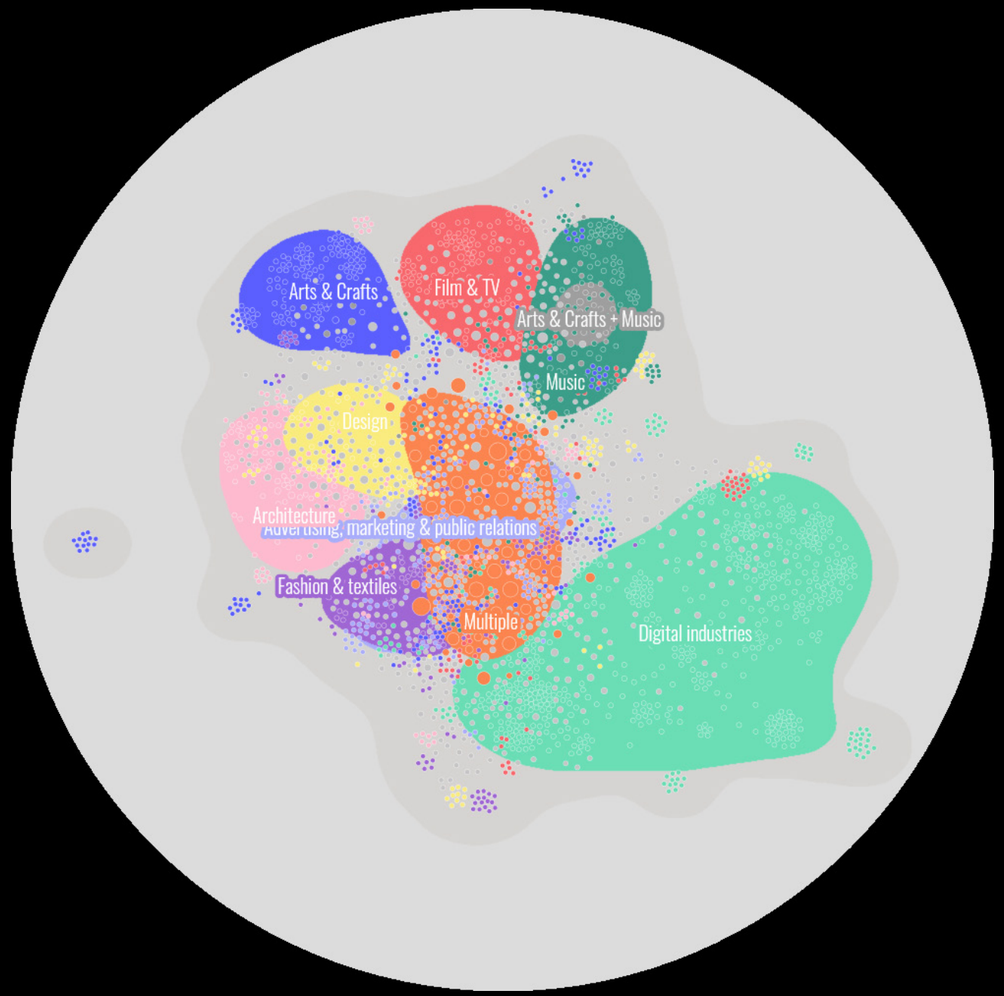




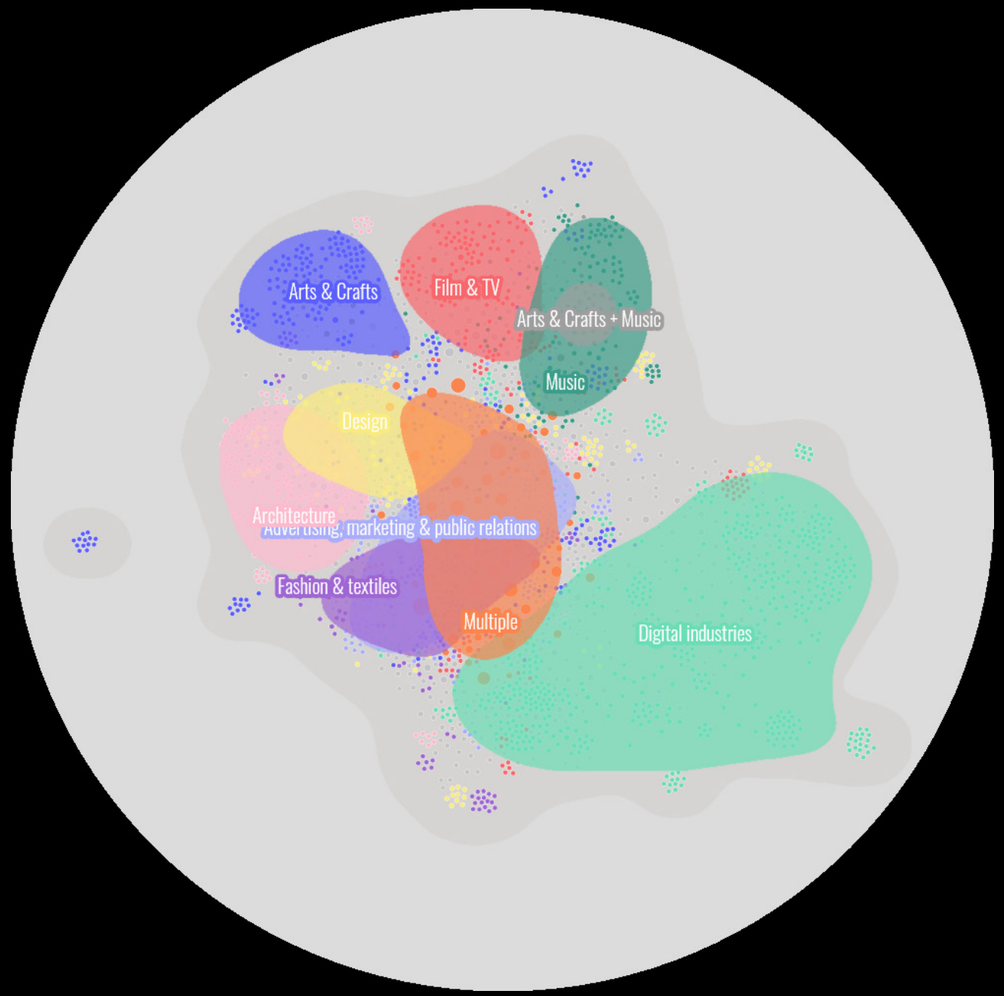
What settings do
cluster fill above nodes

```
// Layer order variations:
settings.cluster_fill_above_nodes = false
```

Alternate order for the layers.
Useful with cluster fill opacity.



cluster_fill_above_nodes = false
cluster_fill_opacity = 1



cluster_fill_above_nodes = true
cluster_fill_opacity = 0.7

III.1.

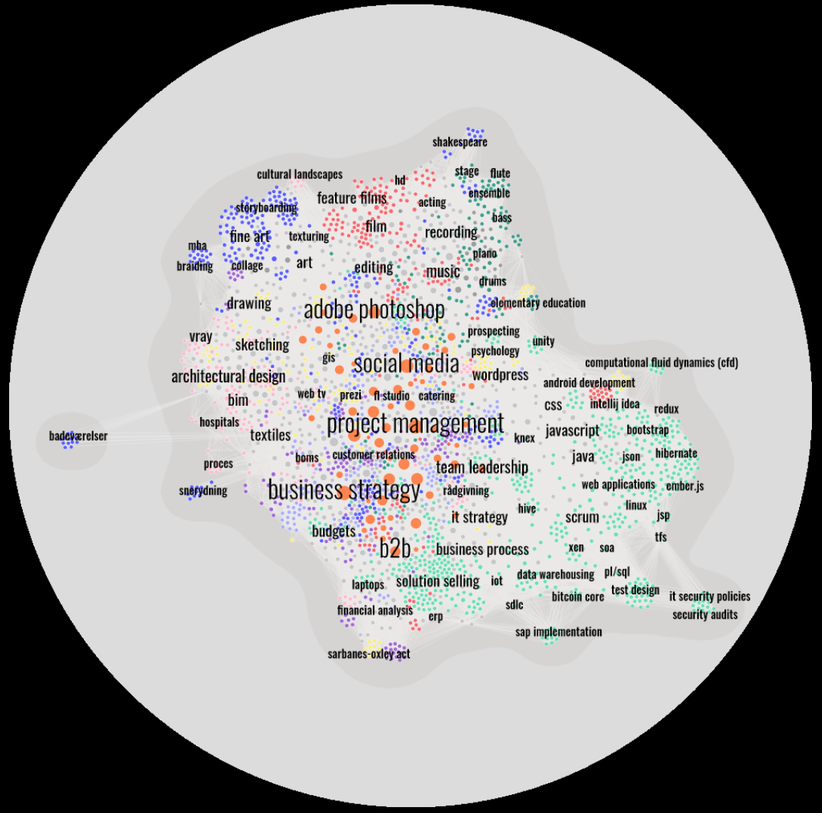
‘Make a Map’ settings: Background layer

background layer settings

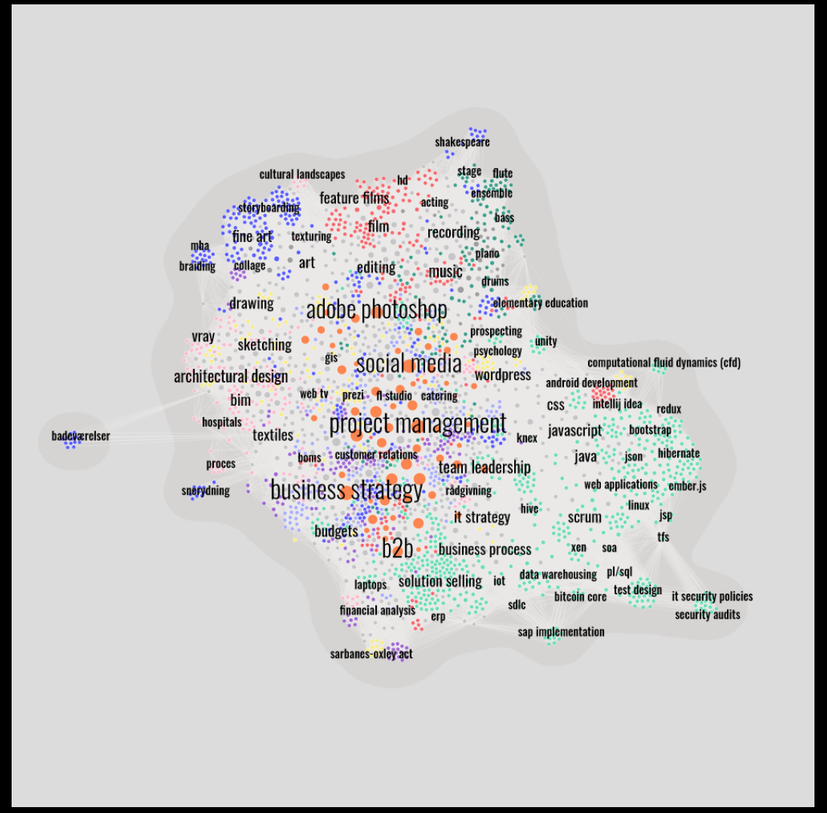
```
53  // Layer: Background
54  settings.background_circle = true
55  settings.background_color = "#DCDCDC"
```

Color and shape of the background

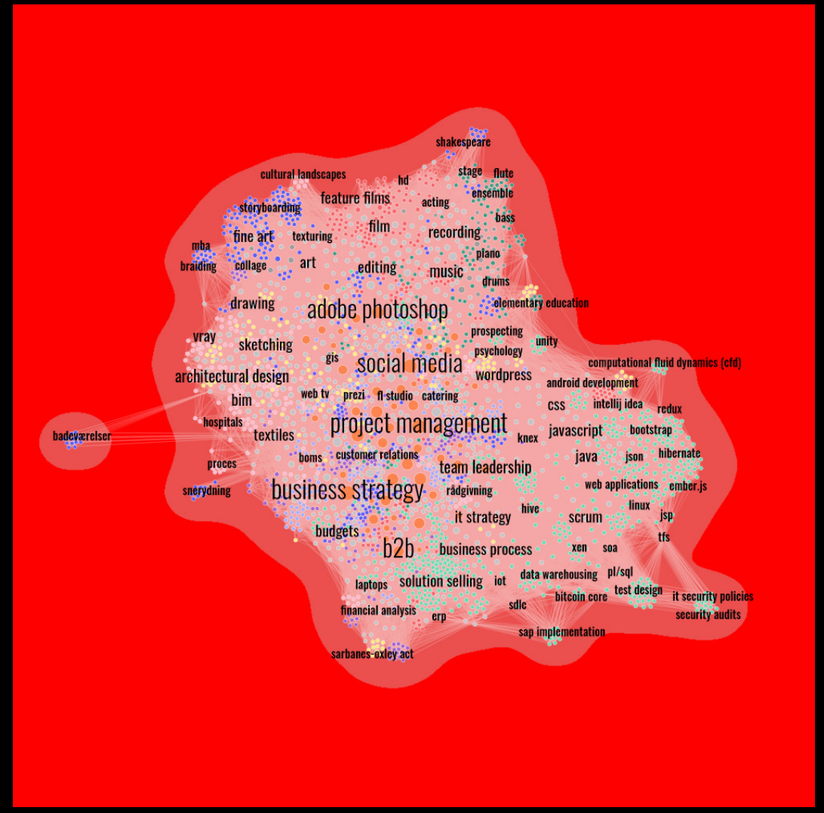
```
settings.background_circle = true
settings.background_color = “#DCDCDC”
```




```
settings.background_circle = false
settings.background_color = “#DCDCDC”
```




```
settings.background_circle = false
settings.background_color = “#FF0000”
```



III.2.

‘Make a Map’ settings: Network shape layers

network shape layer settings

```
57  // Layer: Network shape
58  //        (a potato for the whole network)
59  // ...generic structure
60  settings.network_shape_spreading = 0.9 //
61  settings.network_shape_smoothness = 0 // Range: 0 to 10
62  // ...shape fill
63  settings.network_shape_fill_opacity = 0.4 //
64  settings.network_shape_fill_color = "#cdc7c3"
65  // ...shape contour
66  settings.network_shape_contour_thickness = 3 //
67  settings.network_shape_contour_opacity = 1 //
68  settings.network_shape_contour_color = "#cdc7c3"
```

Settings of the shape itself

Appearance of its fill

Appearance of its contour

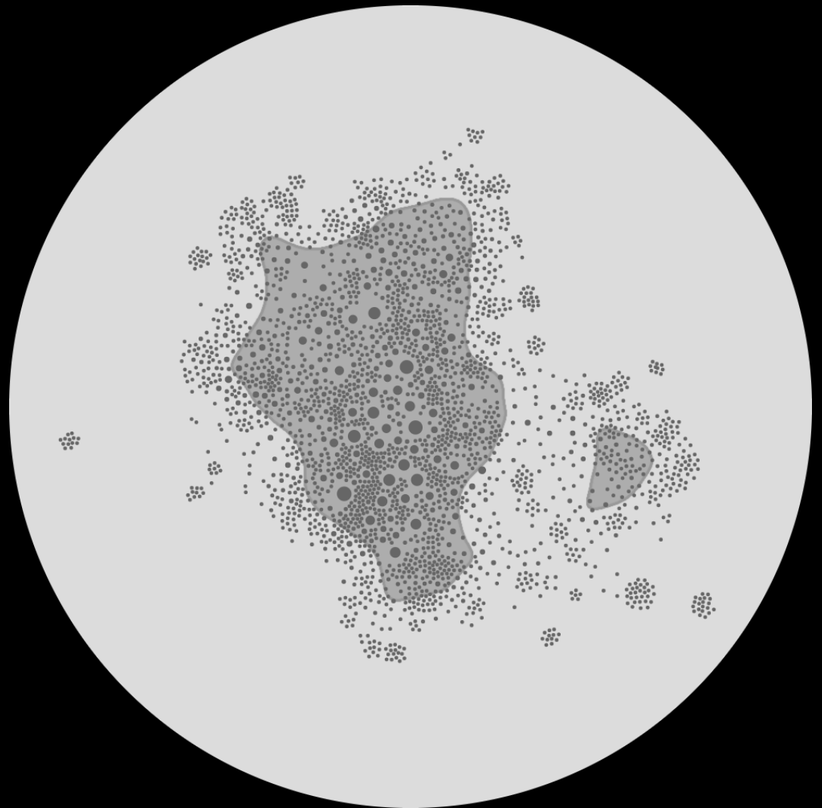
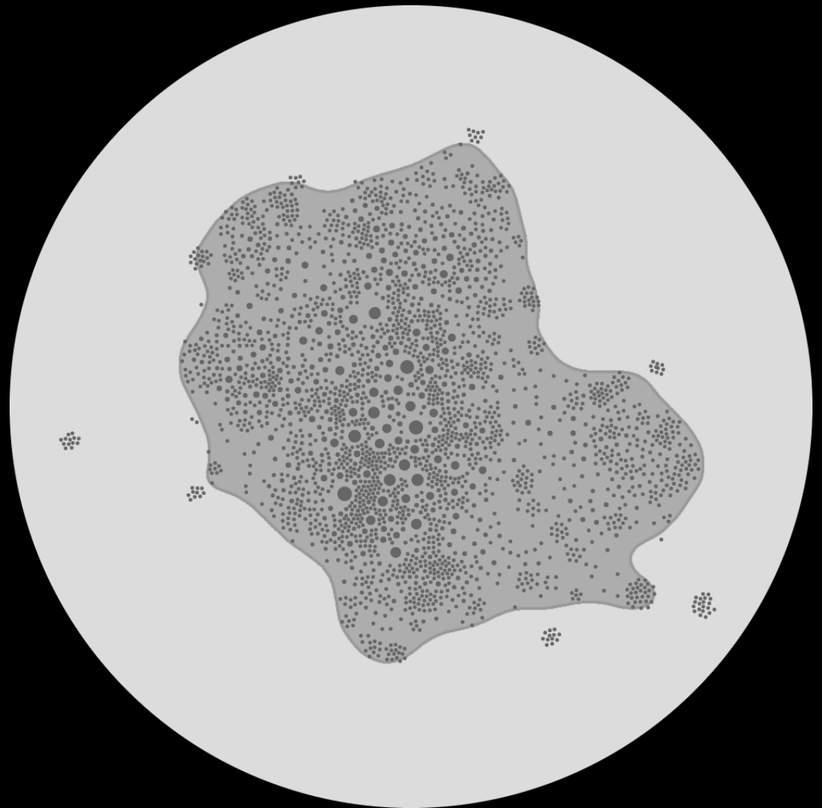
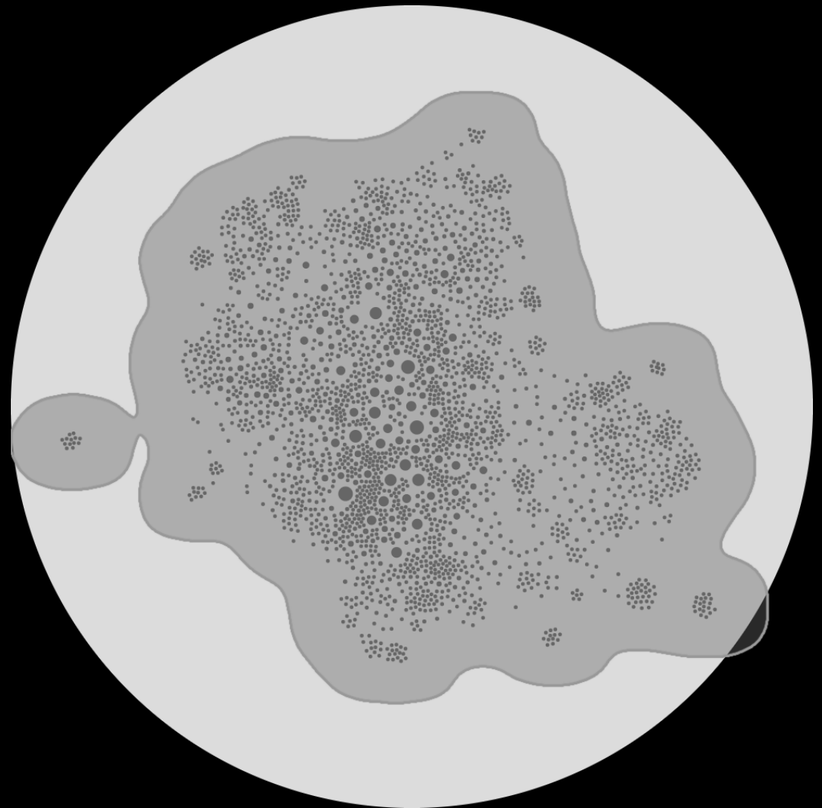
network shape layer settings

spreading

Makes the shape smaller or larger. At 0.5 it approximately follows the nodes.

`settings.network_shape_spreading =`

`0.01` `0.5` `0.99`

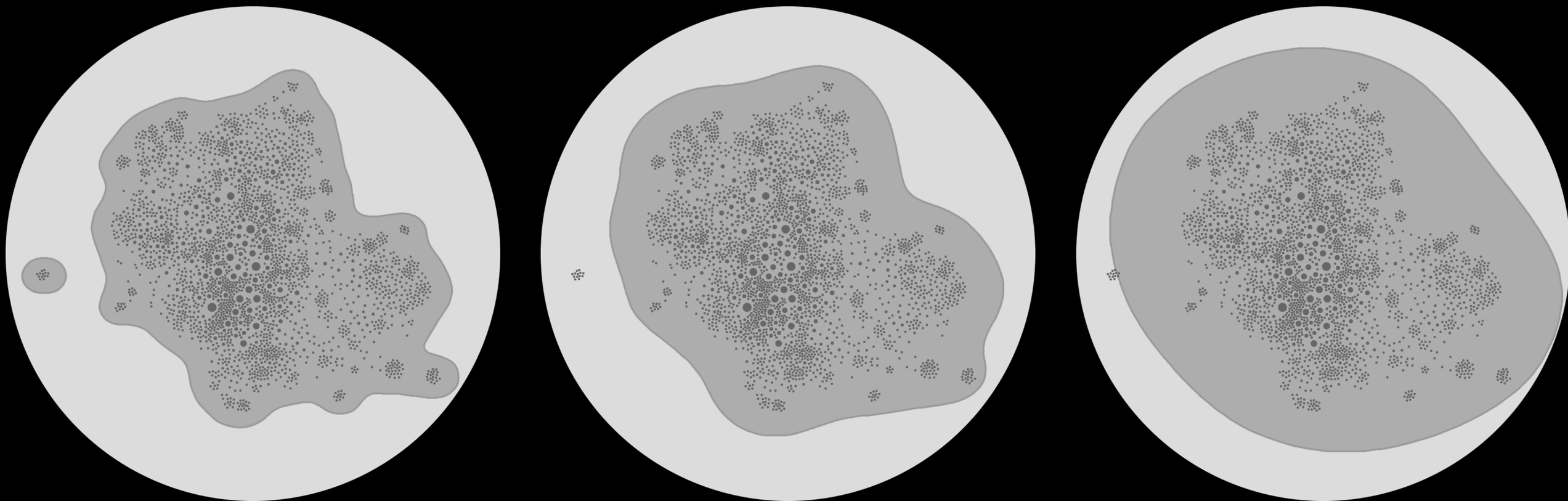




smoothness

The higher, the more the shape is rounded.

`settings.network_shape_smoothness =`

`0` `5` `15`



III.3.
‘Make a Map’ settings:
Clusters layers

clusters layer settings

The settings of the clusters are almost the same as the network shape, except there are also labels.

```
70  // Layer: Clusters
71  //        (a potato per modality of tqrget attribute)
72  // ...generic structure
73  settings.cluster_all_modalities = false // By default, we c
74  settings.cluster_spreading = 0.5 // R
75  settings.cluster_smoothness = 5 // Range: 0 to 10 or more /
76  // ...cluster fills
77  settings.cluster_fill_opacity = 1.0 // Opacity // Range fro
78  settings.cluster_fill_color_by_modality = true /
79  settings.cluster_fill_color_default = "#8B8B8B"
80  // ...cluster contours
81  settings.cluster_contour_thickness = 3 // Range: 0 to 10 or
82  settings.cluster_contour_opacity = 1 // Opacity
83  settings.cluster_contour_color_by_modality = true // if fal
84  settings.cluster_contour_color_default = "#8B8B8B"
85  // ...cluster labels
86  settings.cluster_label_font_size = 20 // in
87  settings.cluster_label_font_weight = 300
88  settings.cluster_label_outline_thickness = 4 // in px based
```

Settings of the shapes

Appearance of their fill

Appearance of their contour

Appearance of the labels

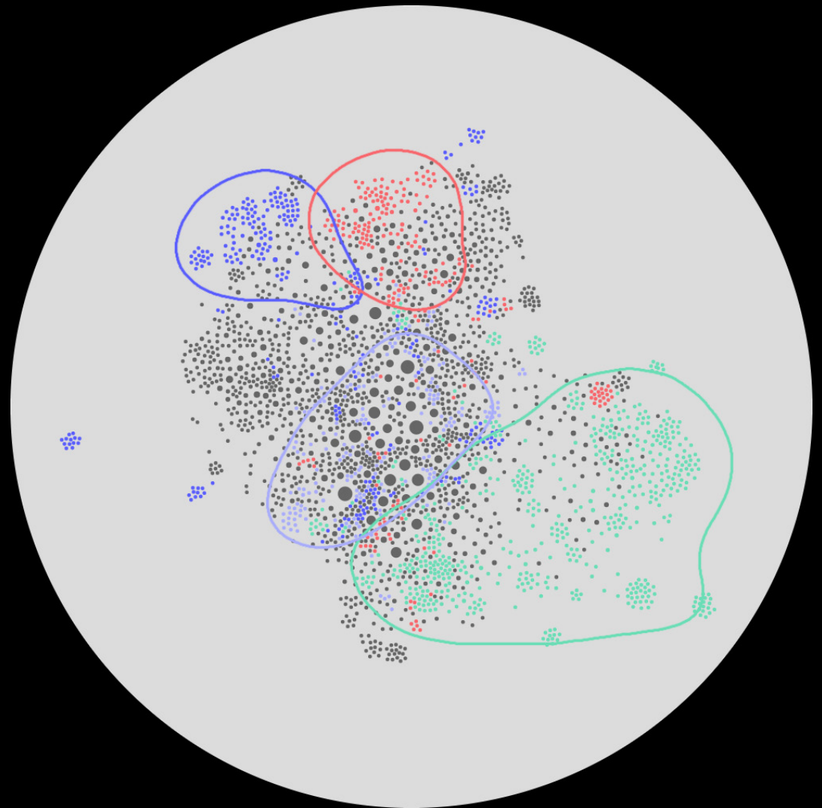
clusters layer settings

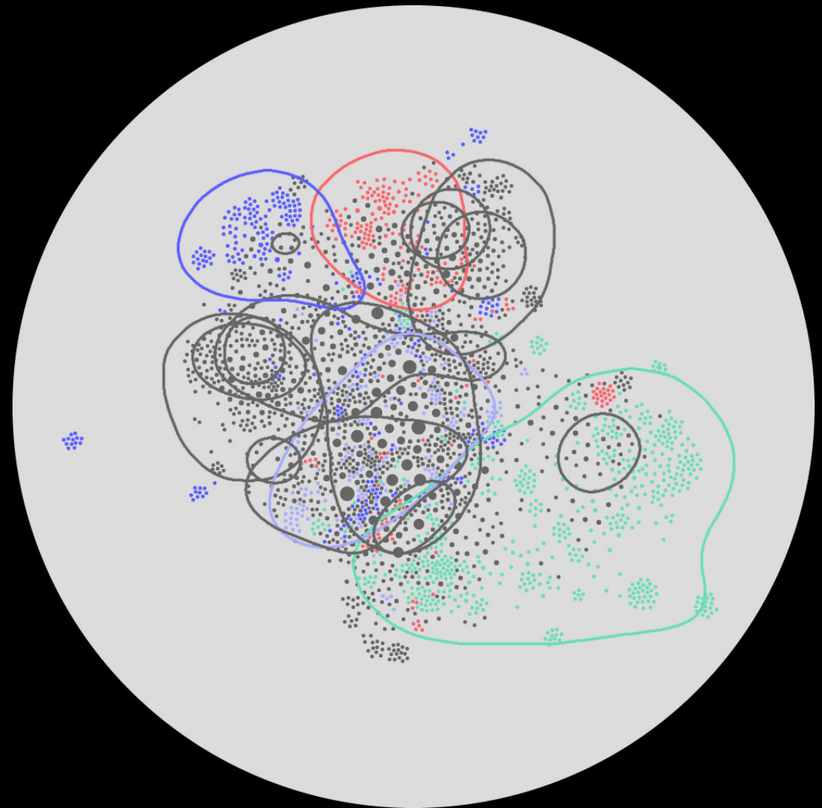
all modalities

Limits the clusters to the modalities mentioned in the JSON bundle from “Prepare”. Setting it to “true” could generate countless little clusters (time consuming).

`settings.cluster_all_modalities =`

`false` `true`





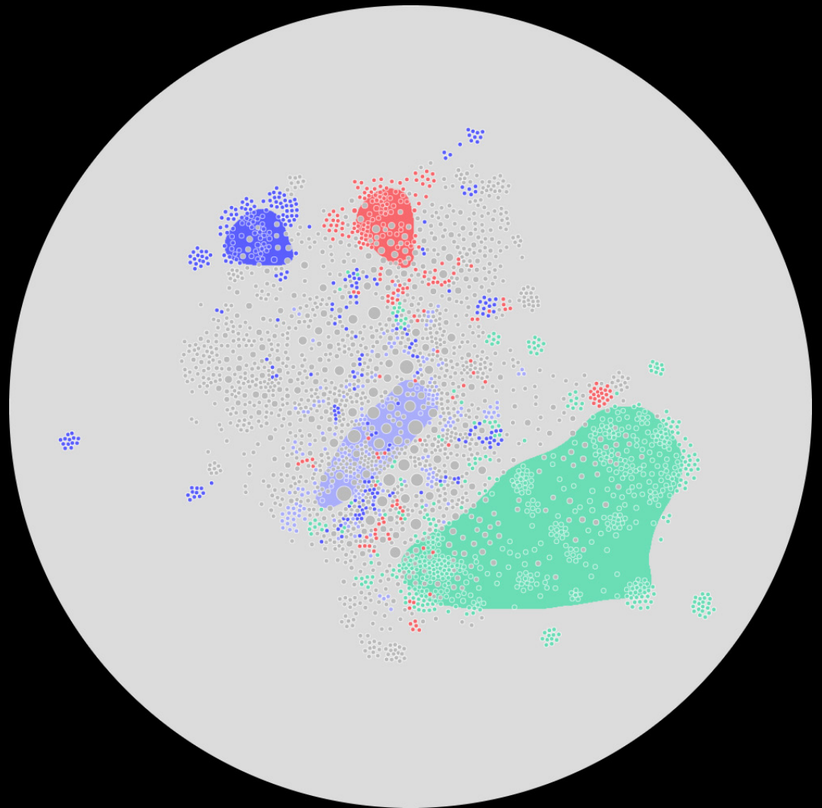
clusters layer settings

spreading

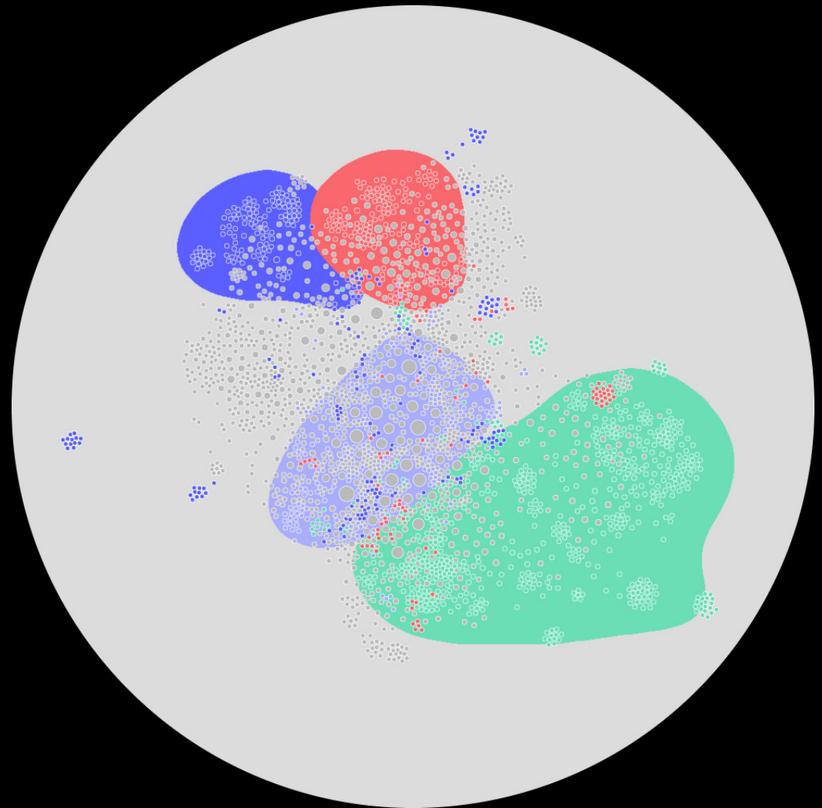
Makes the shapes smaller or larger. At 0.5 it approximately follows the nodes.

`settings.cluster_spreading =`

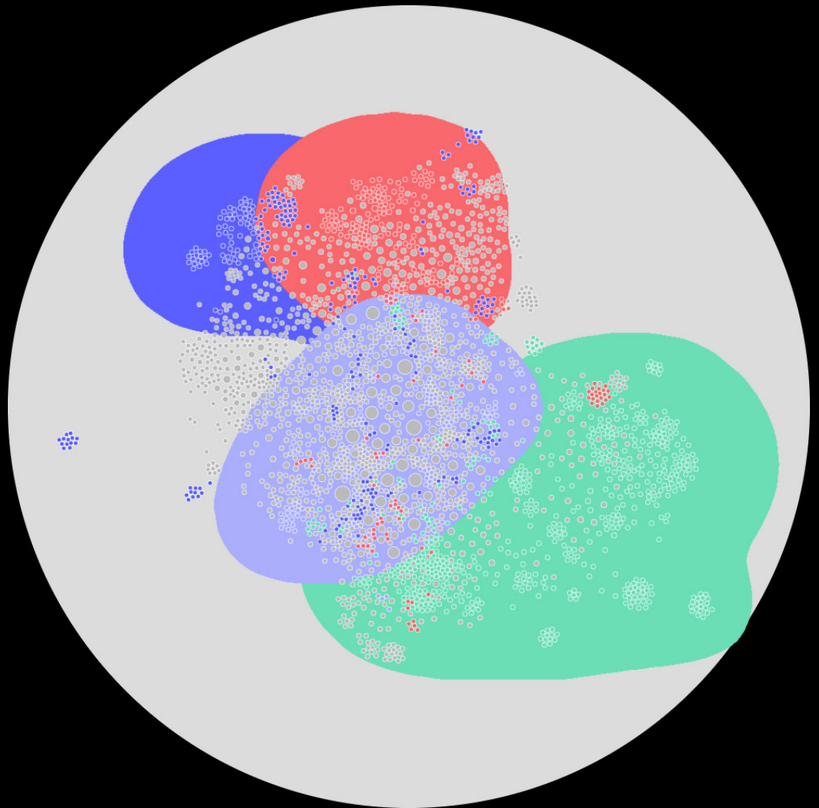
`0.01`



`0.5`



`0.99`



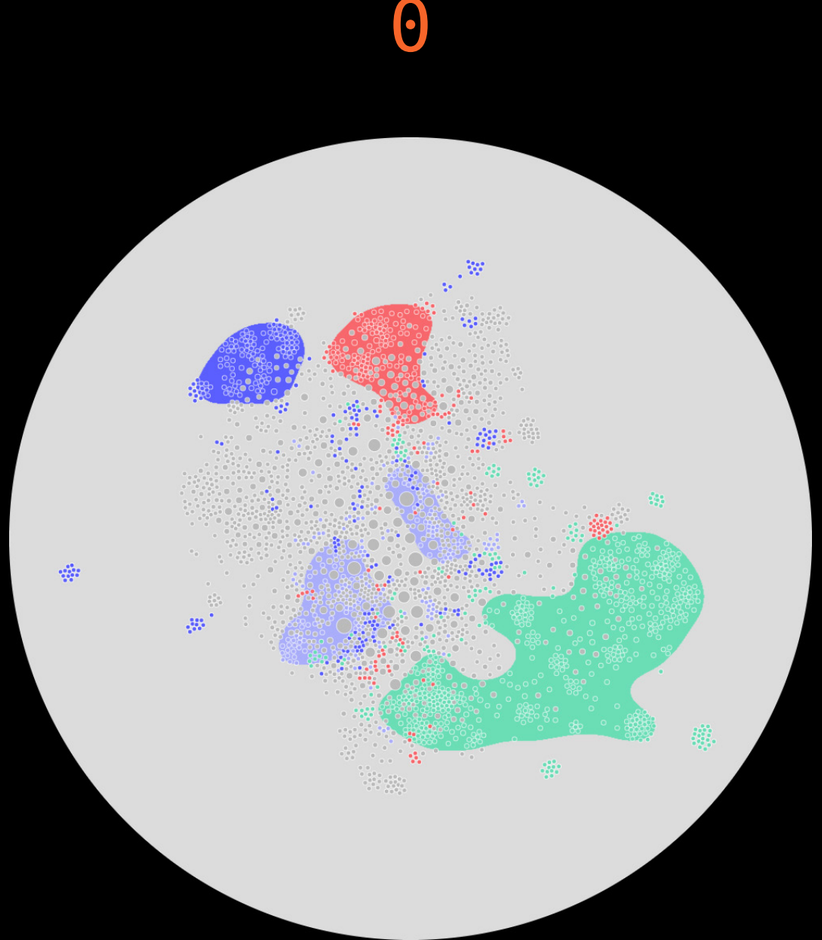
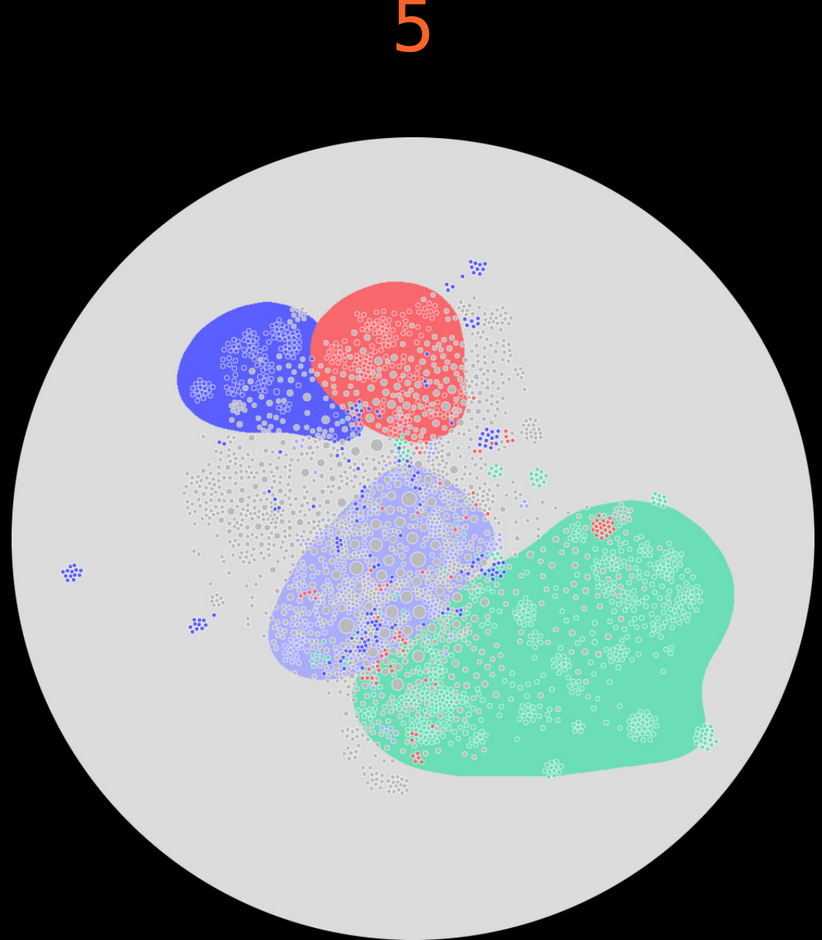
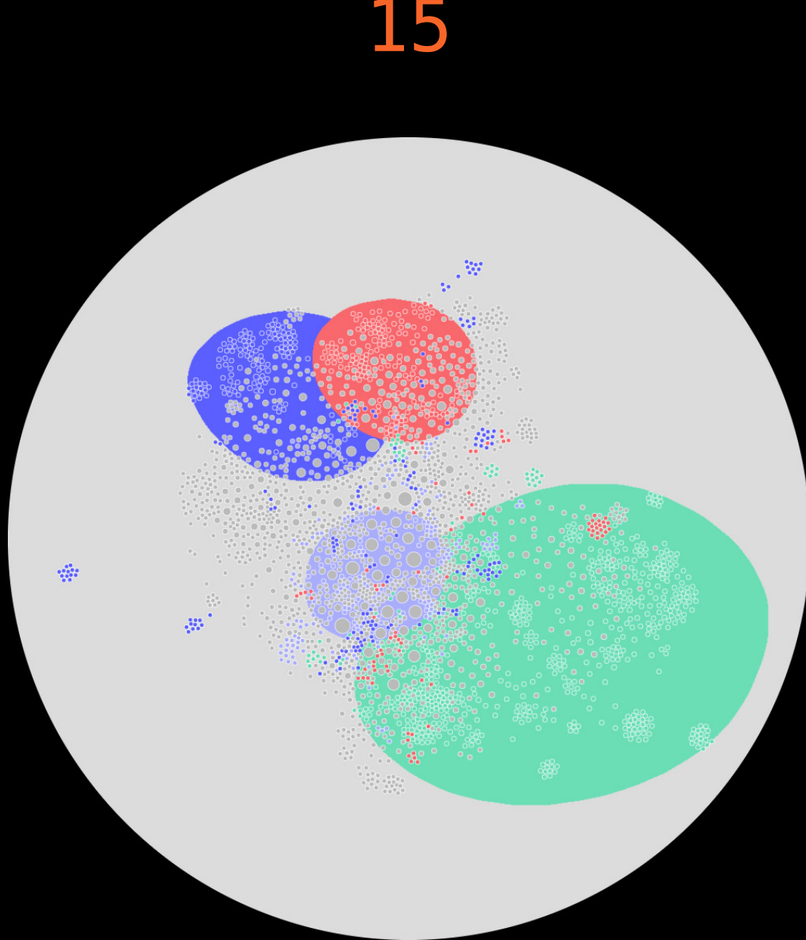
clusters layer settings

smoothness

The higher, the more the clusters are rounded.

`settings.cluster_smoothness =`

`0` `5` `15`

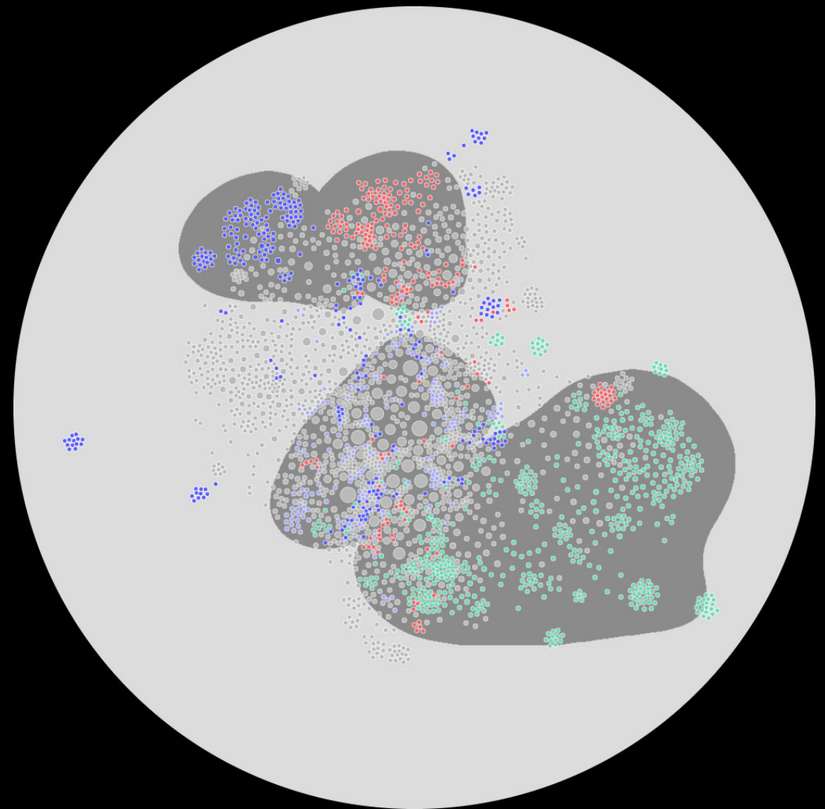
clusters layer settings

fill color by modality

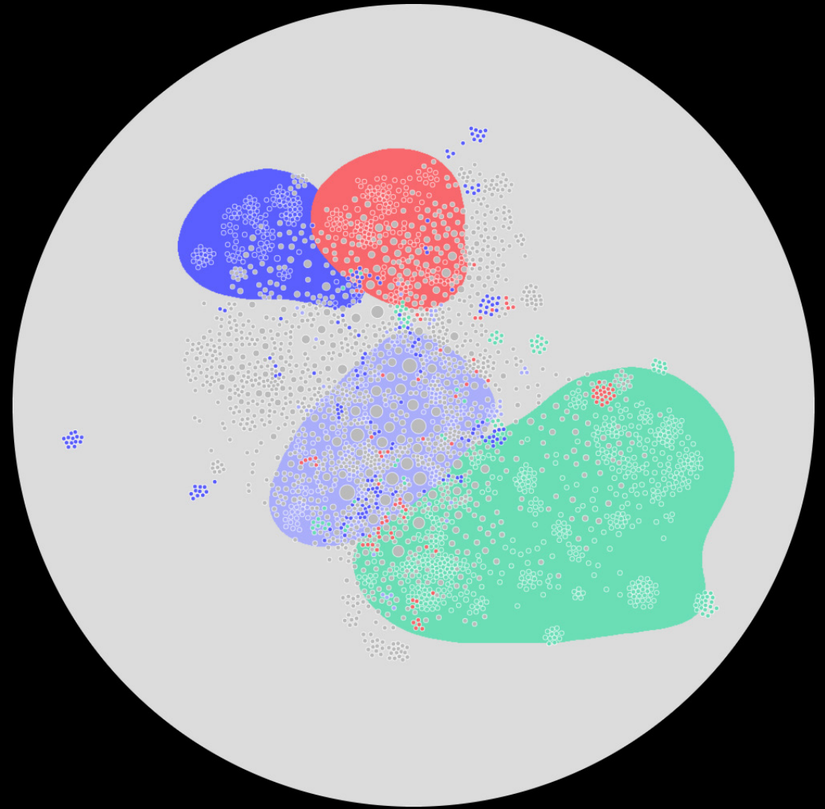
You can use a default color for the cluster fills.

```
settings.cluster_fill_color_by_modality =
```

`false`



`true`



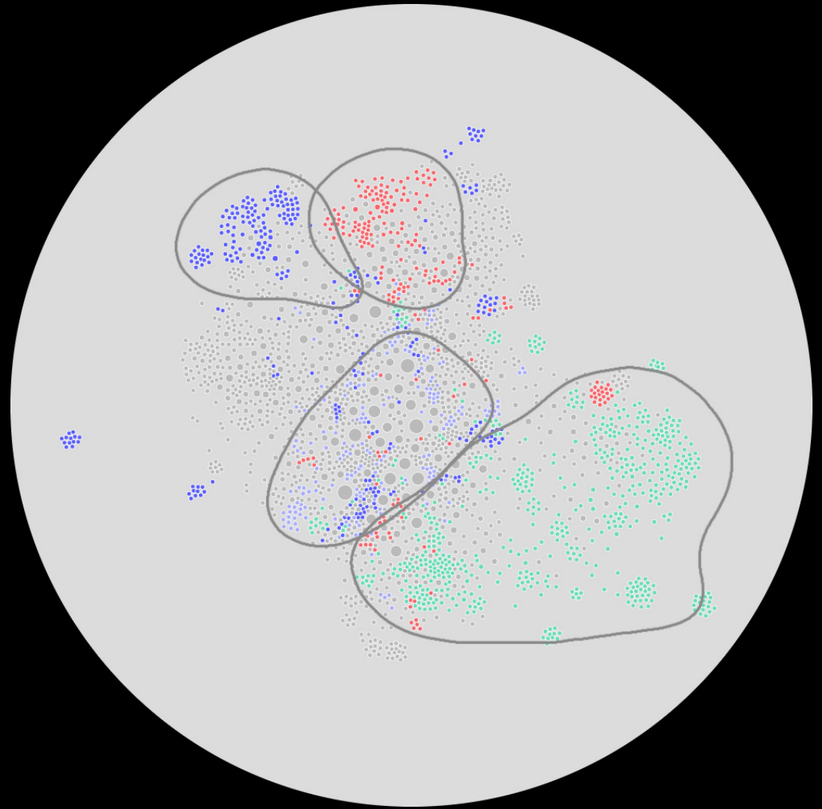
clusters layer settings

contour color by modality

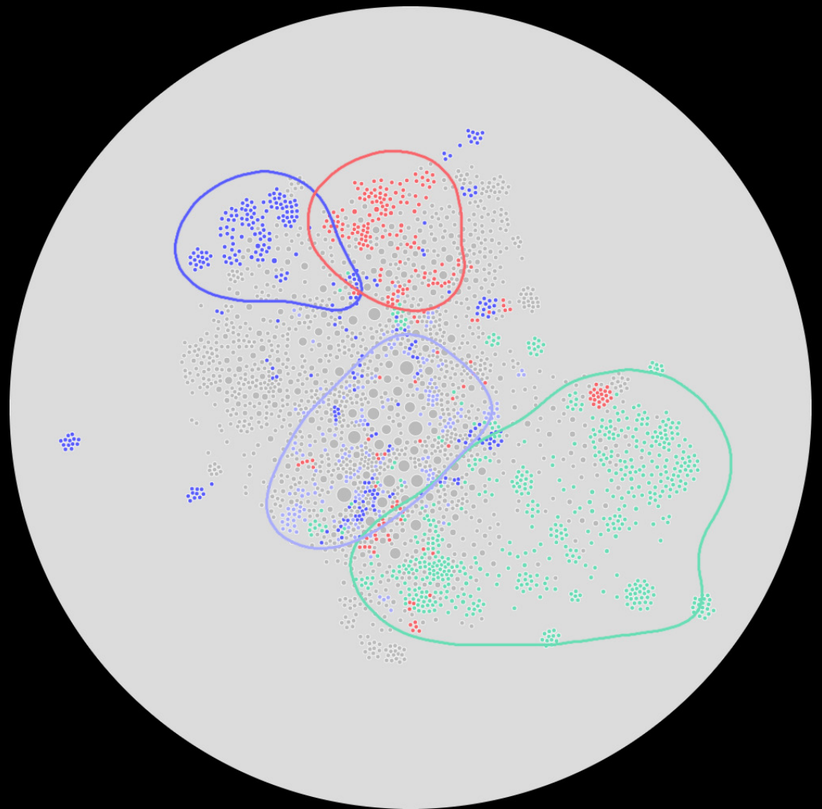
You can use a default color for the cluster contours.

```
settings.cluster_contour_color_by_modality =
```

`false`



`true`



III.4.

‘Make a Map’ settings: Edges layer

What settings do **edges** layer settings

```
90  // Layer: Edges
91  settings.edge_thickness = 0.3 // in px based on 1MP
92  settings.edge_opacity = 0.5 // Opacity // Range from 0 to 1
93  settings.edge_high_quality = false // Halo around nodes // Time-consuming
94  settings.edge_show_part = 1 // Range from 0 to 1 // 0 hides all edges, 1 shows all
```

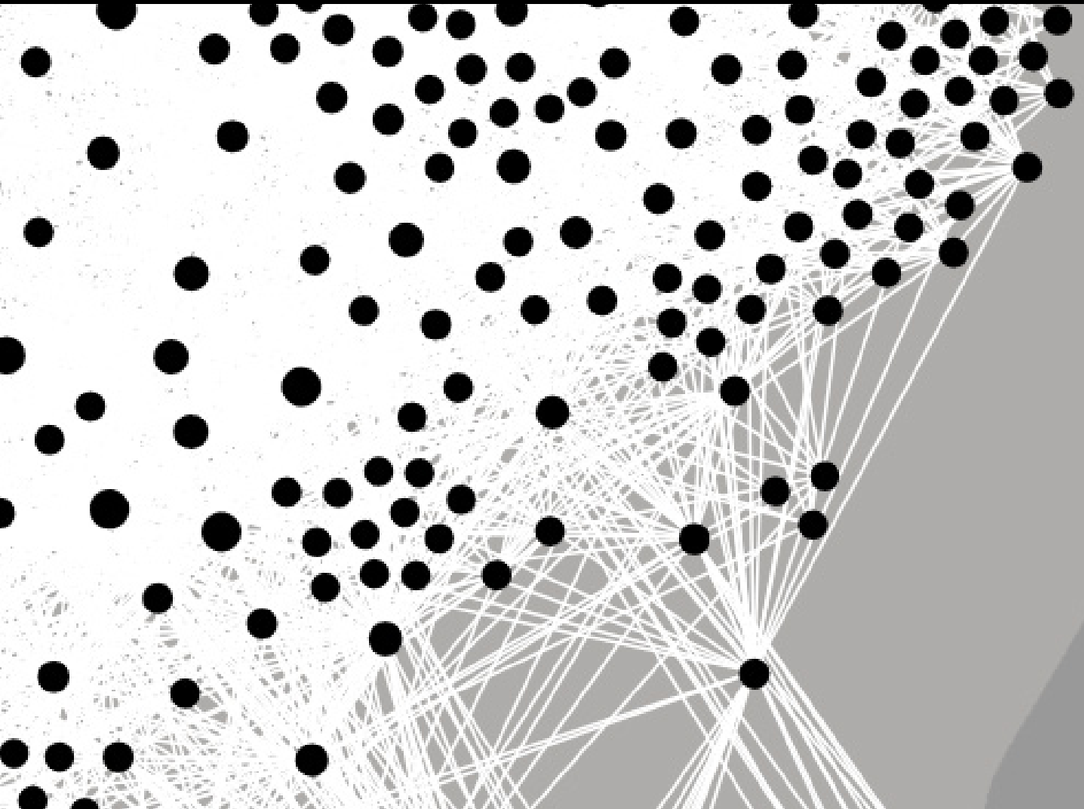
Note: Edge opacity applies to the whole layer (there are often so many edges that otherwise, even a low opacity would stack up to a completely opaque layer)

high quality

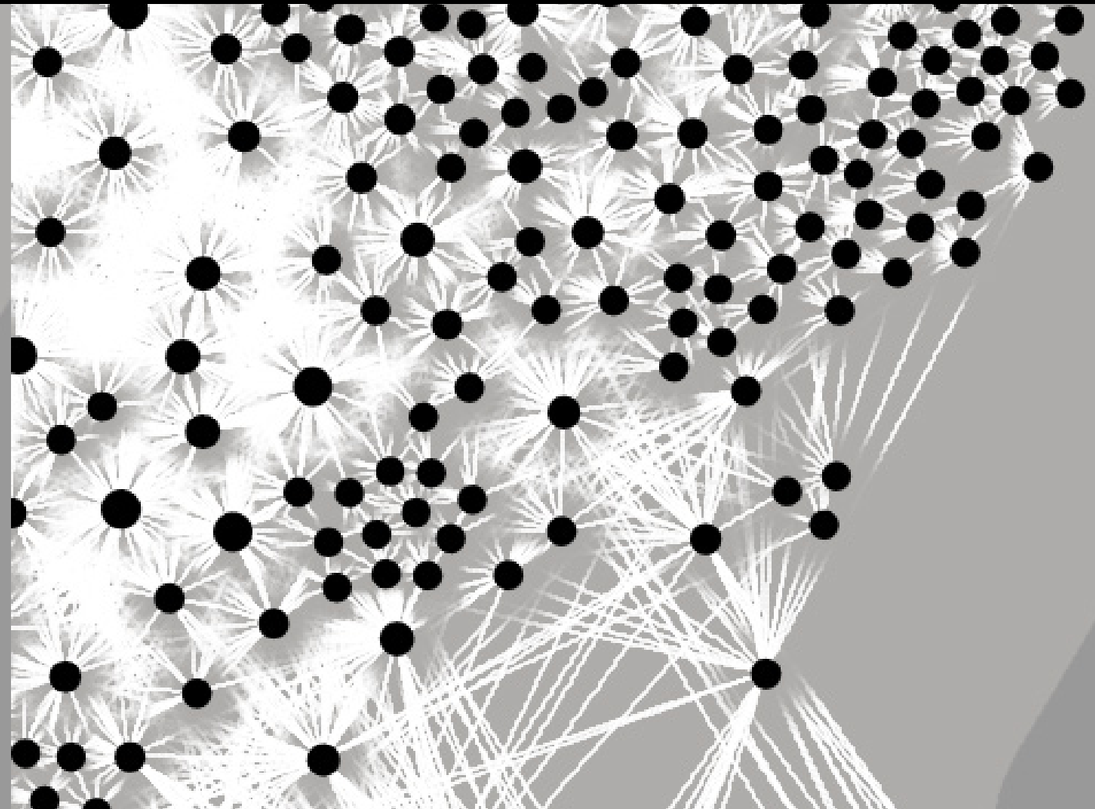
Creates a halo around each node where only connected edges are visible. In other words, edges that pass through are invisible in the halo. Time consuming.

```
settings.edge_high_quality =
```

`false`



`true`



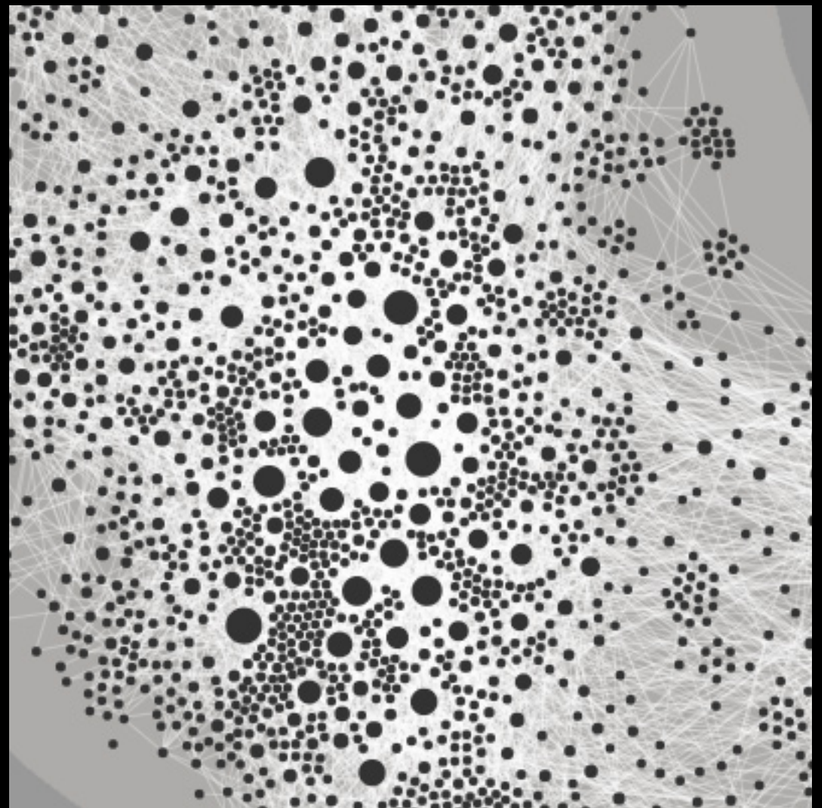
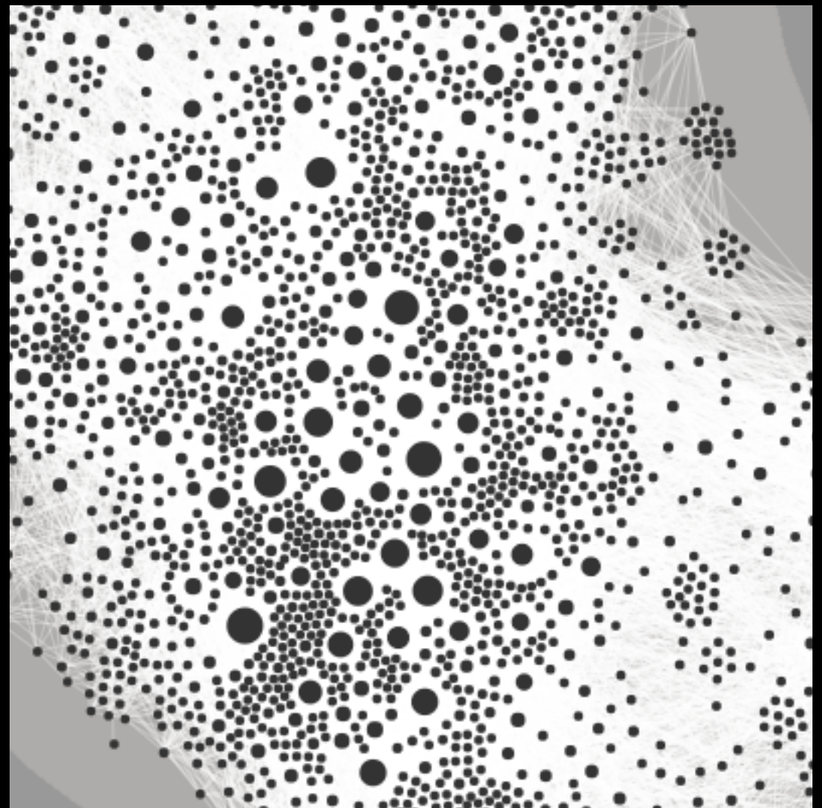
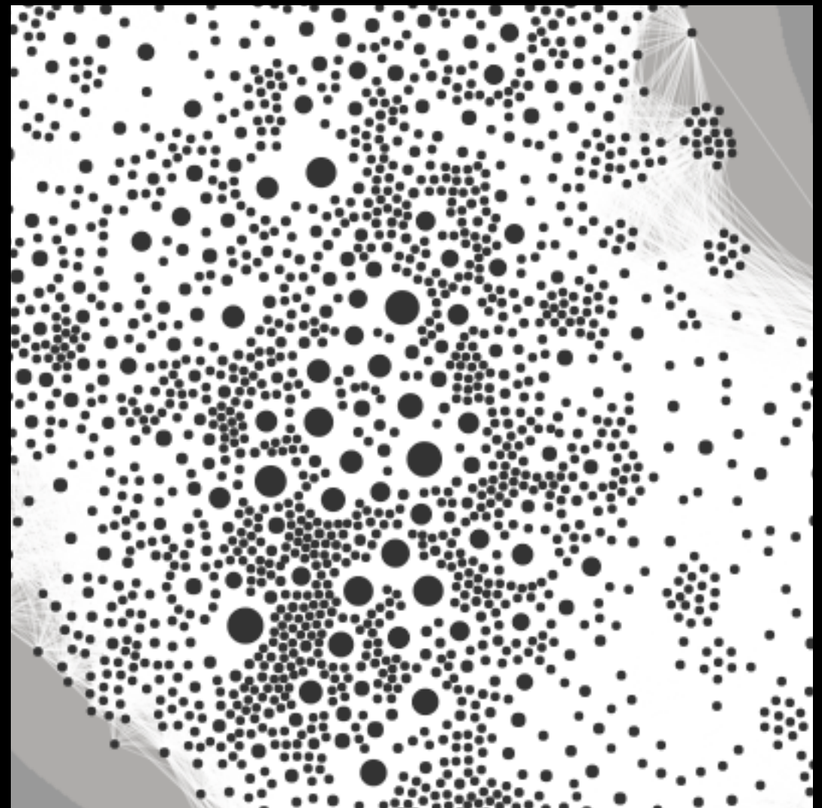
edges layer settings

show part

Only show a certain percentage of edges (expressed as a number between 0 and 1).
Note: edges are picked by “seeded” randomness (i.e. consistently)

```
settings.edge_show_part =
```

0.05 0.25 1

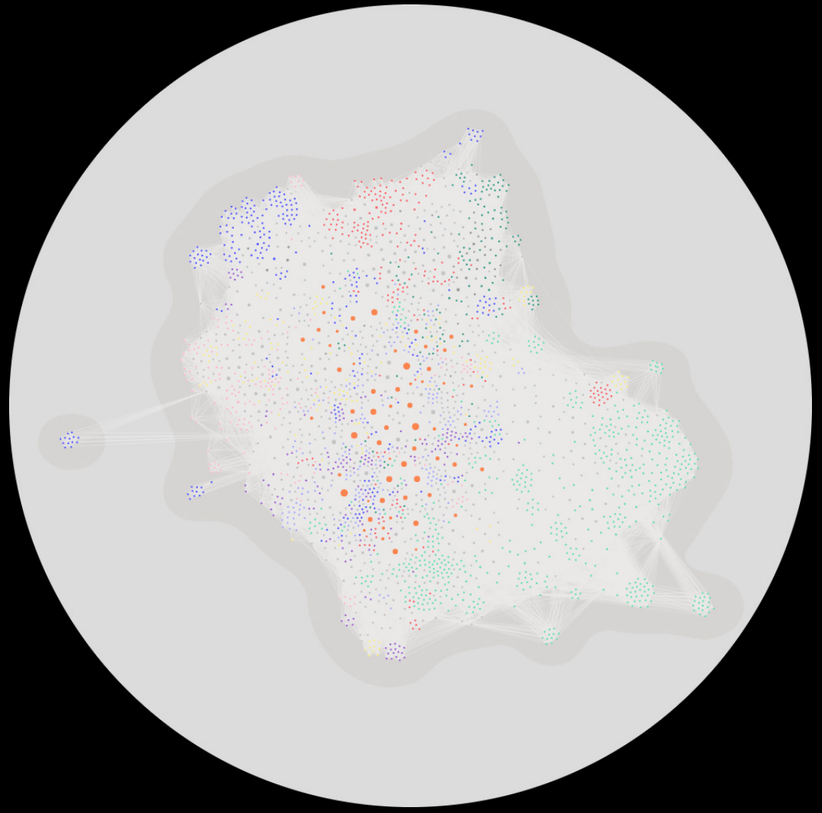
III.5.
‘Make a Map’ settings:
Nodes layers

nodes layer settings

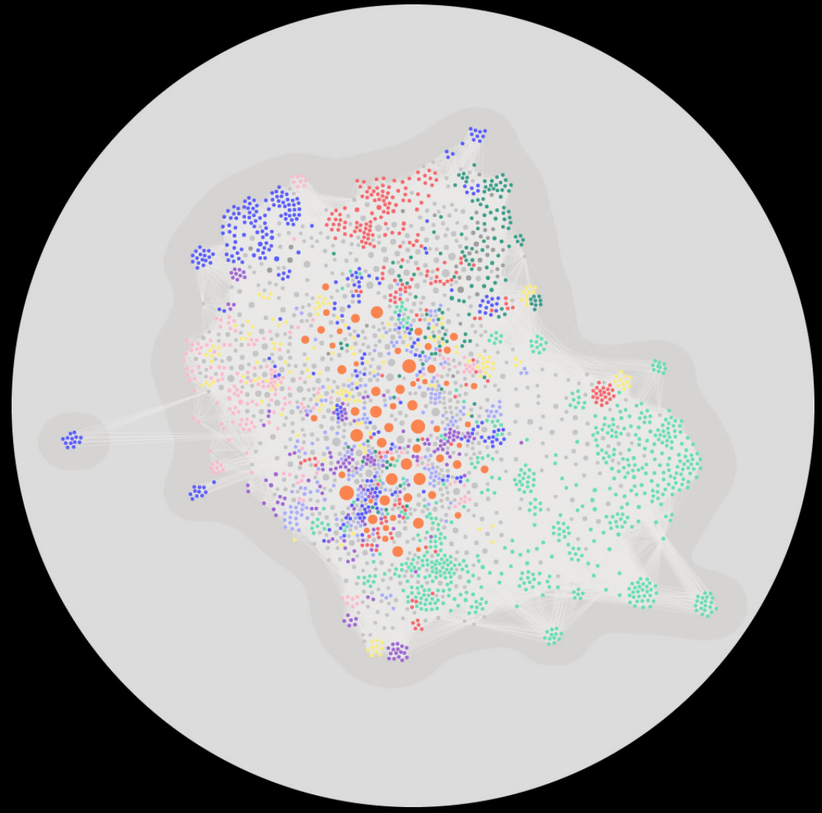
```
// Layer: Nodes
settings.node_size = 1 // Factor to adjust the
settings.node_border_thickness = 0
```

Note: border thickness is useful when nodes are on top of cluster fills (same color)

`settings.node_size = 0.5`



`settings.node_size = 1`



`settings.node_size = 2`

node labels layer settings

```
100  // Layer: Node labels
101  settings.label_limit = Infinity // Limit the count of labels. I
102  settings.label_font_min_size = 16 // in pt based on 1MP 72dpi
103  settings.label_font_max_size = 32  // in pt based on 1MP 72dpi
104  settings.label_border_thickness = 0
105  settings.label_color = "#000"
```

The settings for node labels determine both the size and the number of labels displayed.

An algorithm prevents label overlap. Labels are displayed from biggest to smallest node, and overlapping labels are ignored.

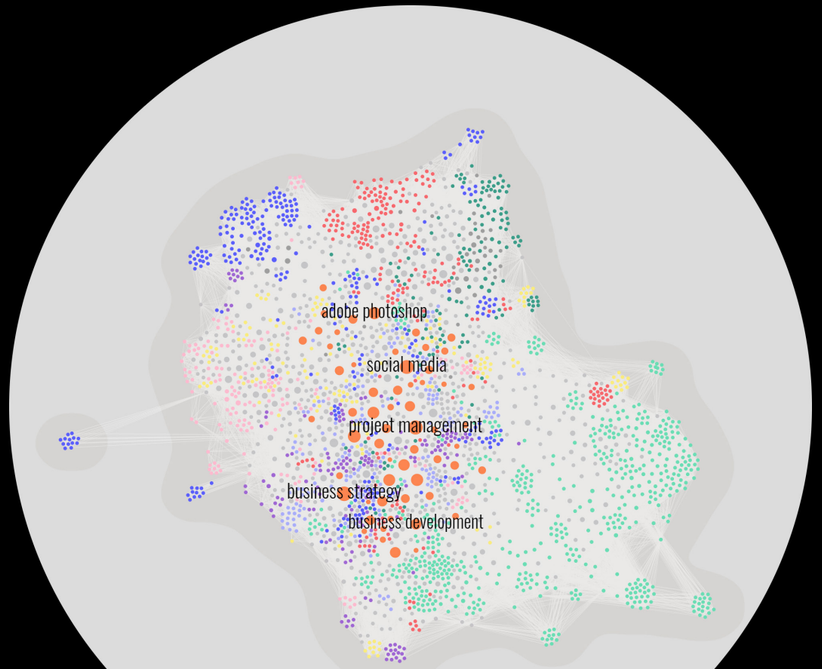
node labels layer settings

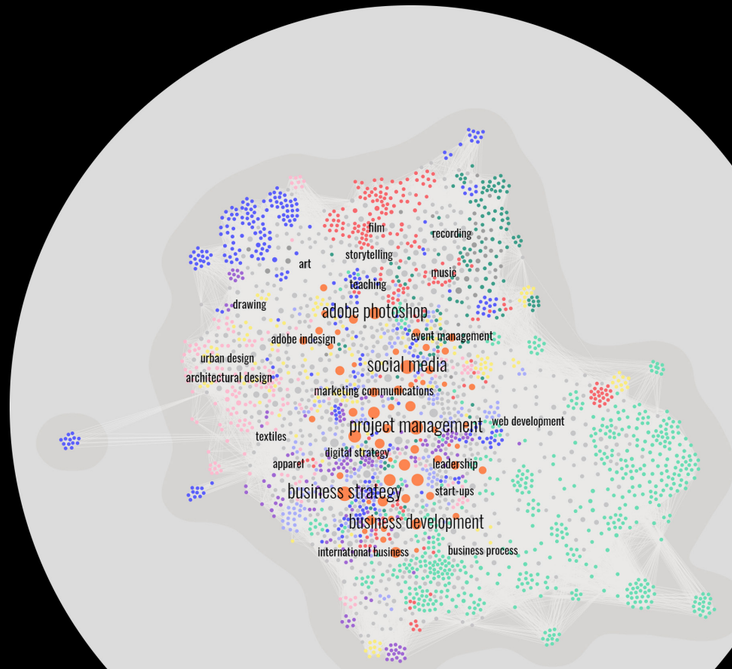
label limit

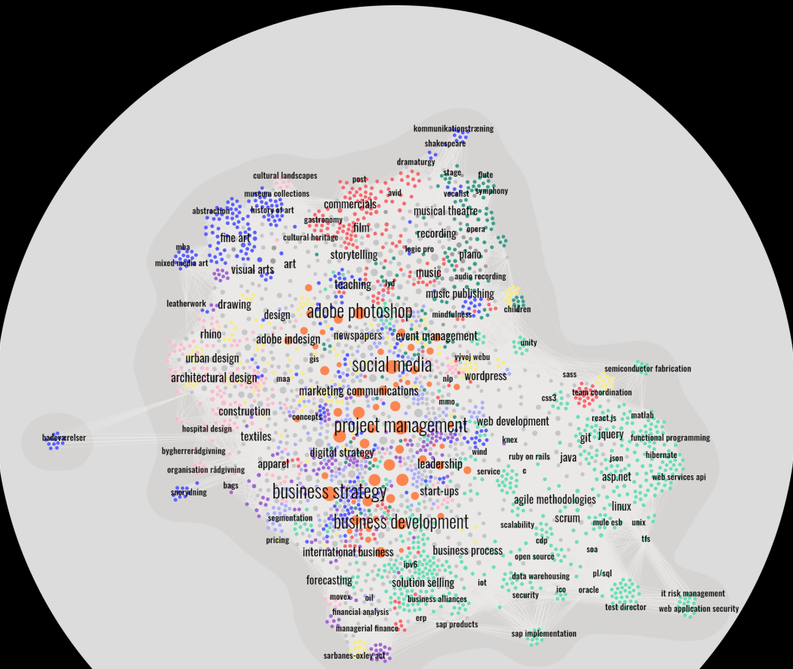
Limits the number of labels to display. Infinity is a valid value.
Note: because an algorithm prevents occlusion, not all labels are displayed.

```
settings.label_limit =
```

5 | 25 | Infinity







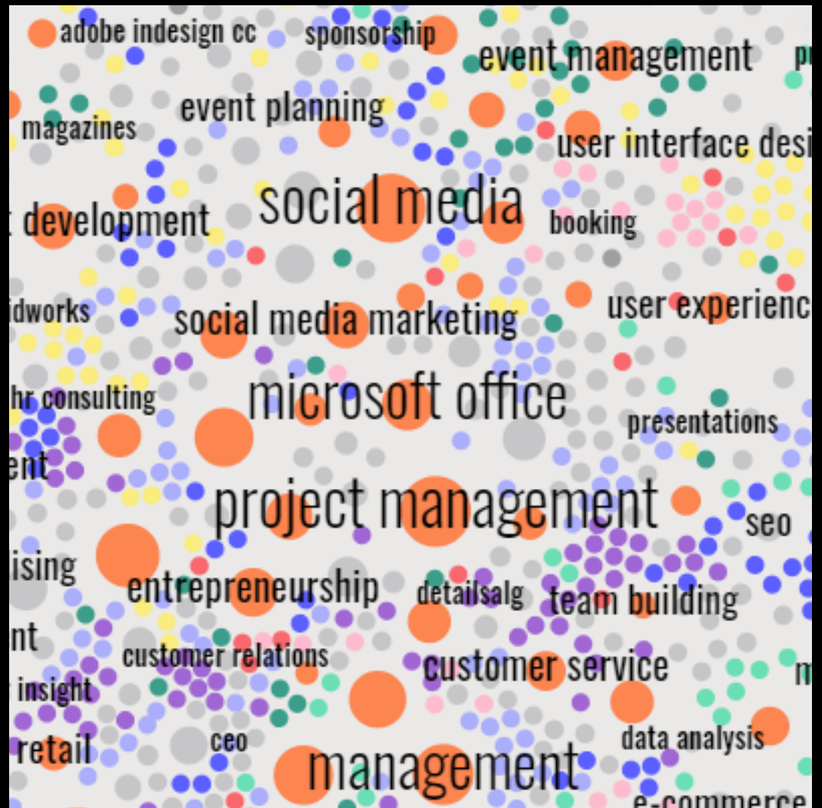
node labels layer settings

font size

Font size should be tweaked depending on the size of the support (web, poster...)

```
settings.label_font_min_size =
settings.label_font_max_size =
```

8	12	16
16	24	32



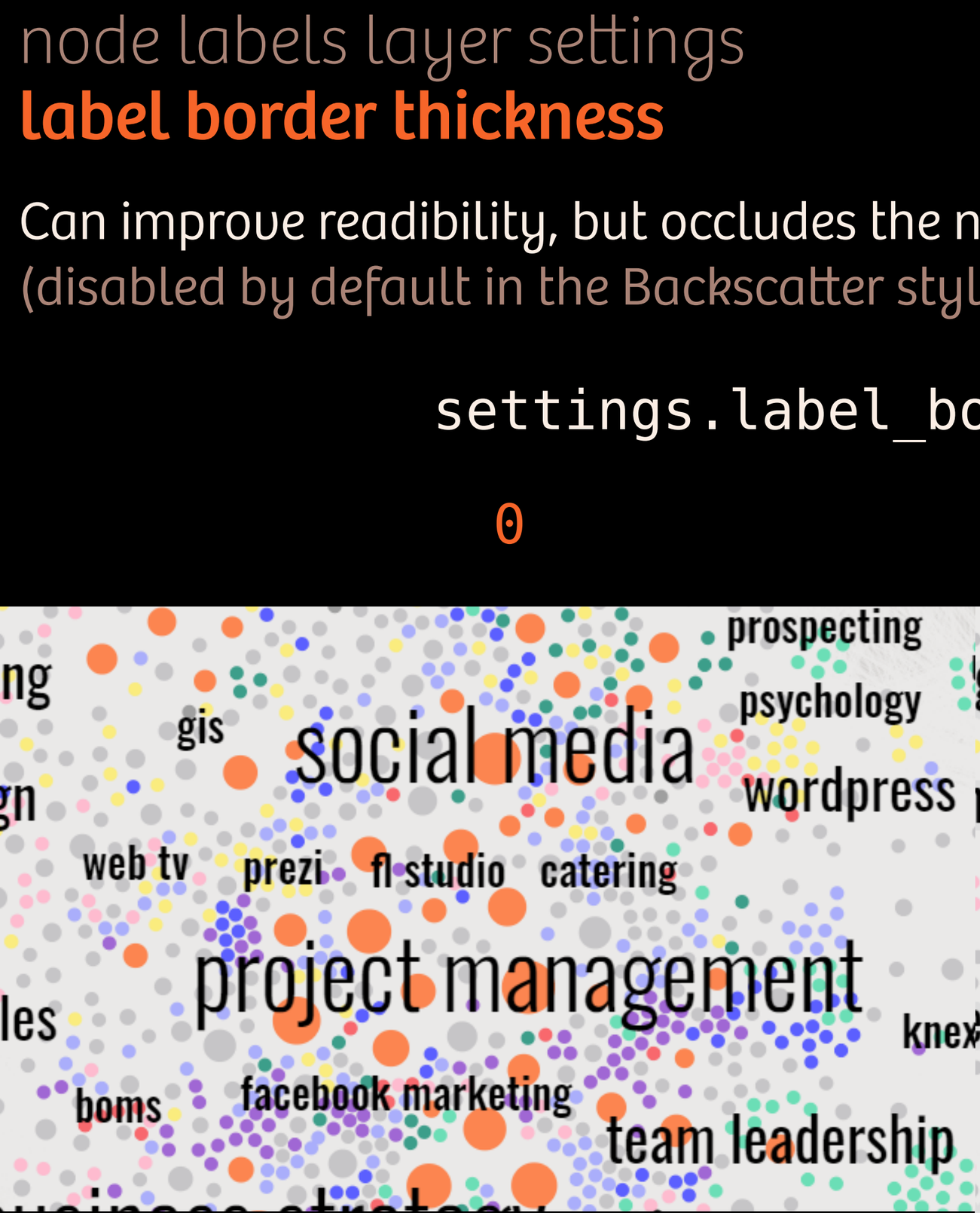
node labels layer settings

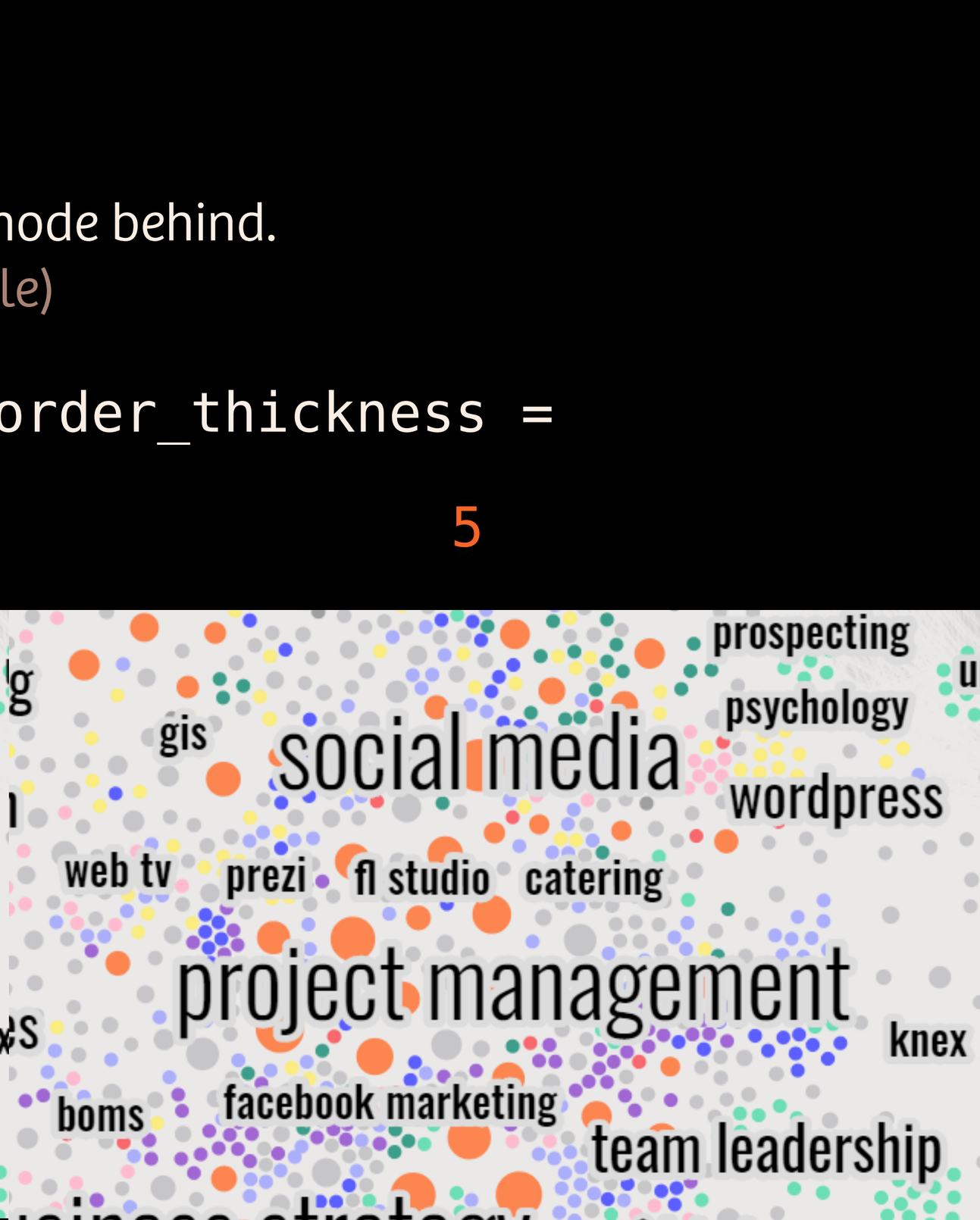
label border thickness

Can improve readibility, but occludes the node behind.
(disabled by default in the Backscatter style)

```
settings.label_border_thickness =

  0                                  5
```





III.6.

‘Make a Map’ settings: Advanced settings

What settings do **advanced settings**

```
// Advanced settings
settings.adjust_voronoi_range = 25 // Factor // Larger node halo + slightly bigger clusters
settings.max_voronoi_size = 250 // Above that size, we approximate the voronoi
```

These settings play a role in the underlying algorithms.
They act both on the quality and performance.

The voronoi range can be adjusted depending on the network. The size depends on the resolution.

Recommended setting for normal use:
`settings.max_voronoi_size = 250`

Recommended setting for high resolution use:
`settings.max_voronoi_size = 1000`

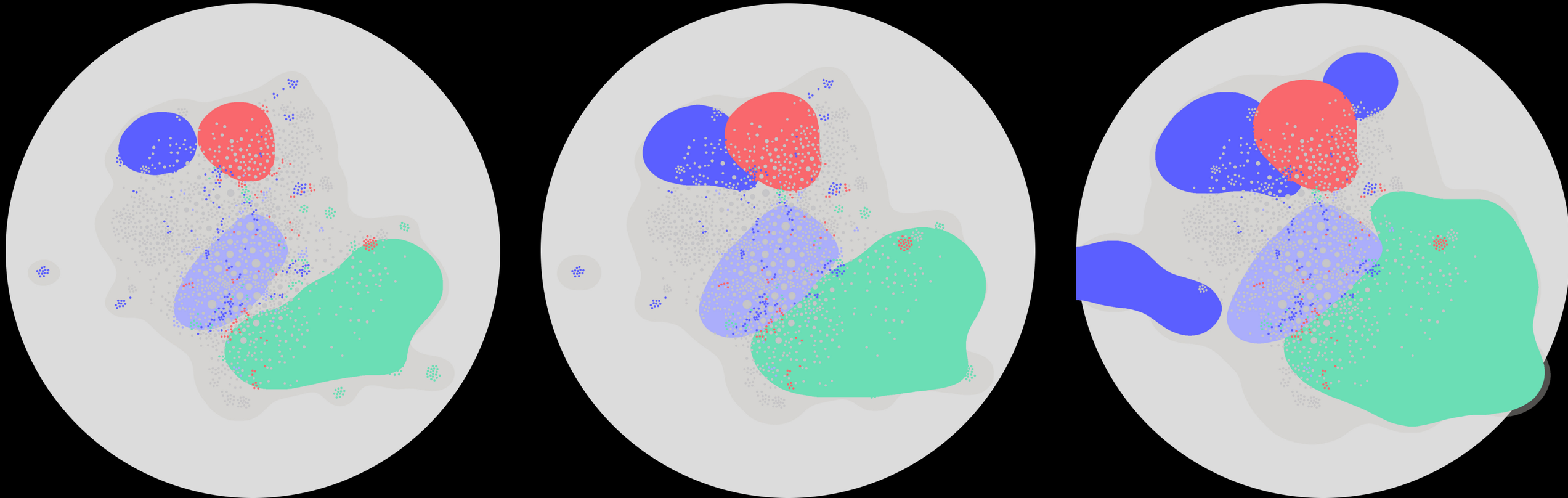
advanced settings

adjust voronoi range

Plays a role both for the clusters and for the high quality edges. It tends to extend the clusters towards the outside of the graph, and not change much in the middle.

`settings.adjust_voronoi_range =`

5 25 150



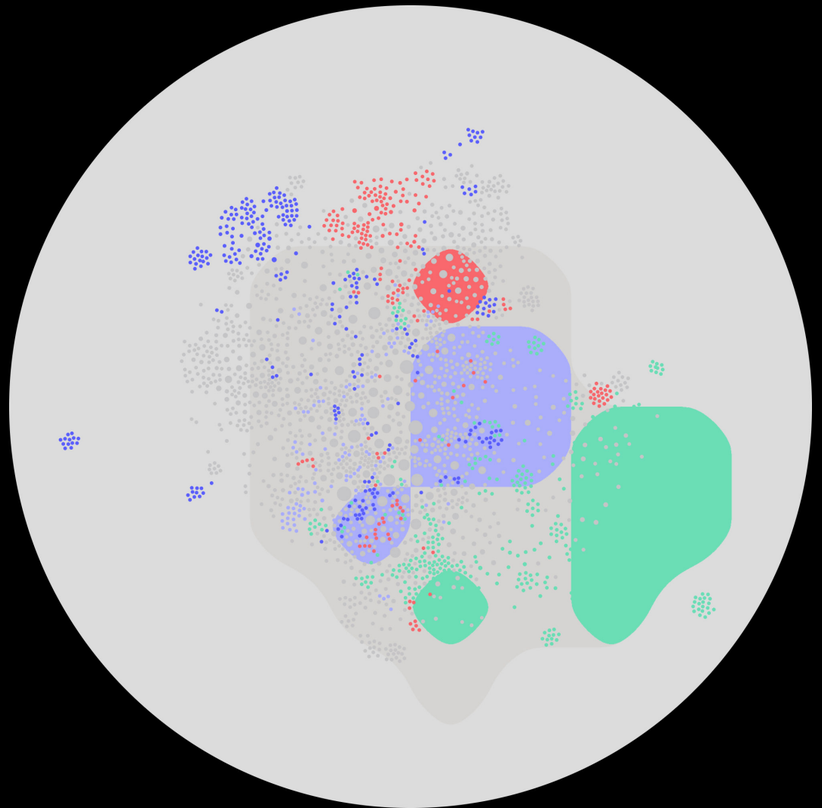
advanced settings

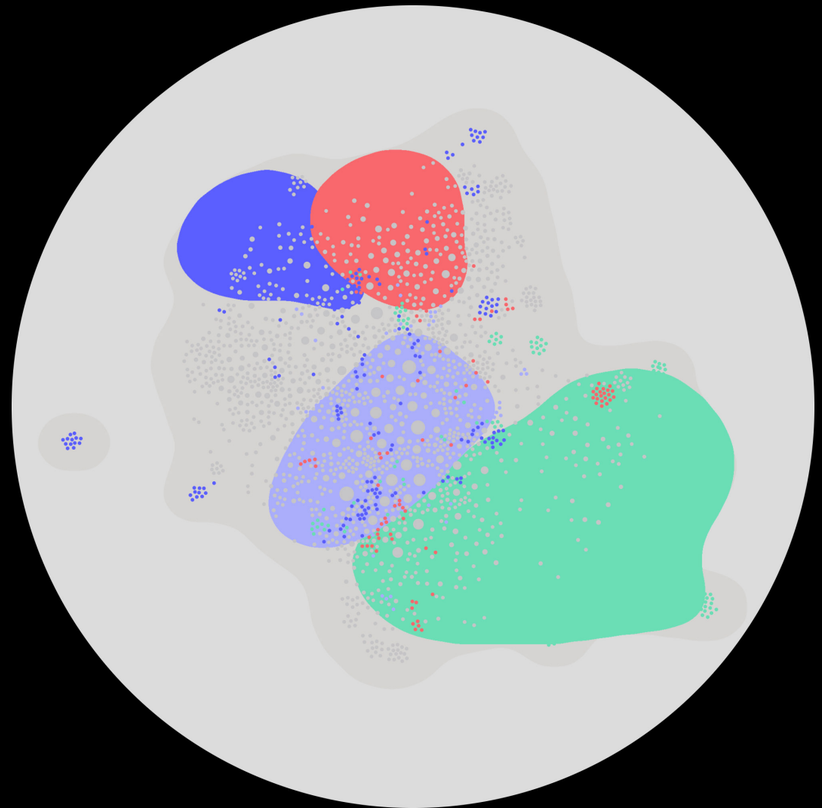
max voronoi size

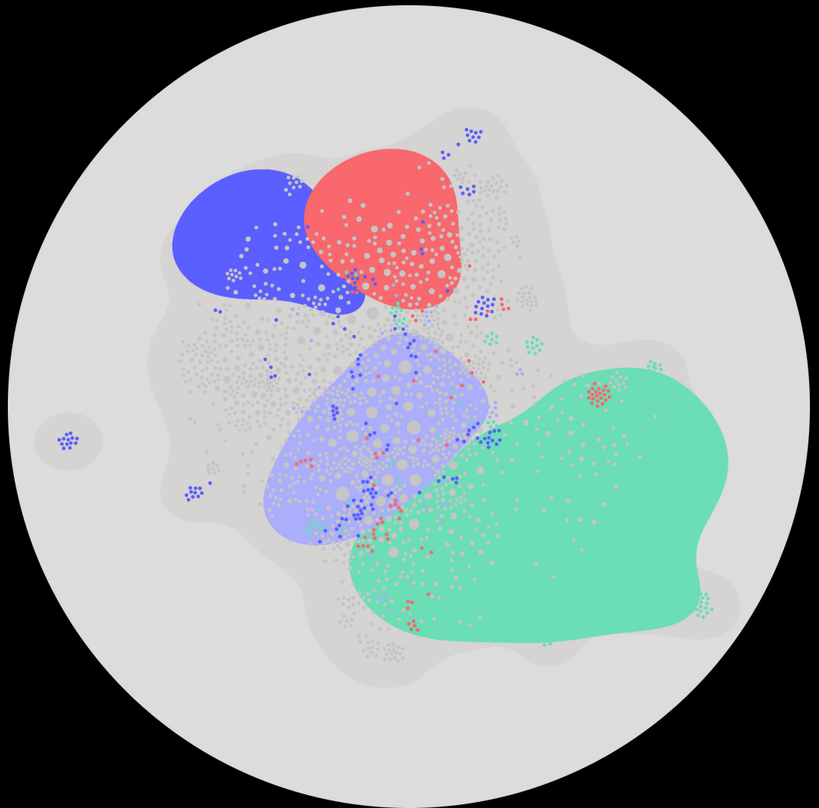
Resolution of the grid used to approximate the voronoi. The higher the more precise, but also the more computation- and memory-costly. Too low, it glitches.

`settings.max_voronoi_size =`

10 250 1000







III.7.

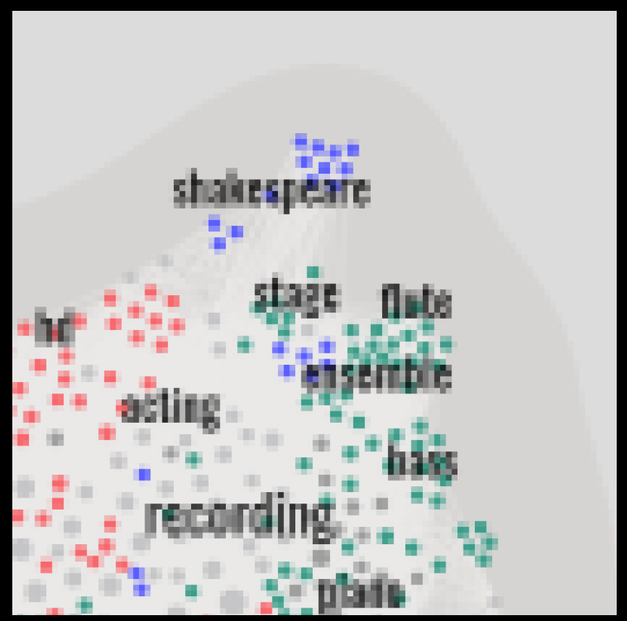
‘Make a Map’ settings: Thinking in terms of optical size

Optical size

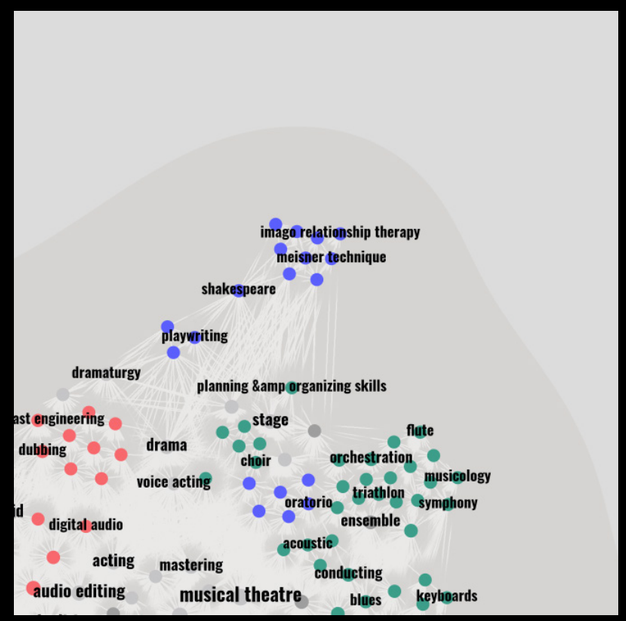
When tweaking settings, take both the size and resolution into account. The optical size matters: what your eyes see in the final product, not just the size in pixels.

There are two different readability issues:

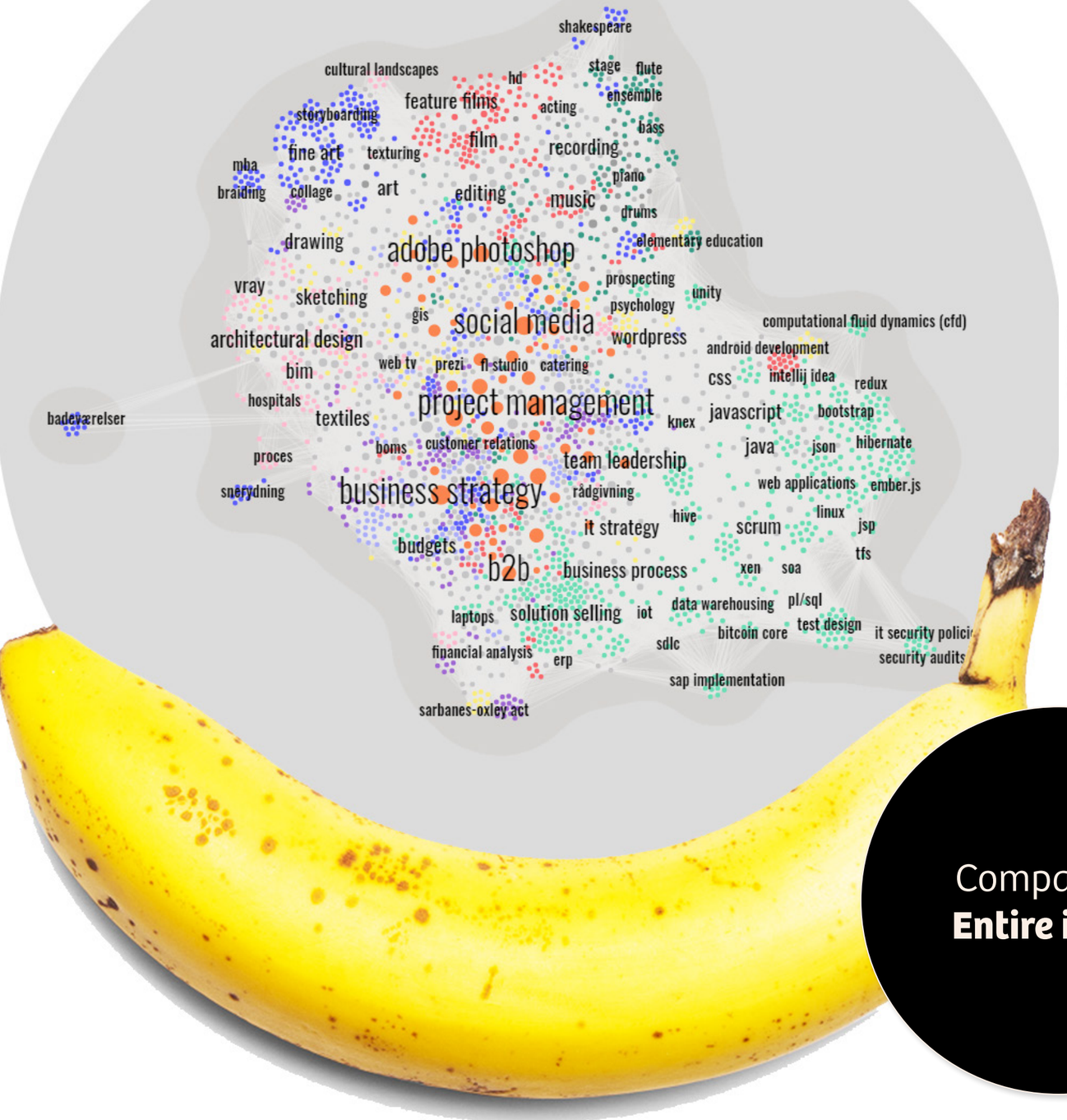
Pixelation (too small for resolution)



Optical size too small (for the eyes)

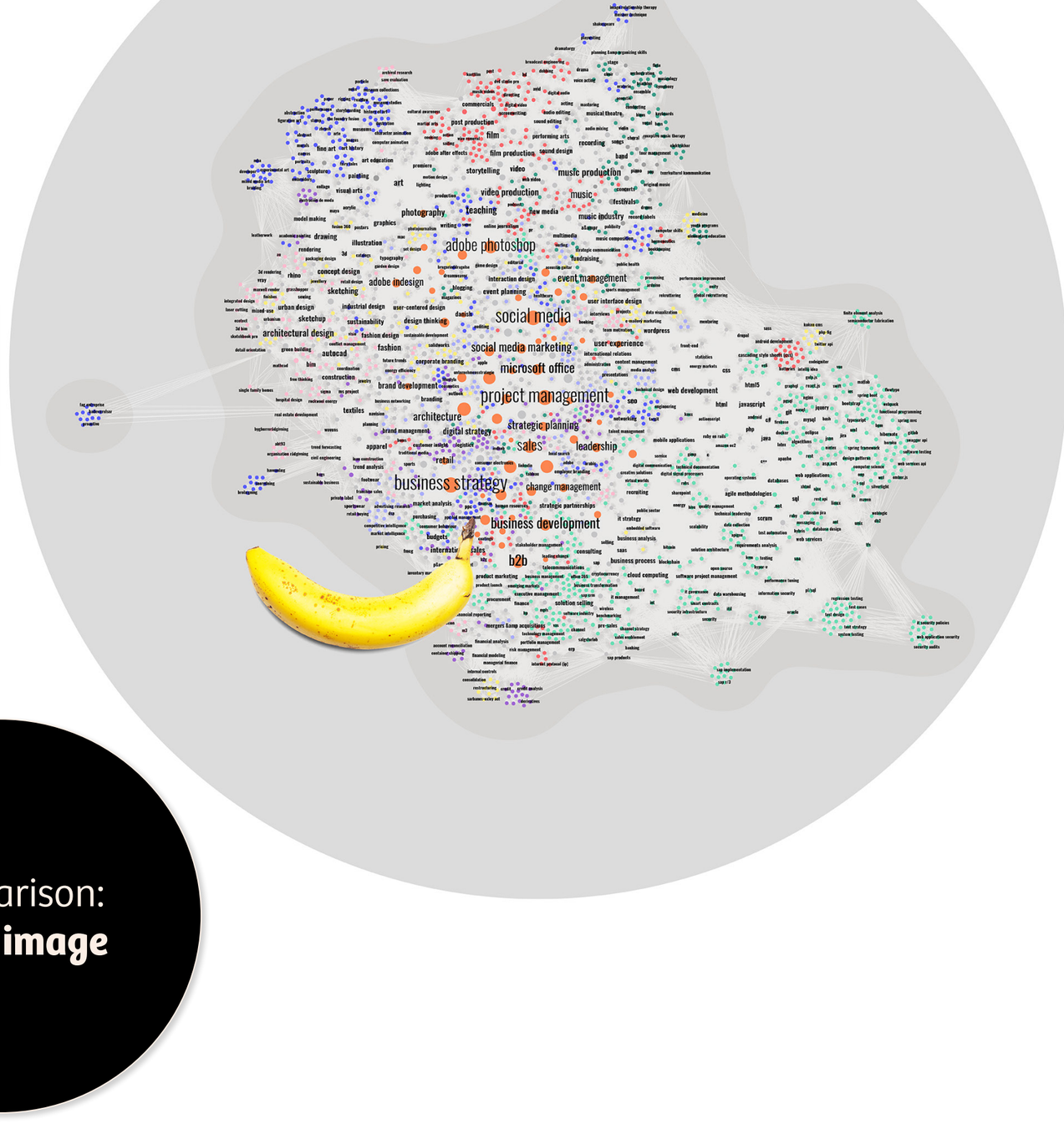


Normal export
1000 x 1000
for a web page



Comparison:
Entire image

High res. export
8000 x 8000
A3 @300dpi



Normal export
1000 x 1000
for a web page

High res. export
8000 x 8000
A3 @300dpi

Comparison:
Same pixel size

Normal export
1000 x 1000
for a web page

High res. export
8000 x 8000
A3@300dpi

Comparison:
Same optical size