Beyond Dashboards - Visualising Complex Systems

Friday 17th April 1pm via Teams

See #sbg-skill-academy for sign up details.


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& gaming

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Beyond Dashboards

Visualising Complex Systems

Hi, I'm Andy...

- Sky Betting and Gaming for the last 6 Years
- Lead Platform Engineer
- Pronouns He/Him

LeedsDevops

Supporting the DevOps community in Leeds since 2013

DEVOPSDAYS
LONDON 2019

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DevOps Enterprise Summit 2017 – John Allspaw

How Your Systems Keep Running Day After Day

https://www.youtube.com/watch?v=xA5U85LSk0M

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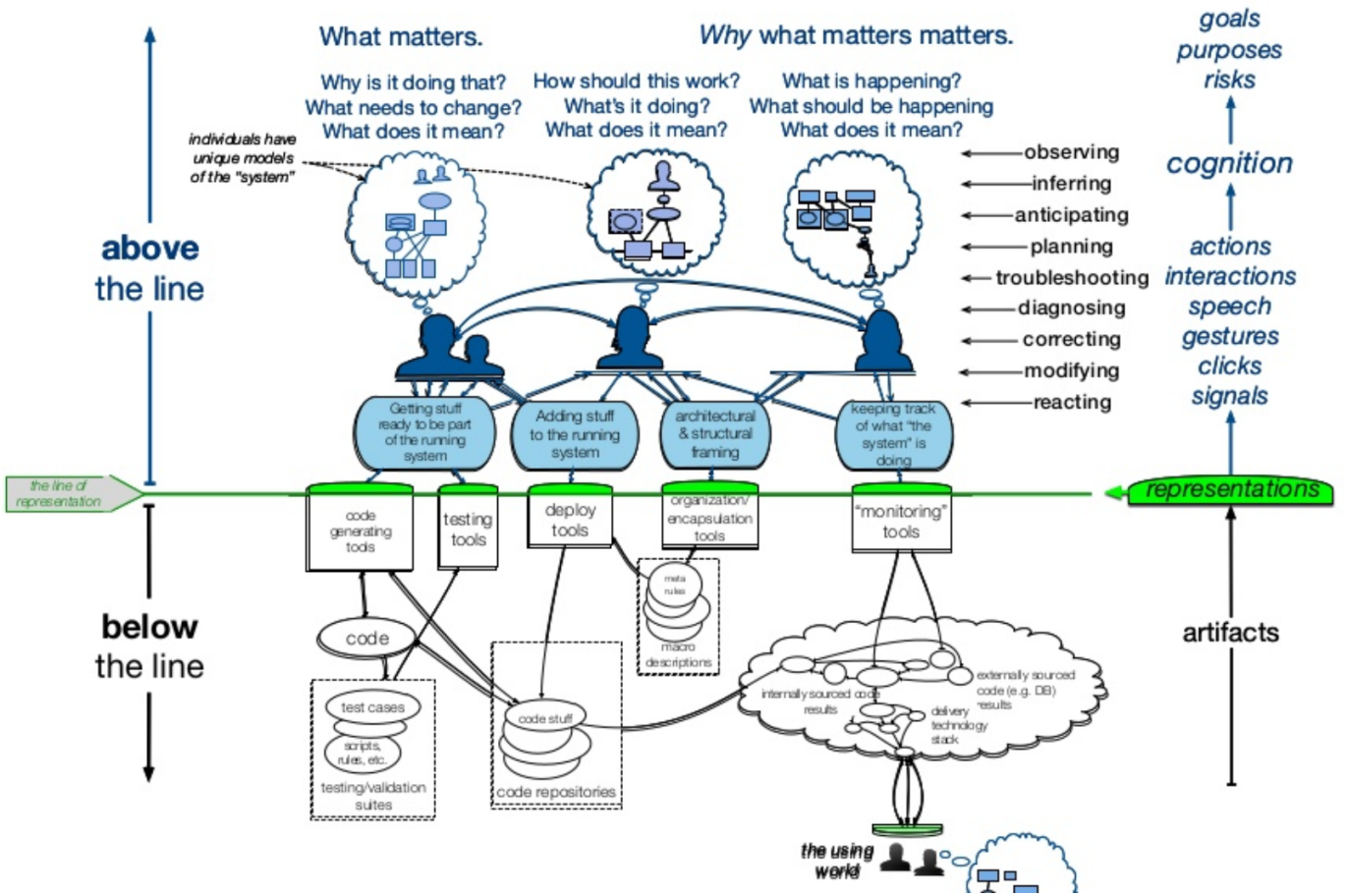
DevOps Enterprise Summit 2017 – John Allspaw



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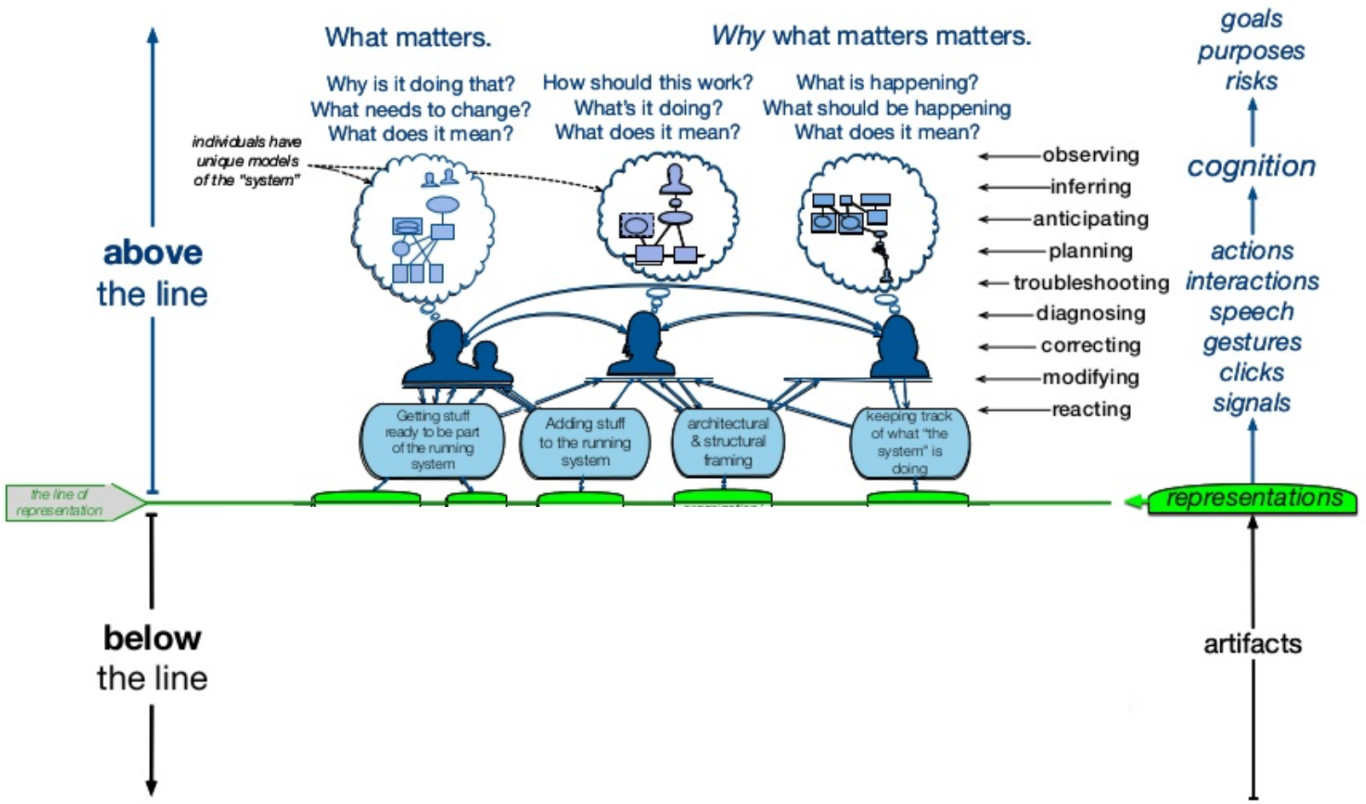
DevOps Enterprise Summit 2017 – John Allspaw



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DevOps Enterprise Summit 2017 – John Allspaw

Six themes were identified and discussed.

1 Capturing the value of anomalies through postmortems

2 Blame versus sanction in the aftermath of anomalies

3 Controlling the costs of coordination during anomaly response

4 Supporting work through improved visualizations

5 The strange loop quality of anomalies

6 Dark debt

STELLA

Report from the SNAFUcatchers Workshop on Coping With Complexity

Brooklyn NY, March 14-16, 2017

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1. tl;dr and Executive Summary
 1.1 tl;dr
 1.2 Executive Summary
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 2.1 About the SNAFUcatchers consortium and the STELLA meeting
 2.2 The focus on handling anomalies
 2.3 The above-the-line/below-the-line framework
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 3.1 Catching the Apache SNAFU
 3.2 Catching the Travis CI SNAFU
 3.3 Catching the Logstash SNAFU
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  The role of search
  Evolving system representations
  Generating hypotheses
  Basic tools
  Coordination
  Communications in joint activity
  Shared artifacts
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  Managing risk
  Goal sacrifice
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 4.1.2. Social issues in postmortems
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 4.3 Controlling the costs of coordination during anomaly response
 4.3.1 Offloading work to low-tempo periods
 4.3.2 Providing expertise on demand
 4.3.3 Supporting communication and coordination with tools
 4.4 Supporting anomaly response through improved visualizations
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5. Possible avenues for progress on coping with complexity
6. Back matter
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 6.2 Acknowledgements
 6.3 Suggested citation for this report
7. References

Winter storm STELLA

Woods' Theorem: *As the complexity of a system increases, the accuracy of any single agent's own model of that system decreases rapidly.*

1. tl;dr and Executive Summary

1.1 tl;dr

A consortium workshop of high end techs reviewed postmortems to better understand how engineers cope with the complexity of anomalies (SNAFU and SNAFU catching episodes) and how to support them. These cases reveal common themes regarding factors that produce resilient performances. The themes that emerge also highlight opportunities to move forward.

1.2 Executive Summary

Current generation internet-facing technology platforms are complex and prone to brittle failure. Without the continuous effort of engineers to keep them running they would stop working -- many in days, most in weeks, all within a year. These platforms remain alive and functioning because workers are able to detect anomalies, diagnose their sources, remediate their effect, and repair their flaws and do so ceaselessly -- SNAFU Catching. Yet we know little about how they accomplish this vital work and

http://stella.report

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What’s Wrong With Dashboards ?

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What's Wrong With Dashboards ?

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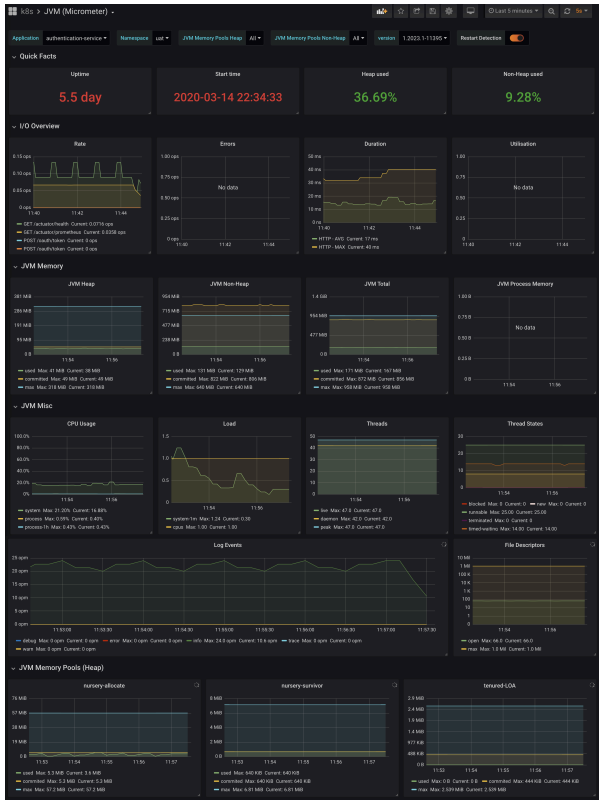
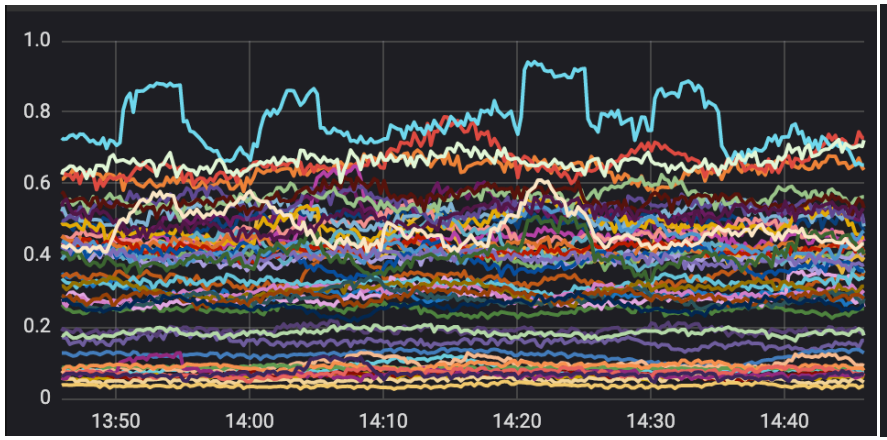
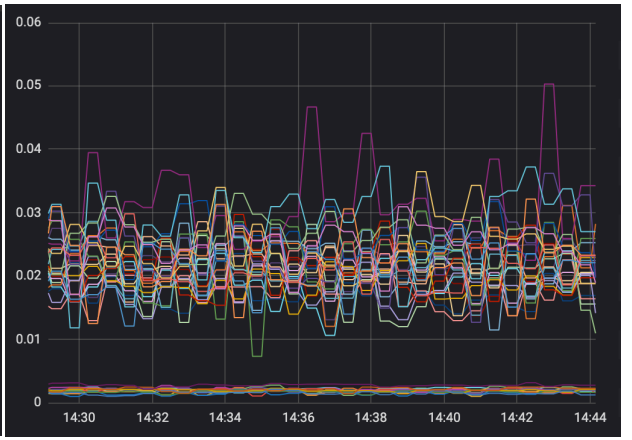
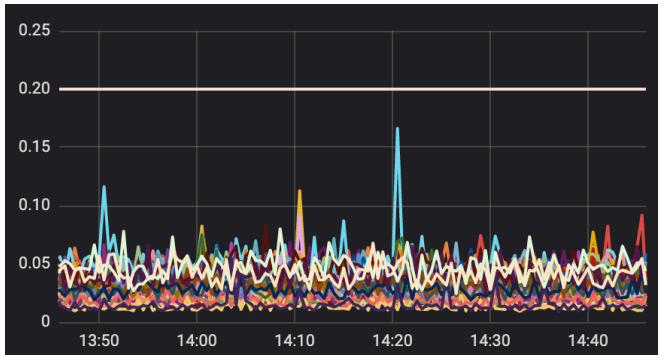
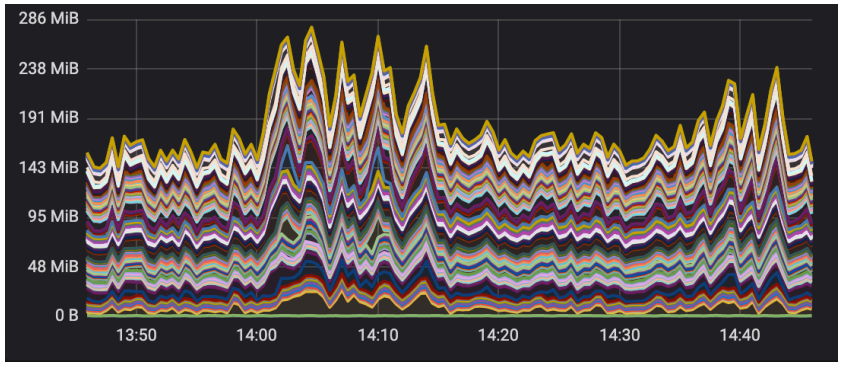
What's Wrong With Dashboards ?











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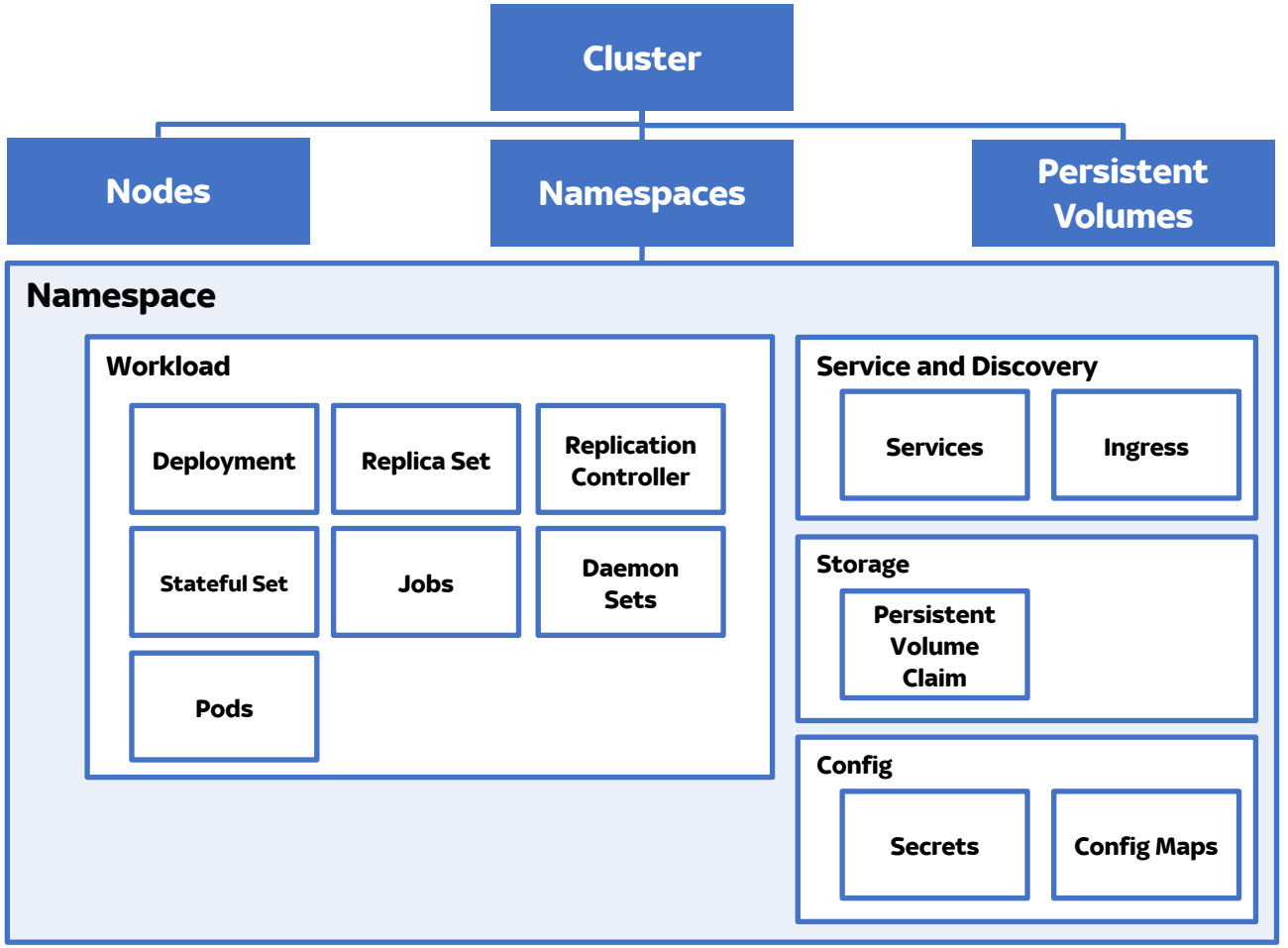
Kubernetes Objects



Graph Databases

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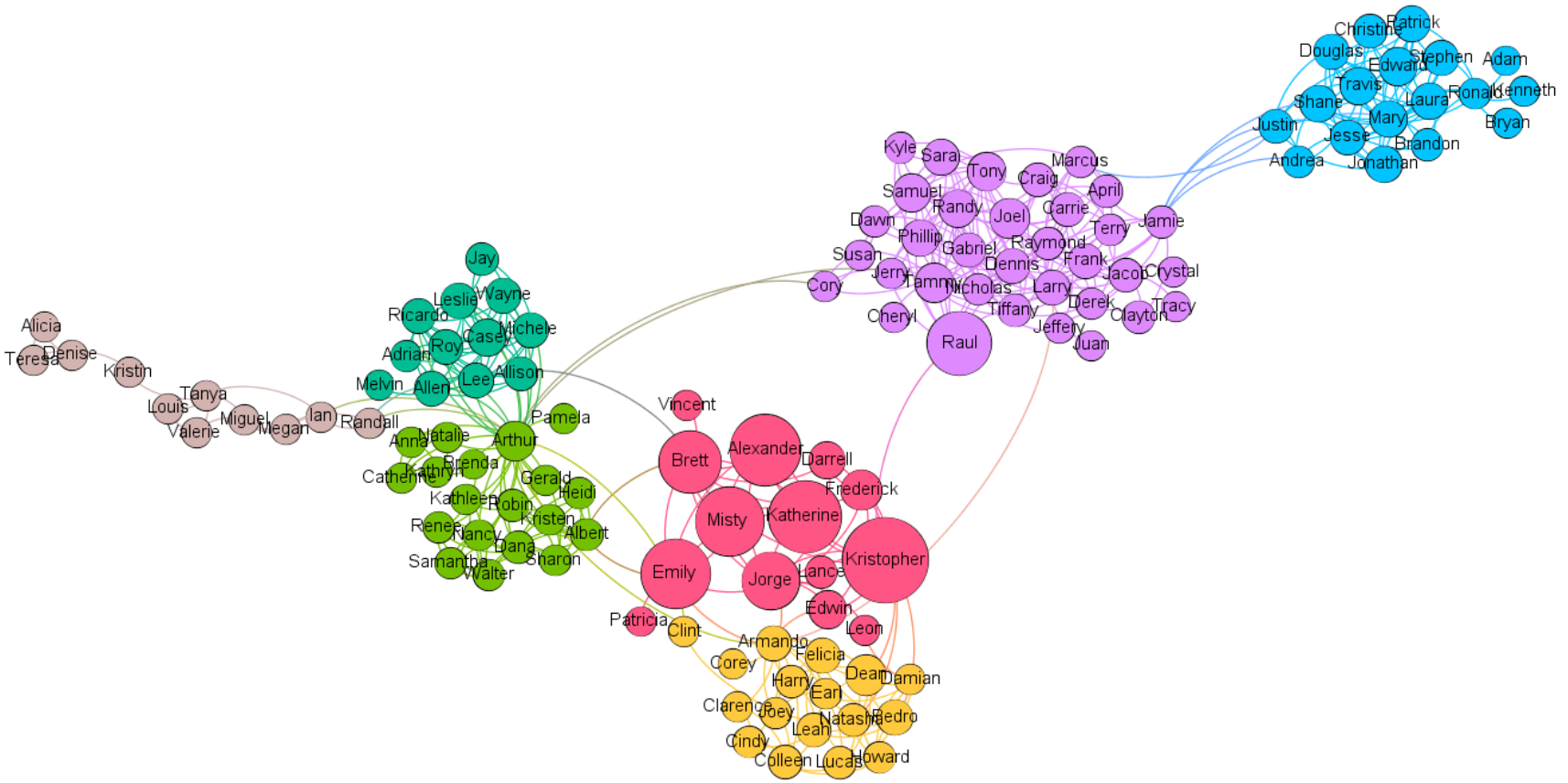
Graph Databases



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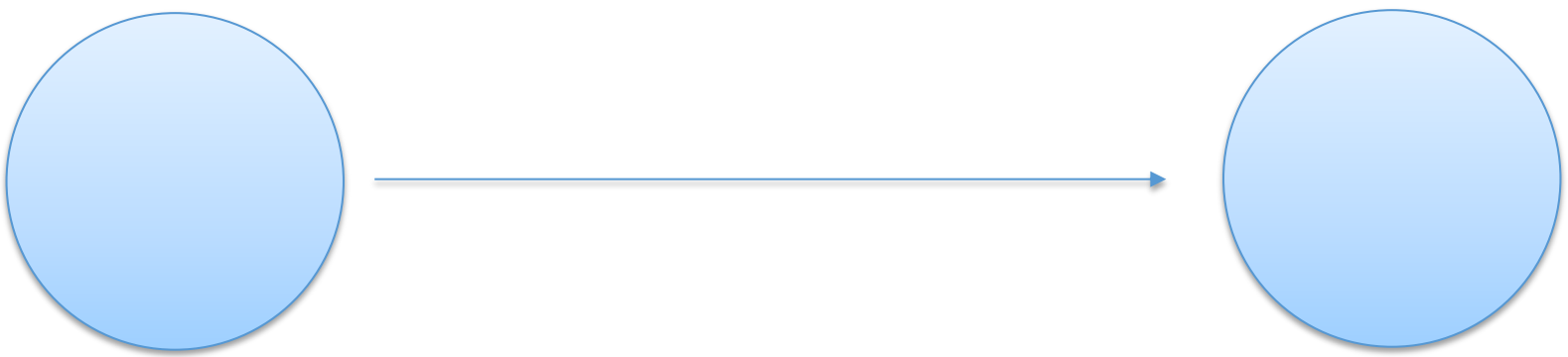
Graph Databases



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Graph Databases

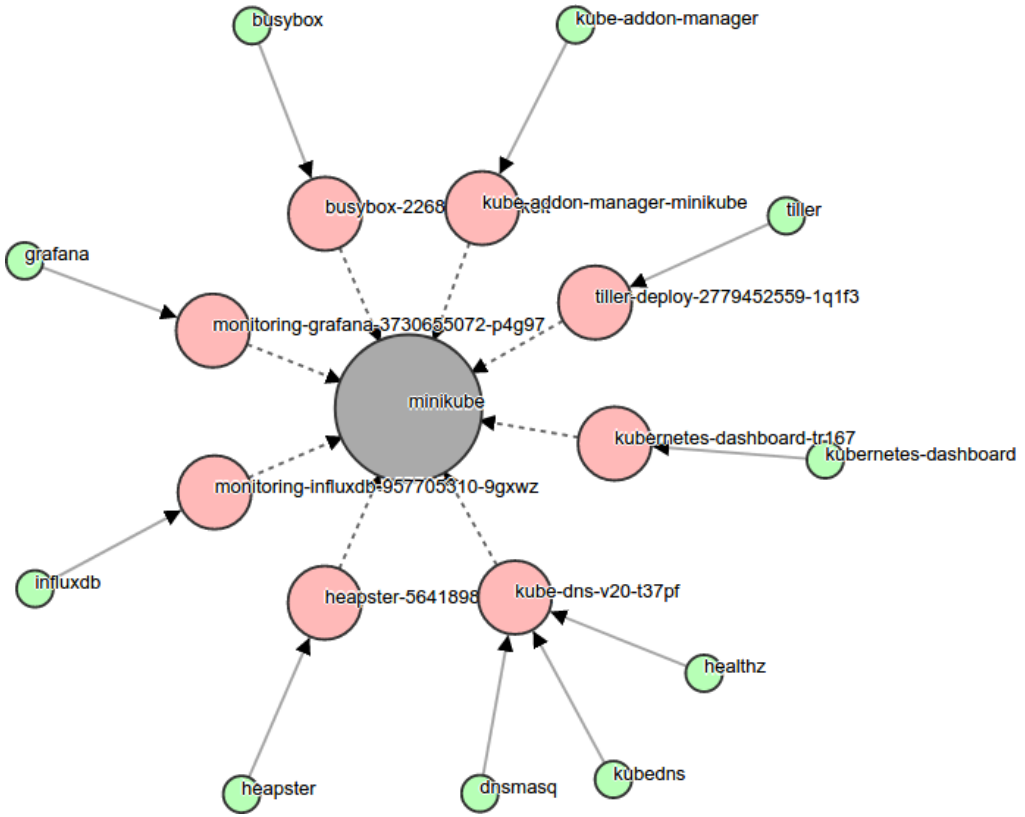
Nodes:

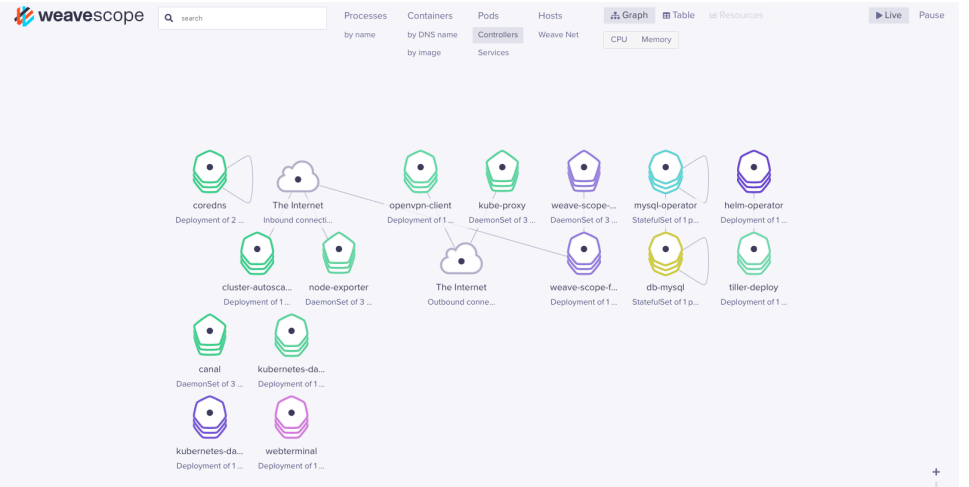
- Person
- Class/Object
- Device
- Port/Socket
- Record/Row
- Services/APis

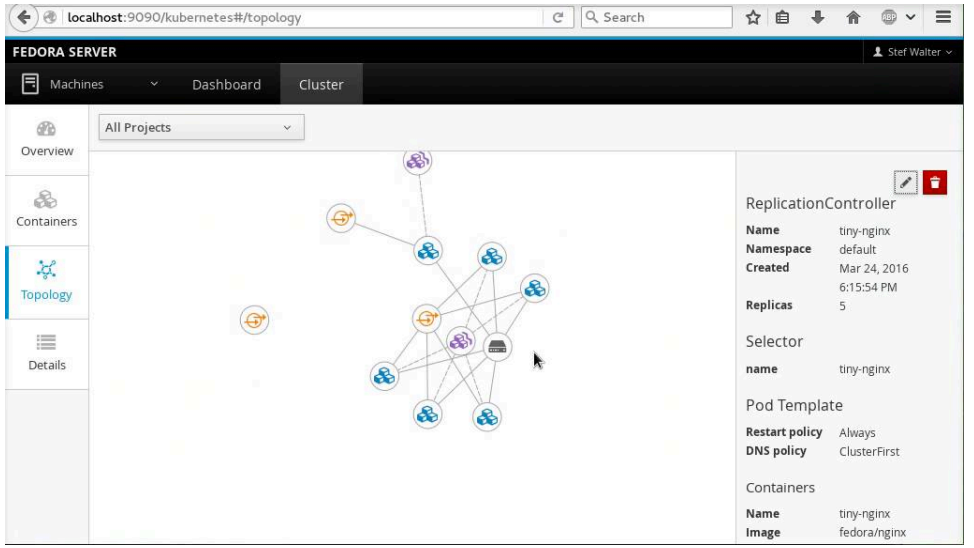
Edges:

- Like/Dislike
- Relationship
- Usage
- Weight/Volume
- Link
- Dependencies

Graph Databases







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Demo

Warning Contains Moving Images

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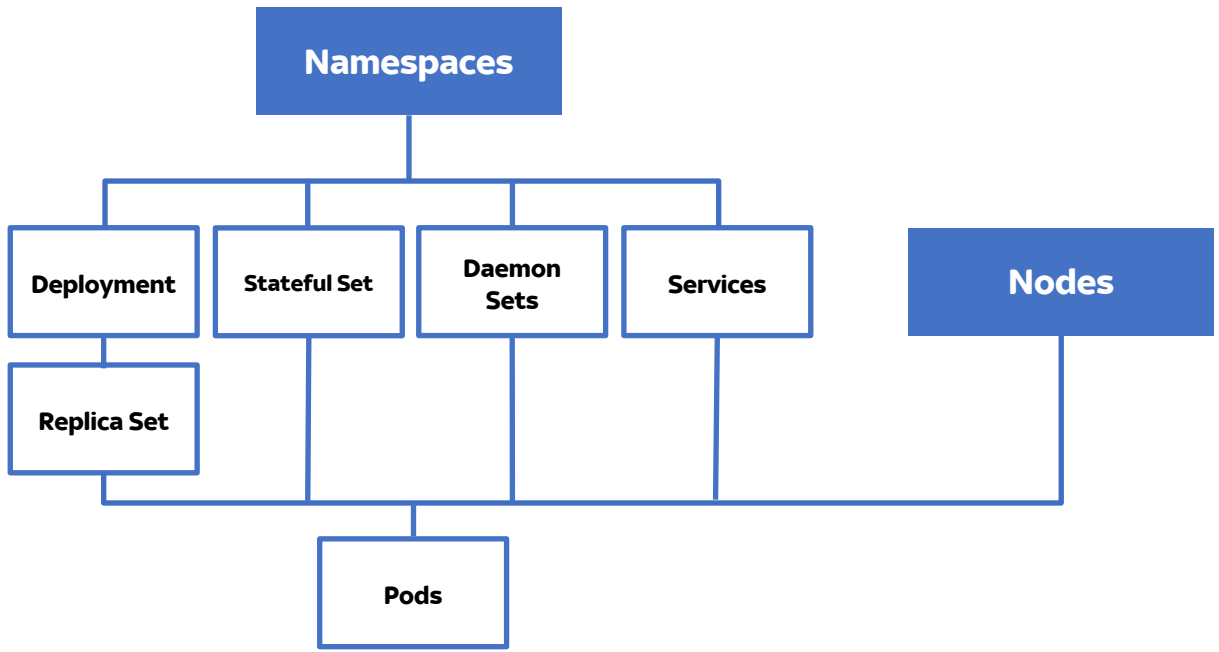
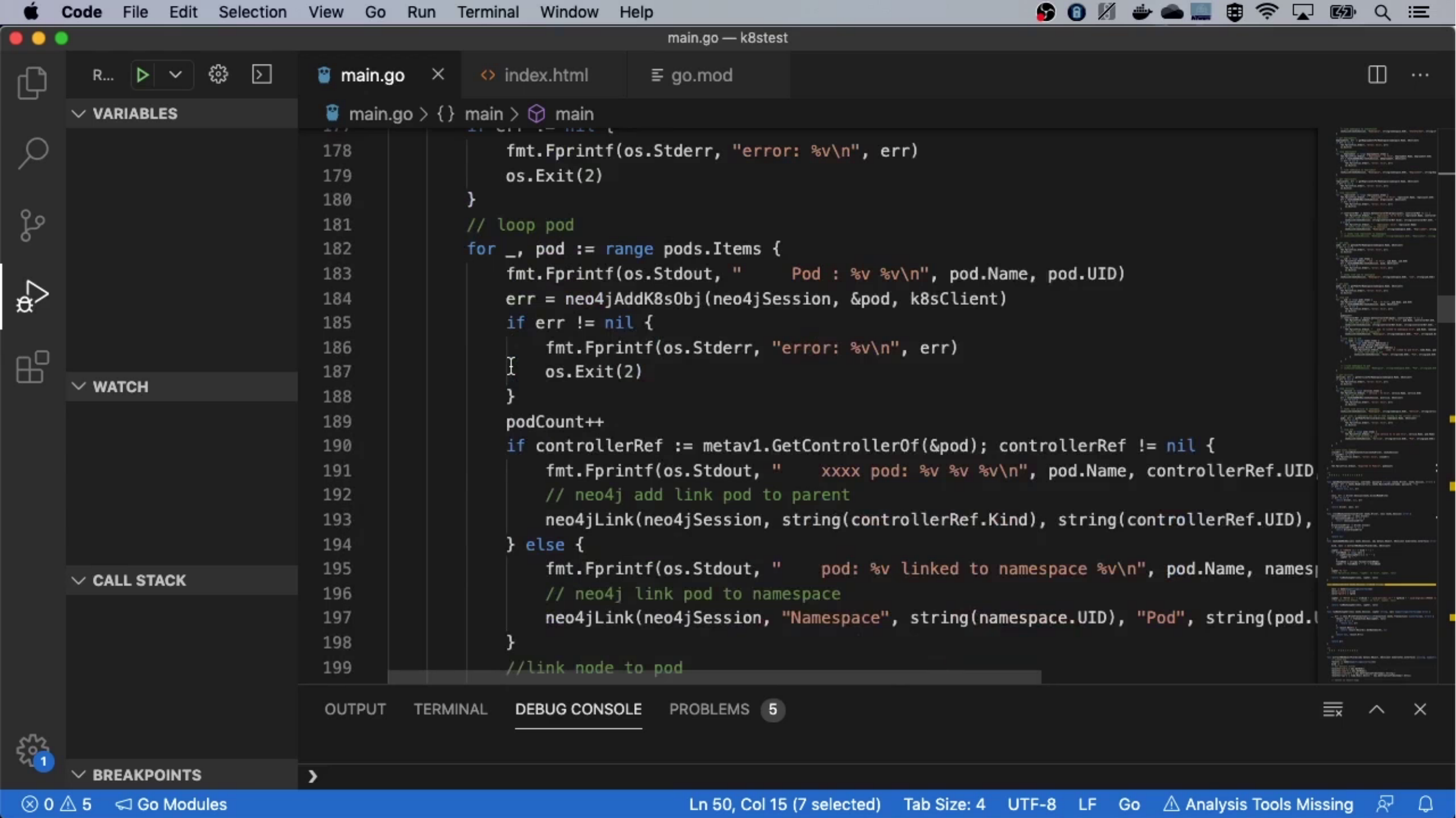
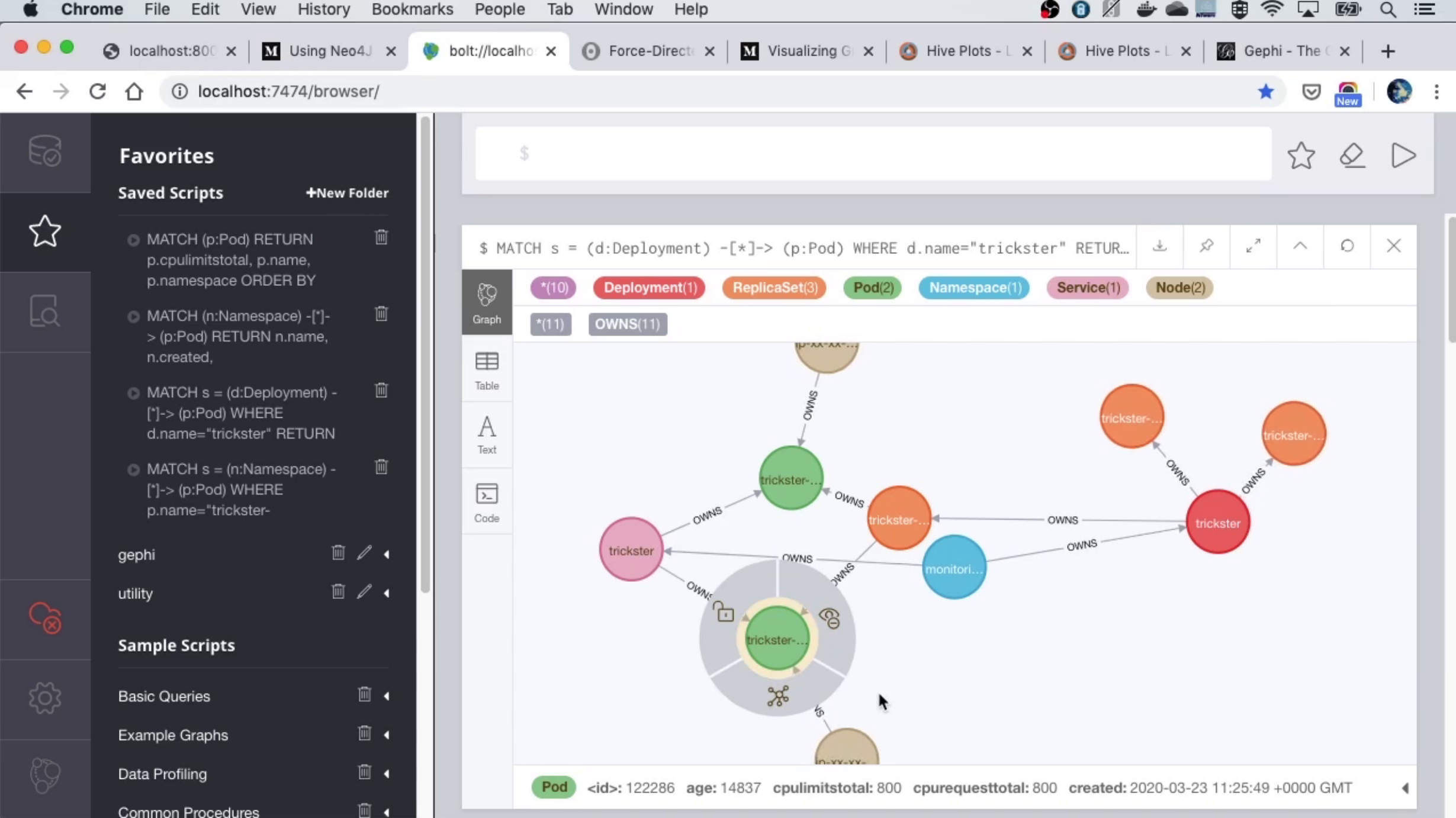
Kubernetes Objects



docker

```
$ docker run -p 7473:7473 -p 7474:7474 -p 7687:7687 -p 6000:6000 -v $HOME/neo4j/data:/data -v $HOME/neo4j/plugins:/plugins --nam
H=none -e NEO4J_apoc_export_file_enabled=true -e NEO4J_apoc_import_file_enabled=true -e NEO4J_apoc_import_file_use__neo4j__confi
or_bolt_tls__level=OPTIONAL neo4j:3.4.12
Active database: graph.db
Directories in use:
  home:         /var/lib/neo4j
  config:       /var/lib/neo4j/conf
  logs:         /var/lib/neo4j/logs
  plugins:      /plugins
  import:       /var/lib/neo4j/import
  data:         /var/lib/neo4j/data
  certificates: /var/lib/neo4j/certificates
  run:          /var/lib/neo4j/run
Starting Neo4j.
2020-04-10 13:13:30.180+0000 WARN  Unknown config option: causal_clustering.discovery_listen_address
2020-04-10 13:13:30.187+0000 WARN  Unknown config option: causal_clustering.raft_advertised_address
2020-04-10 13:13:30.188+0000 WARN  Unknown config option: causal_clustering.raft_listen_address
2020-04-10 13:13:30.188+0000 WARN  Unknown config option: ha.host.coordination
2020-04-10 13:13:30.189+0000 WARN  Unknown config option: causal_clustering.transaction_advertised_address
2020-04-10 13:13:30.190+0000 WARN  Unknown config option: causal_clustering.discovery_advertised_address
2020-04-10 13:13:30.191+0000 WARN  Unknown config option: ha.host.data
2020-04-10 13:13:30.191+0000 WARN  Unknown config option: causal_clustering.transaction_listen_address
2020-04-10 13:13:30.234+0000 INFO  ======== Neo4j 3.4.12 ========
2020-04-10 13:13:30.312+0000 INFO  Starting...
2020-04-10 13:13:42.132+0000 INFO  Bolt enabled on 0.0.0.0:7687.
2020-04-10 13:14:04.384+0000 INFO  Started.
2020-04-10 13:14:07.612+0000 INFO  Remote interface available at http://localhost:7474/
```


Code File Edit Selection View Go Run Terminal Window Help
main.go — k8stest
R...
main.go
index.html
go.mod
main.go > { } main > main
VARIABLES
WATCH
CALL STACK
BREAKPOINTS
178 fmt.Fprintf(os.Stderr, "error: %v\n", err)
179 os.Exit(2)
180 }
181 // loop pod
182 for _, pod := range pods.Items {
183 fmt.Fprintf(os.Stdout, " Pod : %v %v\n", pod.Name, pod.UID)
184 err = neo4jAddK8sObj(neo4jSession, &pod, k8sClient)
185 if err != nil {
186 fmt.Fprintf(os.Stderr, "error: %v\n", err)
187 os.Exit(2)
188 }
189 podCount++
190 if controllerRef := metav1.GetControllerOf(&pod); controllerRef != nil {
191 fmt.Fprintf(os.Stdout, " xxxx pod: %v %v %v\n", pod.Name, controllerRef.UID
192 // neo4j add link pod to parent
193 neo4jLink(neo4jSession, string(controllerRef.Kind), string(controllerRef.UID),
194 } else {
195 fmt.Fprintf(os.Stdout, " pod: %v linked to namespace %v\n", pod.Name, names
196 // neo4j link pod to namespace
197 neo4jLink(neo4jSession, "Namespace", string(namespace.UID), "Pod", string(pod.
198 }
199 //link node to pod
OUTPUT TERMINAL DEBUG CONSOLE PROBLEMS 5
0 5 Go Modules
Ln 50, Col 15 (7 selected) Tab Size: 4 UTF-8 LF Go Analysis Tools Missing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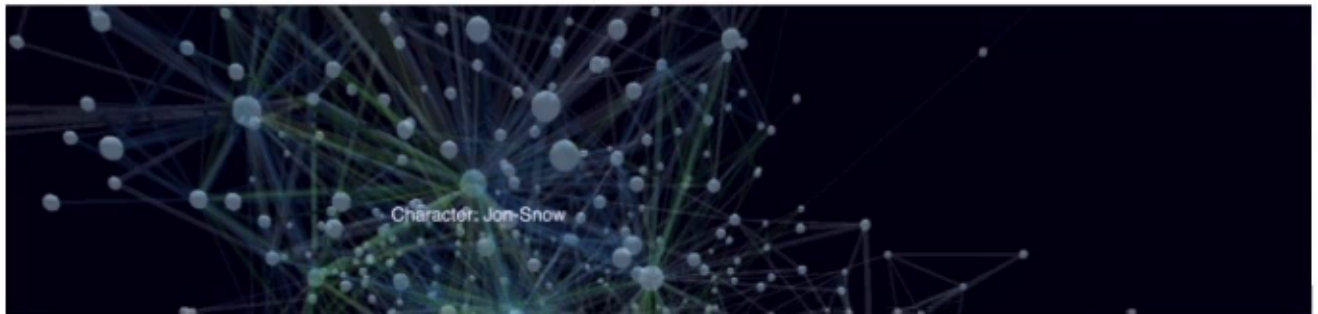
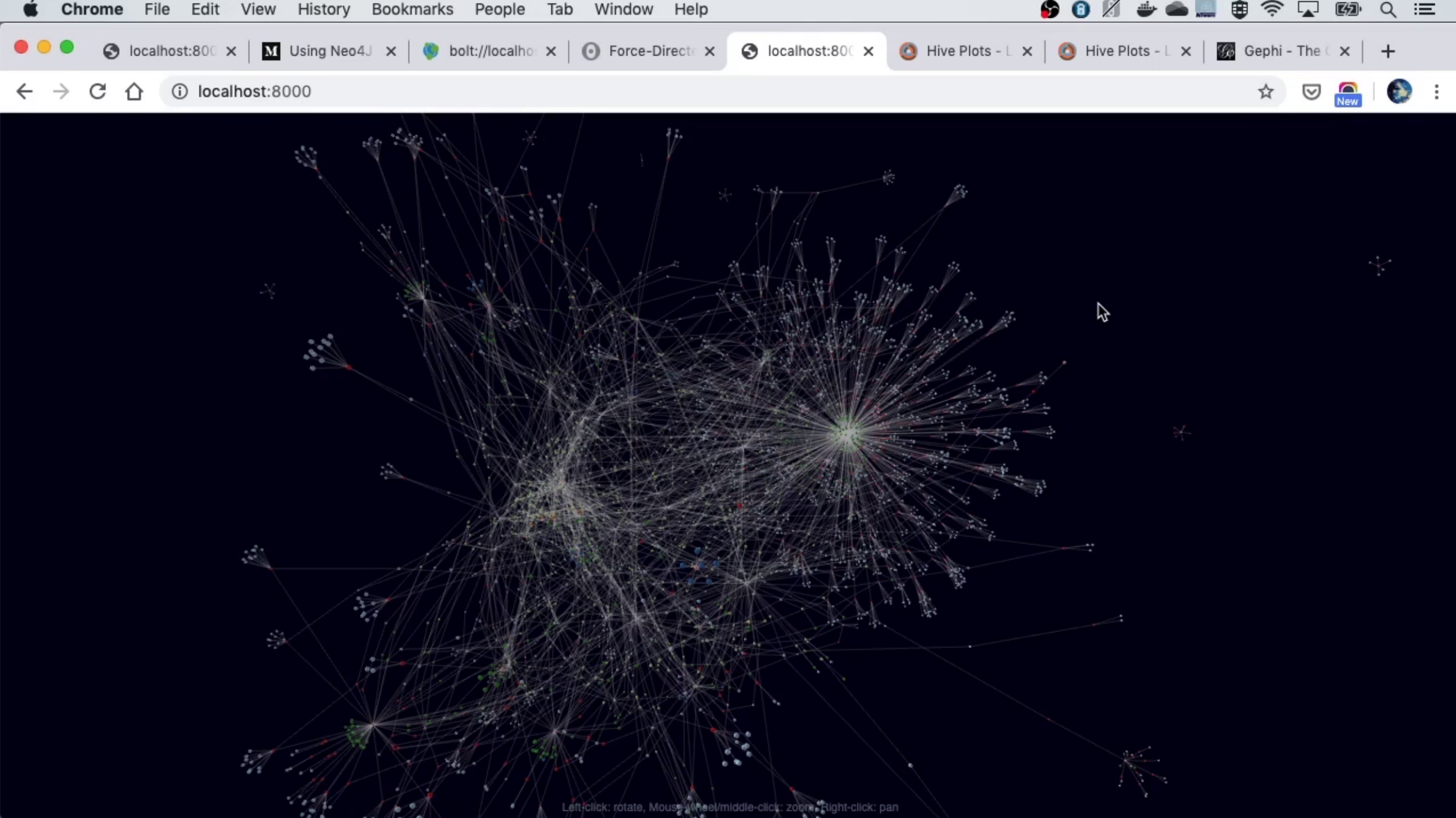
Hive Plots - L
Gephi - The
localhost:7474/browser/
Favorites
Saved Scripts
+New Folder
MATCH (p:Pod) RETURN p.cpulimitstotal, p.name, p.namespace ORDER BY
MATCH (n:Namespace) -[*]-> (p:Pod) RETURN n.name, n.created,
MATCH s = (d:Deployment) -[*]-> (p:Pod) WHERE d.name="trickster" RETURN
MATCH s = (n:Namespace) -[*]-> (p:Pod) WHERE p.name="trickster-
gephi
utility
Sample Scripts
Basic Queries
Example Graphs
Data Profiling
Common Procedures
$ MATCH s = (d:Deployment) -[*]-> (p:Pod) WHERE d.name="trickster" RETUR…
Graph
Table
Text
Code
*(10)
Deployment(1)
ReplicaSet(3)
Pod(2)
Namespace(1)
Service(1)
Node(2)
*(11)
OWNS(11)
OWNS
trickster-…
trickster
monitori…
Pod <id>: 122286 age: 14837 cpulimitstotal: 800 cpurequesttotal: 800 created: 2020-03-23 11:25:49 +0000 GMT

Visualizing Graphs in 3D with WebGL

While looking for efficient graph visualization libraries for large scale rendering, I came across 3d-force-graph, a really neat wrapper around three.js for graph visualization. Check out that repository after reading this, they have many more examples and settings to explore.

Michael Hunger Follow
Jul 23, 2018 · 6 min read

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Hive Plots - L
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localhost:8000
New
Left-click: rotate, Mouse-Wheel/middle-click: zoom, Right-click: pan

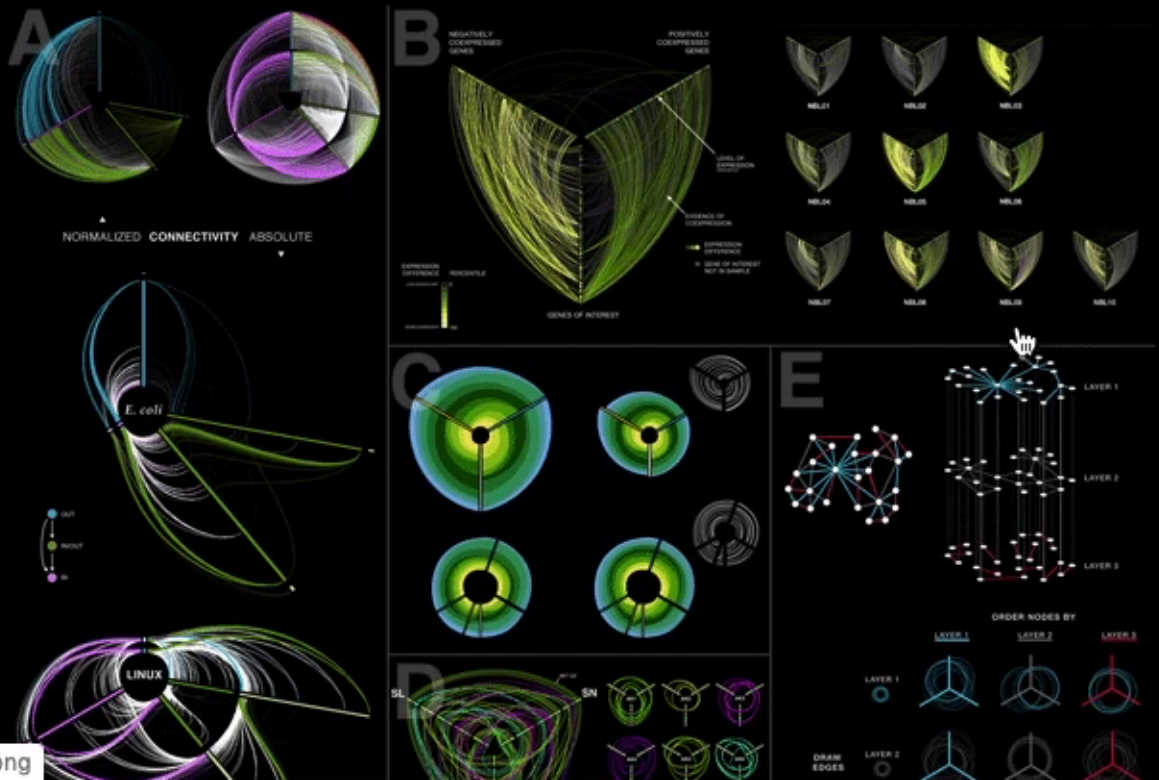
HIVE PLOTS

RATIONAL NETWORK VISUALIZATION — FAREWELL TO HAIRBALLS

Martin Krzywinski, Genome Sciences Center, Vancouver, BC

USEFUL GEEKY SIMPLE

PUBLISHED IN BRIEFINGS IN BIOINFORMATICS
Krzywinski M, Birol I, Jones S, Marra M (2011). Hive Plots — Rational Approach to Visualizing Networks. Briefings in Bioinformatics (early access 9 December 2011, doi: 10.1093/bib/bbr069). (download citation)



THE HIVE PLOT IS A PERCEPTUALLY UNIFORM AND SCALABLE LINEAR LAYOUT VISUALIZATION FOR NETWORK VISUAL ANALYTICS

UNDERSTANDING NETWORK STRUCTURE WITH HIVE PLOTS.
(A) Normalized (top) and absolute (bottom) connectivity of *E. coli* gene regulatory network and Linux function call network (Yan *et al.*)
(B) Gene co-regulation networks in neuroblastoma samples.
(C) Network edges shown as ribbons creating circularly composited stacked bar plots (a periodic streamgraph).
(D) Syntenic network of three modern crucifer species to ancestral genome.
(E) Layered network correlation matrix. In each cell two layers u,v are depicted with u used to order axes and nodes while links for v are shown.

ZOOM GET SLIDES

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makes graphs handy

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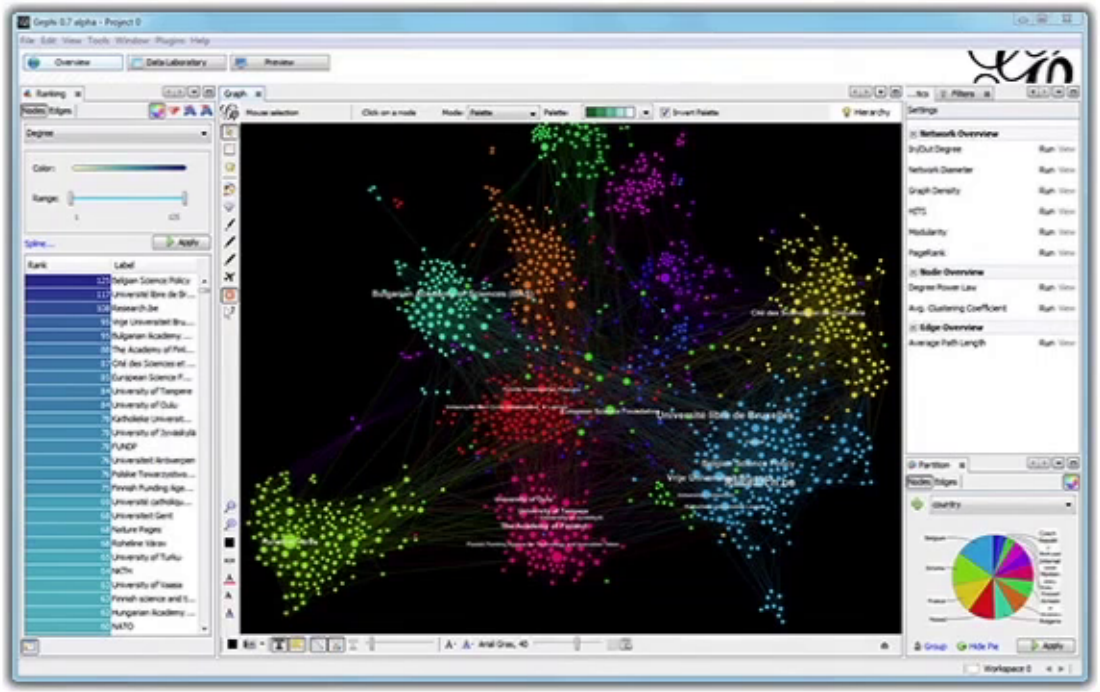
Release Notes | System Requirements

- Features
- Quick start
- Screenshots
- Videos



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VISA

APPLICATIONS

PAPERS

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localhost:7474/browser/

Favorites

Saved Scripts

+New Folder

- MATCH (p:Pod) RETURN p.cpulimitstotal, p.name, p.namespace ORDER BY
- MATCH (n:Namespace) -[*]-> (p:Pod) RETURN n.name, n.created,
- MATCH s = (d:Deployment) -[*]-> (p:Pod) WHERE d.name="trickster" RETURN
- MATCH s = (n:Namespace) -[*]-> (p:Pod) WHERE p.name="trickster-

gephi

- MATCH path = (n)-[]->() CALL apoc.gephi.add('host.docker
- MATCH path = (n) WHERE not((n)-[]-()) CALL apoc.gephi.add('host.docker

utility

Sample Scripts

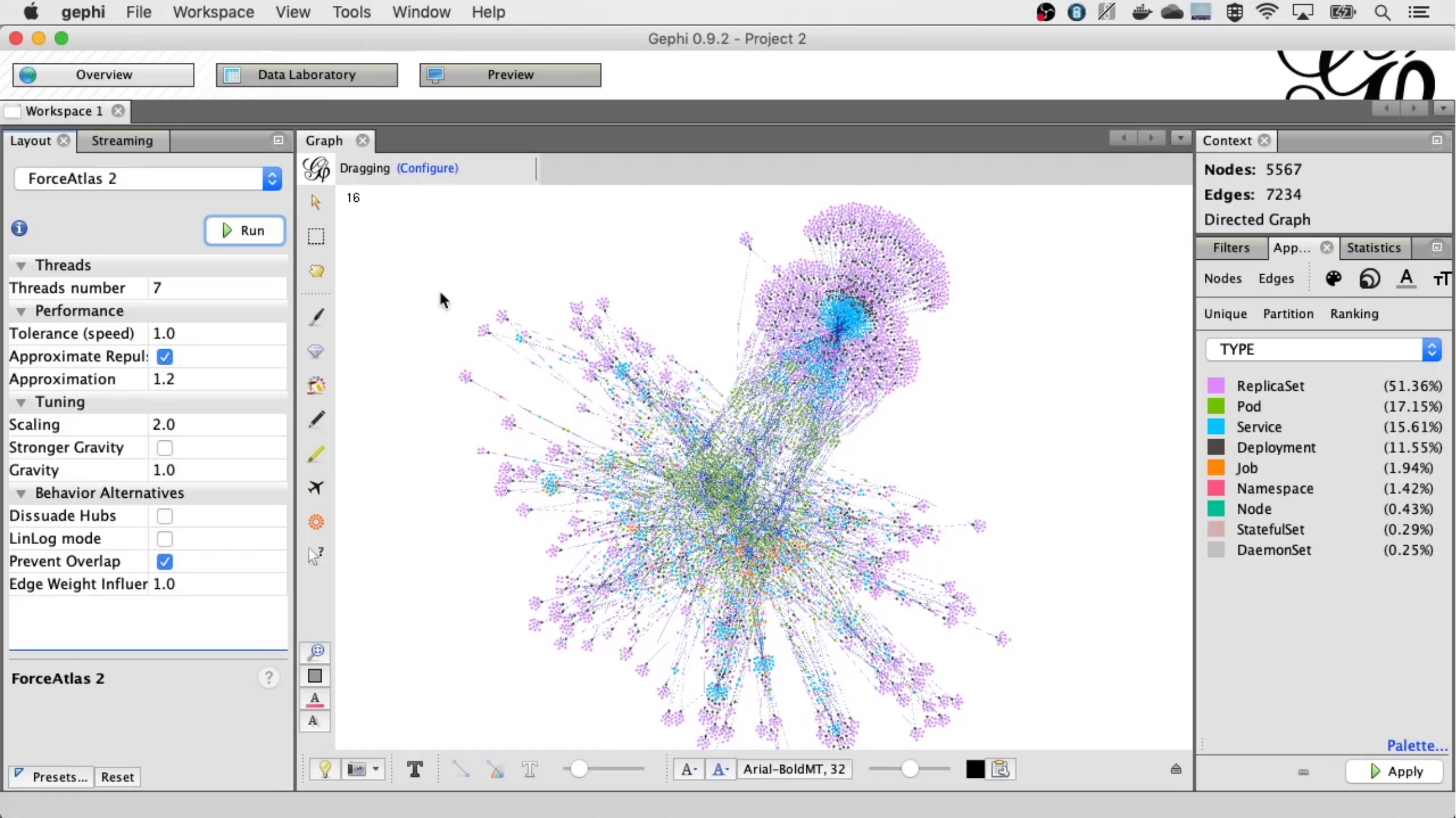
```
1 MATCH path = (n)-[]->()
2 CALL apoc.gephi.add('host.docker.internal',
'workspace1',path,'weight',
["age","completions","cpulimitstotal","cpurequesttotal","created","d
efcpu","defmem","defreqcpu","defreqmem","hostip","hostname","interna
ldns","internalip","limitcount","memlimitstotal","memrequesttotal","
name","namespace","node","nodealloccpu","nodeallocmem","nodecapcpu"
```

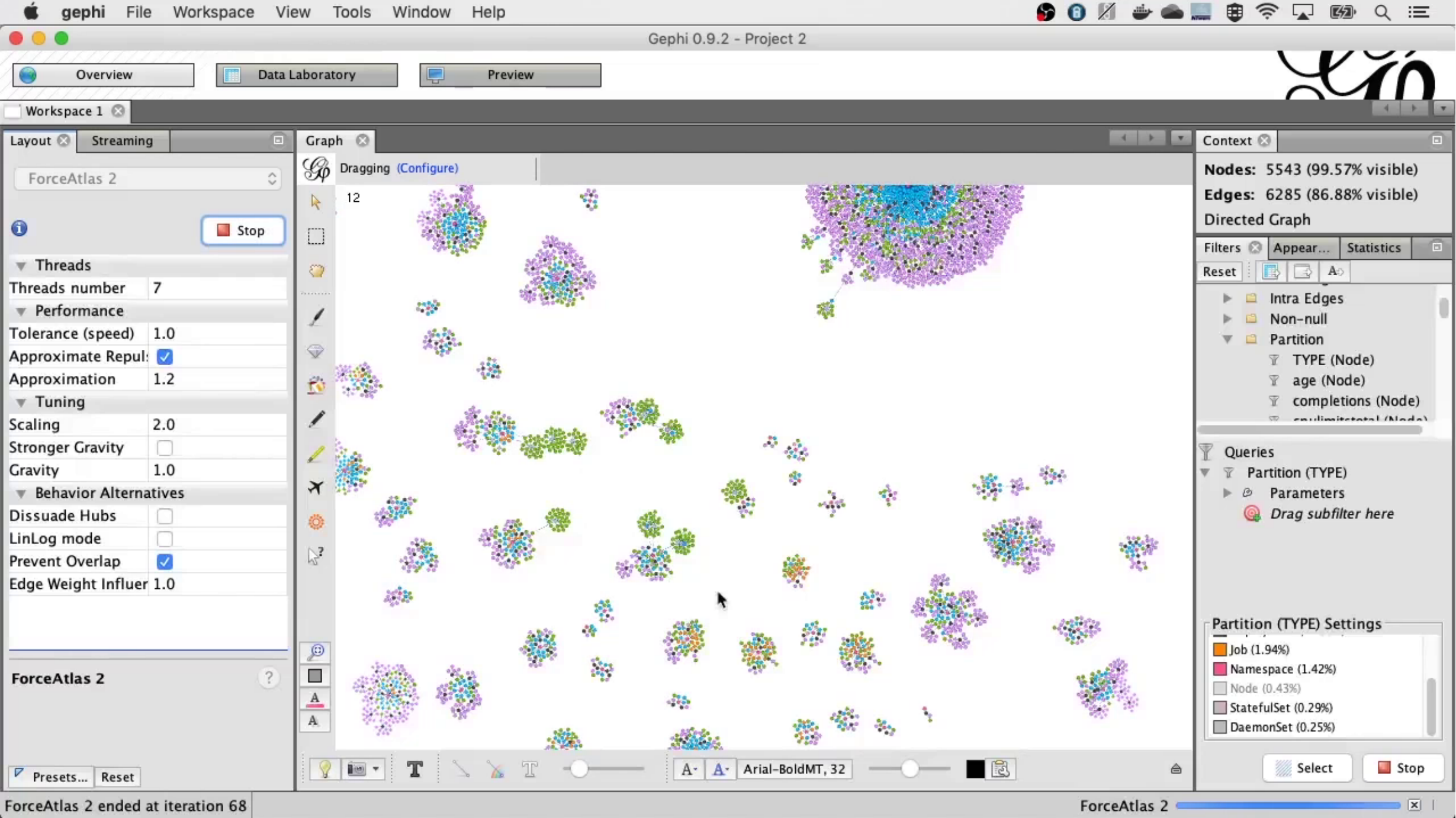
$ MATCH s = (n:Namespace) -[*]-> (p:Pod) WHERE p.name="trickster-69db6b8…

Graph | Table | Text | Code

*(51) | Namespace(1) | Deployment(7) | ReplicaSet(16) | Pod(7) | Service(13) | Node(2) | DaemonSet(2)

*(61) | OWNS(61)


gephi File Workspace View Tools Window Help
Gephi 0.9.2 - Project 2
Overview
Data Laboratory
Preview
Workspace 1
Layout
Streaming
ForceAtlas 2
Run
Threads
Threads number 7
Performance
Tolerance (speed) 1.0
Approximate Repul
Approximation 1.2
Tuning
Scaling 2.0
Stronger Gravity
Gravity 1.0
Behavior Alternatives
Dissuade Hubs
LinLog mode
Prevent Overlap
Edge Weight Influer 1.0
ForceAtlas 2
Presets...
Reset
Graph
Dragging (Configure)
16
Arial-BoldMT, 32
Context
Nodes: 5567
Edges: 7234
Directed Graph
Filters
App...
Statistics
Nodes
Edges
Unique
Partition
Ranking
TYPE
ReplicaSet (51.36%)
Pod (17.15%)
Service (15.61%)
Deployment (11.55%)
Job (1.94%)
Namespace (1.42%)
Node (0.43%)
StatefulSet (0.29%)
DaemonSet (0.25%)
Palette...
Apply


gephi File Workspace View Tools Window Help
Gephi 0.9.2 - Project 2
Overview
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Layout
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ForceAtlas 2
Stop
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Threads number 7
Performance
Tolerance (speed) 1.0
Approximate Repul
Approximation 1.2
Tuning
Scaling 2.0
Stronger Gravity
Gravity 1.0
Behavior Alternatives
Dissuade Hubs
LinLog mode
Prevent Overlap
Edge Weight Influer 1.0
ForceAtlas 2
Presets...
Reset
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Dragging (Configure)
12
Arial-BoldMT, 32
Context
Nodes: 5543 (99.57% visible)
Edges: 6285 (86.88% visible)
Directed Graph
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Appear...
Statistics
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Intra Edges
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Partition
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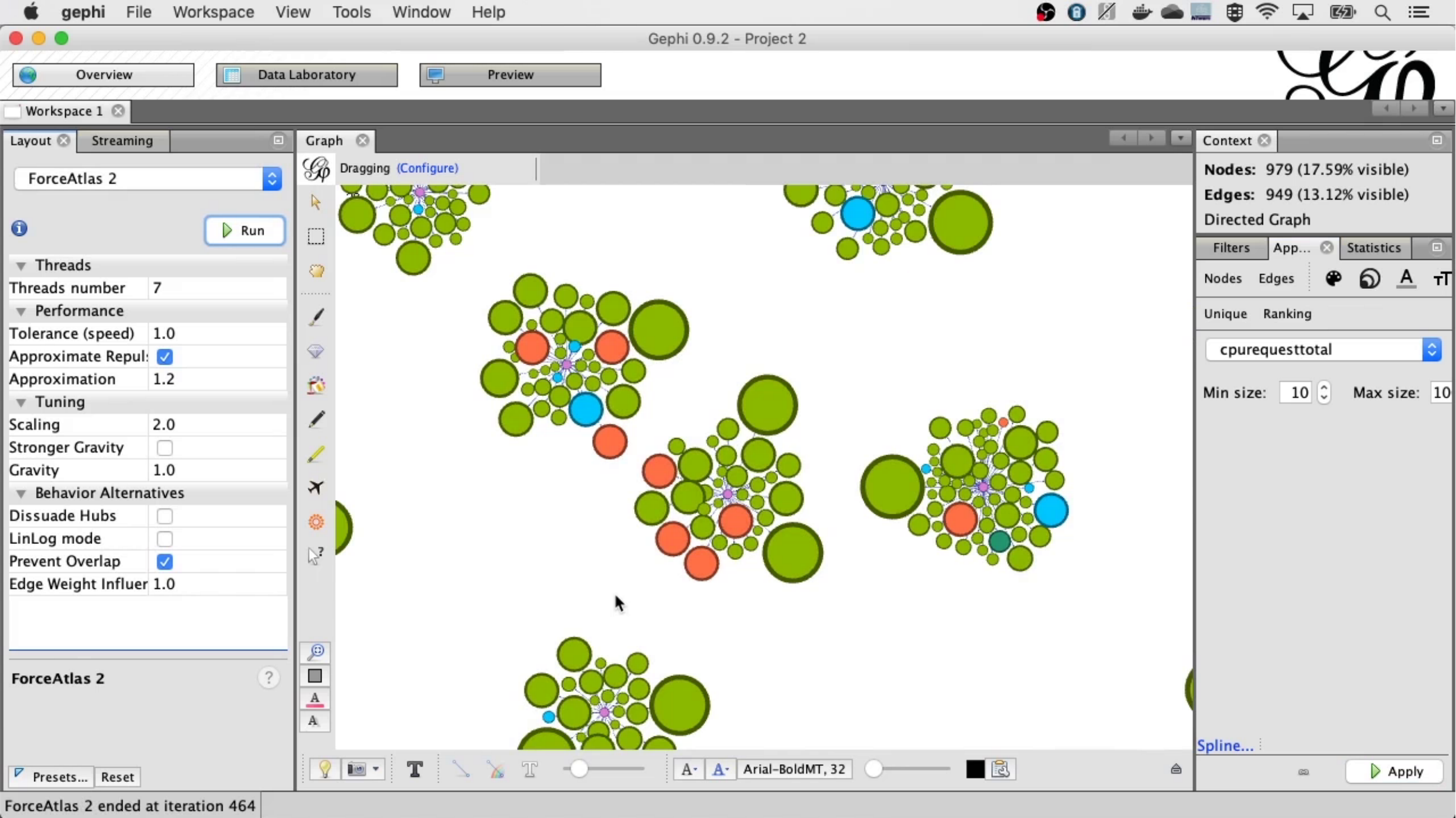
Parameters
Drag subfilter here
Partition (TYPE) Settings
Job (1.94%)
Namespace (1.42%)
Node (0.43%)
StatefulSet (0.29%)
DaemonSet (0.25%)
Select
Stop
ForceAtlas 2 ended at iteration 68
ForceAtlas 2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Threads number 7
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Approximate Repul
Approximation 1.2
Tuning
Scaling 2.0
Stronger Gravity
Gravity 1.0
Behavior Alternatives
Dissuade Hubs
LinLog mode
Prevent Overlap
Edge Weight Influer 1.0
ForceAtlas 2
Presets...
Reset
Graph
Dragging (Configure)
Arial-BoldMT, 32
Context
Nodes: 979 (17.59% visible)
Edges: 949 (13.12% visible)
Directed Graph
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Statistics
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Edges
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Ranking
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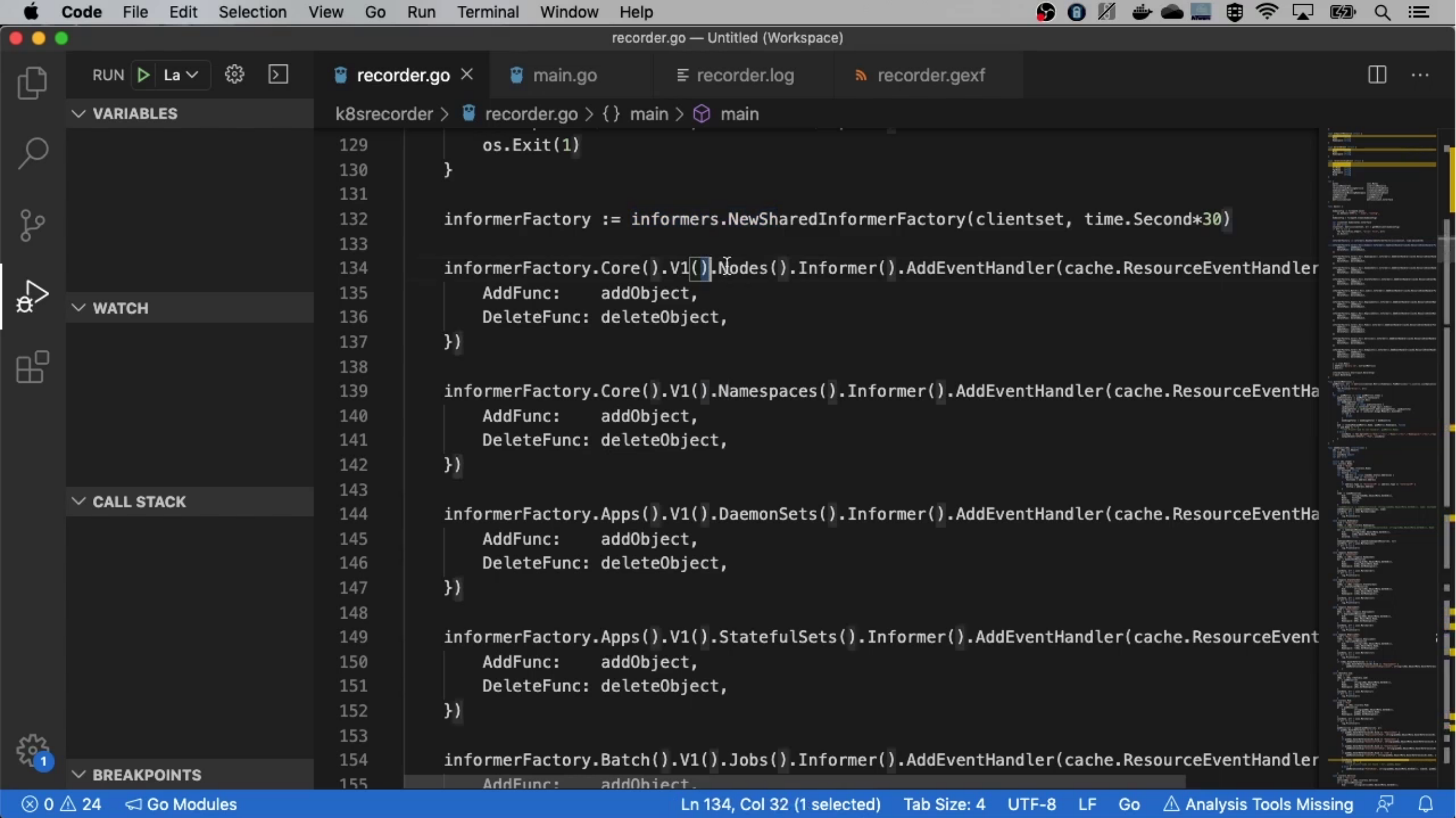
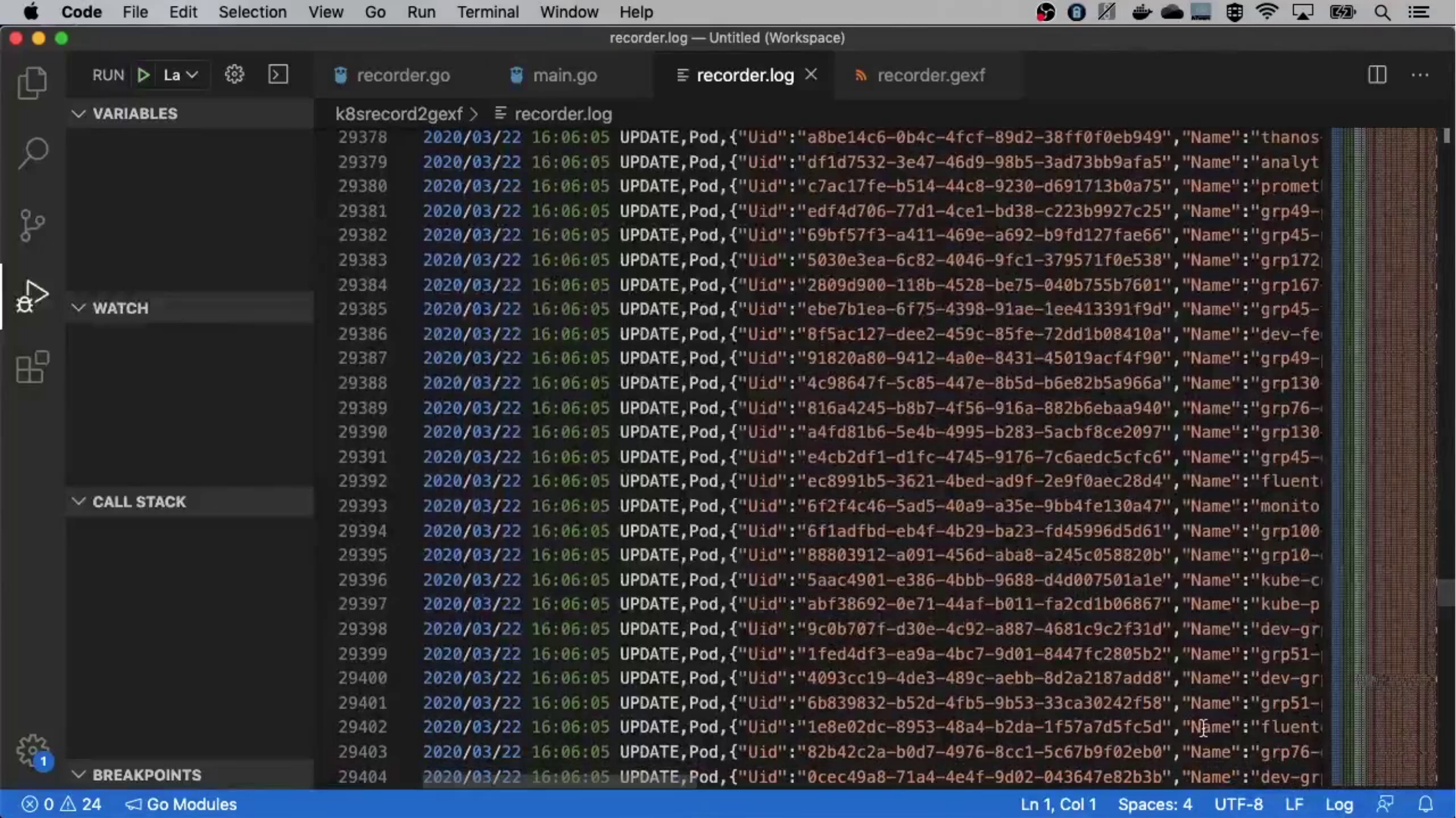
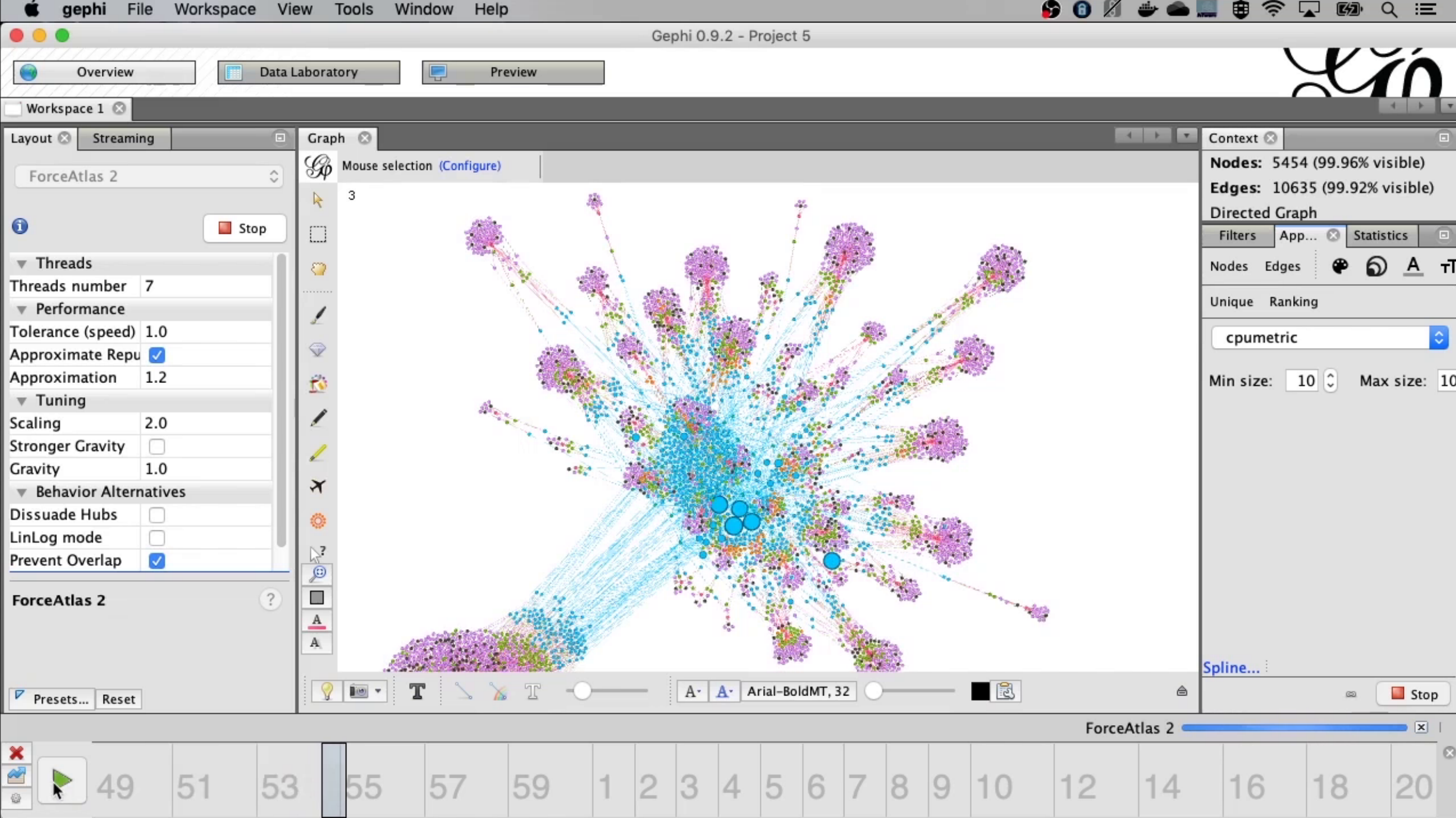
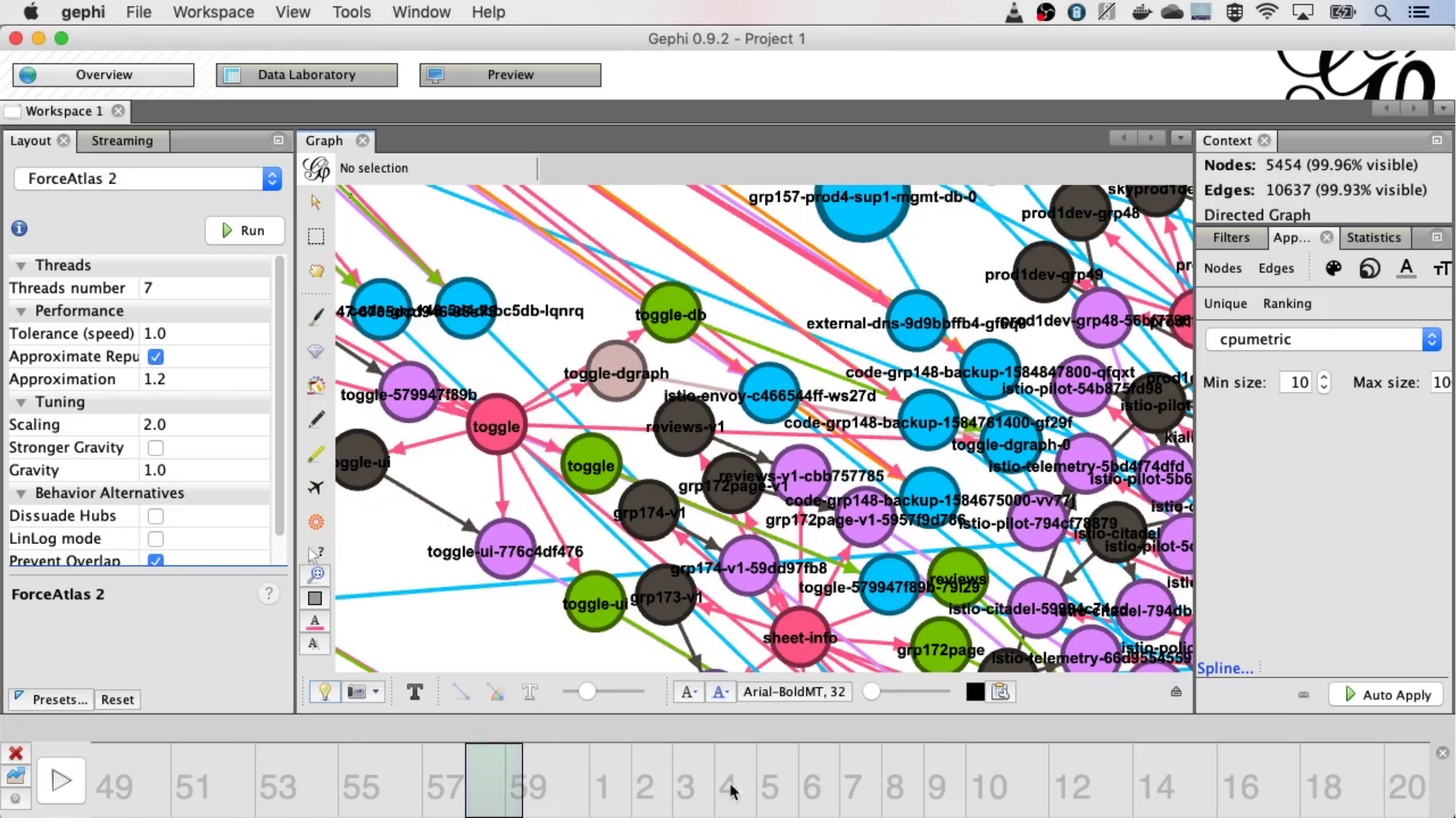
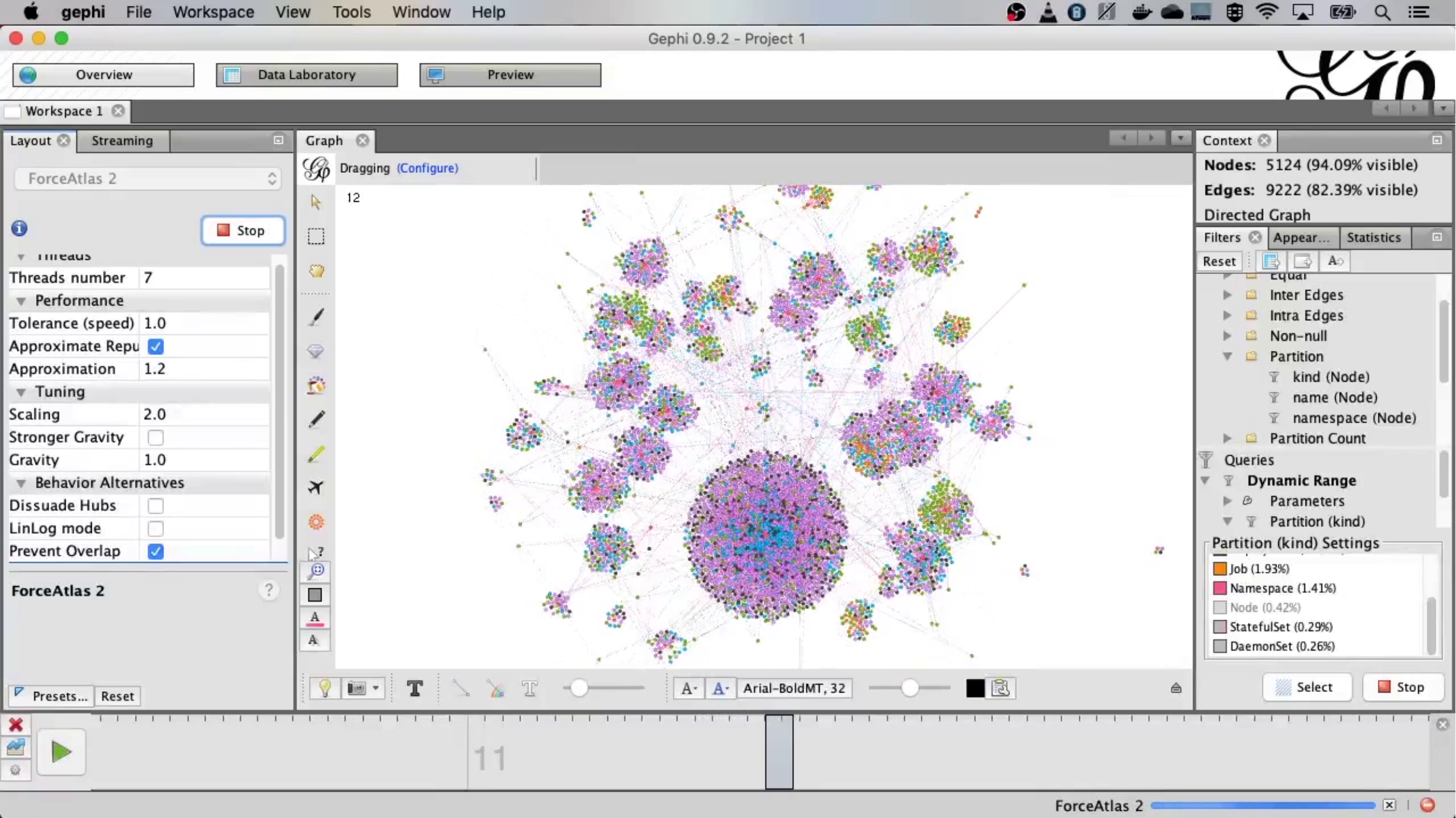
Min size: 10
Max size: 10
Spline...
Apply
ForceAtlas 2 ended at iteration 464

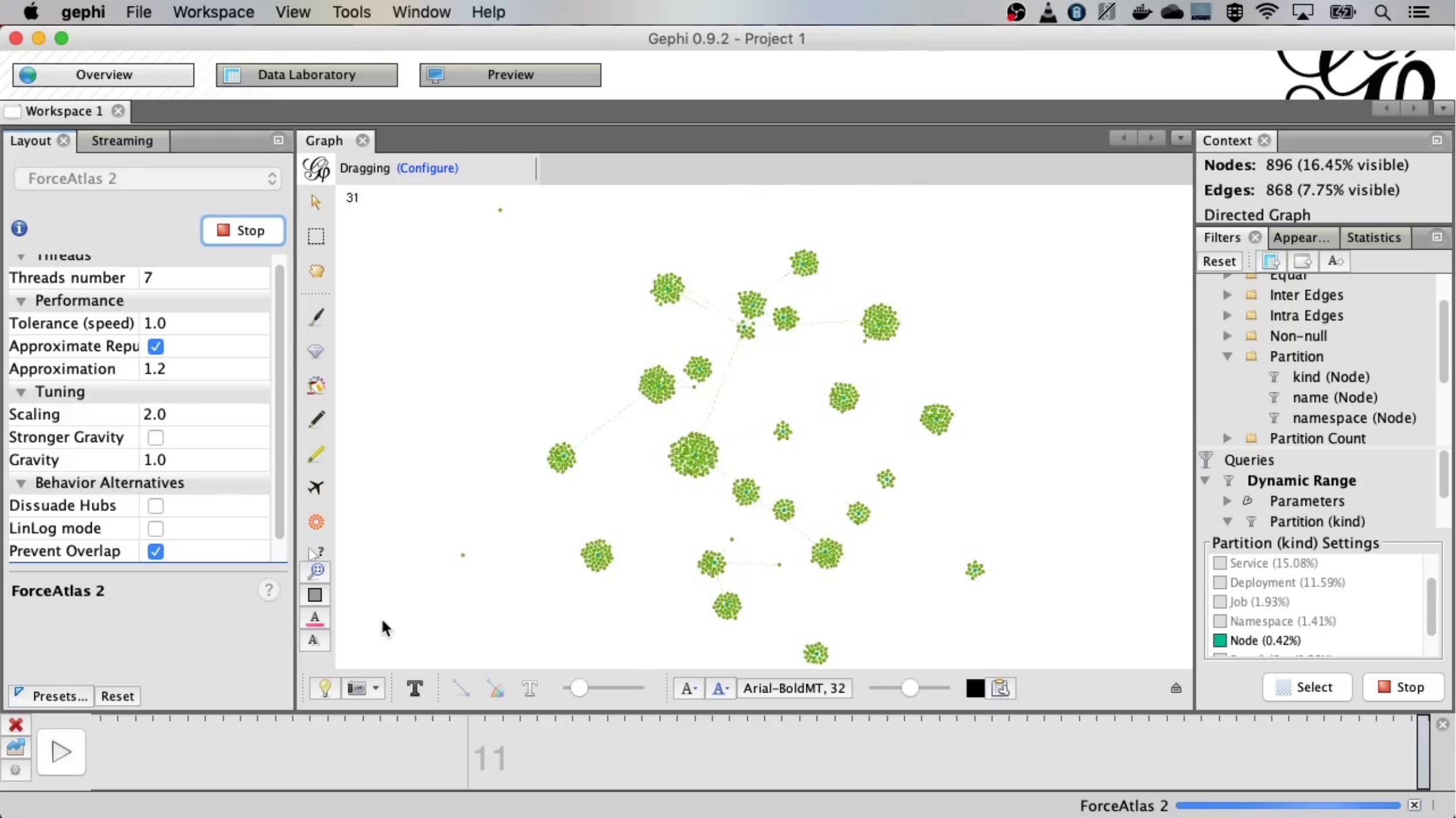

Code File Edit Selection View Go Run Terminal Window Help
recorder.go — Untitled (Workspace)
RUN La
VARIABLES
WATCH
CALL STACK
BREAKPOINTS
recorder.go
main.go
recorder.log
recorder.gexf
k8srecorder > recorder.go > { } main > main
129 os.Exit(1)
130 }
131
132 informerFactory := informers.NewSharedInformerFactory(clientset, time.Second*30)
133
134 informerFactory.Core().V1().Nodes().Informer().AddEventHandler(cache.ResourceEventHandler
135 AddFunc: addObject,
136 DeleteFunc: deleteObject,
137 })
138
139 informerFactory.Core().V1().Namespaces().Informer().AddEventHandler(cache.ResourceEventHa
140 AddFunc: addObject,
141 DeleteFunc: deleteObject,
142 })
143
144 informerFactory.Apps().V1().DaemonSets().Informer().AddEventHandler(cache.ResourceEventHa
145 AddFunc: addObject,
146 DeleteFunc: deleteObject,
147 })
148
149 informerFactory.Apps().V1().StatefulSets().Informer().AddEventHandler(cache.ResourceEvent
150 AddFunc: addObject,
151 DeleteFunc: deleteObject,
152 })
153
154 informerFactory.Batch().V1().Jobs().Informer().AddEventHandler(cache.ResourceEventHandler
155 AddFunc: addObject,
0 24 Go Modules
Ln 134, Col 32 (1 selected) Tab Size: 4 UTF-8 LF Go Analysis Tools Missing


Code File Edit Selection View Go Run Terminal Window Help
recorder.log — Untitled (Workspace)
RUN La
recorder.go
main.go
recorder.log
recorder.gexf
VARIABLES
WATCH
CALL STACK
BREAKPOINTS
k8srecord2gexf > recorder.log
29378 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"a8be14c6-0b4c-4fcf-89d2-38ff0f0eb949","Name":"thanos
29379 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"df1d7532-3e47-46d9-98b5-3ad73bb9afa5","Name":"analyt
29380 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"c7ac17fe-b514-44c8-9230-d691713b0a75","Name":"promet
29381 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"edf4d706-77d1-4ce1-bd38-c223b9927c25","Name":"grp49-
29382 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"69bf57f3-a411-469e-a692-b9fd127fae66","Name":"grp45-
29383 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"5030e3ea-6c82-4046-9fc1-379571f0e538","Name":"grp172
29384 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"2809d900-118b-4528-be75-040b755b7601","Name":"grp167
29385 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"ebe7b1ea-6f75-4398-91ae-1ee413391f9d","Name":"grp45-
29386 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"8f5ac127-dee2-459c-85fe-72dd1b08410a","Name":"dev-fe
29387 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"91820a80-9412-4a0e-8431-45019acf4f90","Name":"grp49-
29388 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"4c98647f-5c85-447e-8b5d-b6e82b5a966a","Name":"grp130
29389 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"816a4245-b8b7-4f56-916a-882b6ebaa940","Name":"grp76-
29390 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"a4fd81b6-5e4b-4995-b283-5acbf8ce2097","Name":"grp130
29391 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"e4cb2df1-d1fc-4745-9176-7c6aedc5cfc6","Name":"grp45-
29392 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"ec8991b5-3621-4bed-ad9f-2e9f0aec28d4","Name":"fluent
29393 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"6f2f4c46-5ad5-40a9-a35e-9bb4fe130a47","Name":"monito
29394 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"6f1adfbd-eb4f-4b29-ba23-fd45996d5d61","Name":"grp100
29395 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"88803912-a091-456d-aba8-a245c058820b","Name":"grp10-
29396 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"5aac4901-e386-4bbb-9688-d4d007501a1e","Name":"kube-c
29397 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"abf38692-0e71-44af-b011-fa2cd1b06867","Name":"kube-p
29398 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"9c0b707f-d30e-4c92-a887-4681c9c2f31d","Name":"dev-gr
29399 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"1fed4df3-ea9a-4bc7-9d01-8447fc2805b2","Name":"grp51-
29400 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"4093cc19-4de3-489c-aebb-8d2a2187add8","Name":"dev-gr
29401 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"6b839832-b52d-4fb5-9b53-33ca30242f58","Name":"grp51-
29402 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"1e8e02dc-8953-48a4-b2da-1f57a7d5fc5d","Name":"fluent
29403 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"82b42c2a-b0d7-4976-8cc1-5c67b9f02eb0","Name":"grp76-
29404 2020/03/22 16:06:05 UPDATE,Pod,{"Uid":"0cec49a8-71a4-4e4f-9d02-043647e82b3b","Name":"dev-gr
⊗ 0 ⚠ 24 Go Modules
Ln 1, Col 1 Spaces: 4 UTF-8 LF Log


gephi File Workspace View Tools Window Help
Gephi 0.9.2 - Project 5
Overview
Data Laboratory
Preview
Workspace 1
Layout
Streaming
ForceAtlas 2
Stop
Threads
Threads number 7
Performance
Tolerance (speed) 1.0
Approximate Repu
Approximation 1.2
Tuning
Scaling 2.0
Stronger Gravity
Gravity 1.0
Behavior Alternatives
Dissuade Hubs
LinLog mode
Prevent Overlap
ForceAtlas 2
Presets...
Reset
Graph
Mouse selection (Configure)
3
Arial-BoldMT, 32
Context
Nodes: 5454 (99.96% visible)
Edges: 10635 (99.92% visible)
Directed Graph
Filters
App...
Statistics
Nodes
Edges
Unique
Ranking
cpumetric
Min size: 10
Max size:
Spline...
Stop
ForceAtlas 2
49 51 53 55 57 59 1 2 3 4 5 6 7 8 9 10 12 14 16 18 20


gephi File Workspace View Tools Window Help
Gephi 0.9.2 - Project 1
Overview
Data Laboratory
Preview
Workspace 1
Layout
Streaming
ForceAtlas 2
Run
Threads
Threads number 7
Performance
Tolerance (speed) 1.0
Approximate Repu
Approximation 1.2
Tuning
Scaling 2.0
Stronger Gravity
Gravity 1.0
Behavior Alternatives
Dissuade Hubs
LinLog mode
Prevent Overlap
ForceAtlas 2
Presets...
Reset
Graph
No selection
grp157-prod4-sup1-mgmt-db-0
prod1dev-grp48
prod1dev-grp49
toggle-db
external-dns-9d9bbffb4-gfqq9
toggle-dgraph
code-grp148-backup-1584847800-qfqxt
istio-pilot-54b875fd98
toggle-579947f89b
istio-envoy-c466544ff-ws27d
toggle
reviews-v1
code-grp148-backup-1584761400-gf29f
toggle-dgraph-0
istio-telemetry-5bd4f74dfd
reviews-v1-cbb757785
grp172page-v1
code-grp148-backup-1584675000-vv771
grp174-v1
grp172page-v1-5957f9d786
istio-pilot-794cf78879
istio-citadel
toggle-ui-776c4df476
grp174-v1-59dd97fb8
reviews
toggle-579947f89b-79l29
toggle-ui
grp173-v1
sheet-info
grp172page
Arial-BoldMT, 32
Context
Nodes: 5454 (99.96% visible)
Edges: 10637 (99.93% visible)
Directed Graph
Filters
App...
Statistics
Nodes
Edges
Unique
Ranking
cpumetric
Min size: 10
Max size: 10
Spline...
Auto Apply
49 51 53 55 57 59 1 2 3 4 5 6 7 8 9 10 12 14 16 18 20


gephi File Workspace View Tools Window Help
Gephi 0.9.2 - Project 1
Overview
Data Laboratory
Preview
Workspace 1
Layout
Streaming
ForceAtlas 2
Stop
Threads number 7
Performance
Tolerance (speed) 1.0
Approximate Repu
Approximation 1.2
Tuning
Scaling 2.0
Stronger Gravity
Gravity 1.0
Behavior Alternatives
Dissuade Hubs
LinLog mode
Prevent Overlap
ForceAtlas 2
Presets...
Reset
Graph
Dragging (Configure)
12
Arial-BoldMT, 32
Context
Nodes: 5124 (94.09% visible)
Edges: 9222 (82.39% visible)
Directed Graph
Filters
Appear...
Statistics
Reset
Inter Edges
Intra Edges
Non-null
Partition
kind (Node)
name (Node)
namespace (Node)
Partition Count
Queries
Dynamic Range
Parameters
Partition (kind)
Partition (kind) Settings
Job (1.93%)
Namespace (1.41%)
Node (0.42%)
StatefulSet (0.29%)
DaemonSet (0.26%)
Select
Stop
11
ForceAtlas 2


gephi File Workspace View Tools Window Help
Gephi 0.9.2 - Project 1
Overview
Data Laboratory
Preview
Workspace 1
Layout
Streaming
ForceAtlas 2
Stop
Threads number 7
Performance
Tolerance (speed) 1.0
Approximate Repu
Approximation 1.2
Tuning
Scaling 2.0
Stronger Gravity
Gravity 1.0
Behavior Alternatives
Dissuade Hubs
LinLog mode
Prevent Overlap
ForceAtlas 2
Presets...
Reset
Graph
Dragging (Configure)
31
Arial-BoldMT, 32
Context
Nodes: 896 (16.45% visible)
Edges: 868 (7.75% visible)
Directed Graph
Filters
Appear...
Statistics
Reset
Inter Edges
Intra Edges
Non-null
Partition
kind (Node)
name (Node)
namespace (Node)
Partition Count
Queries
Dynamic Range
Parameters
Partition (kind)
Partition (kind) Settings
Service (15.08%)
Deployment (11.59%)
Job (1.93%)
Namespace (1.41%)
Node (0.42%)
Select
Stop
11
ForceAtlas 2

Graphs OR Hairballs

sky betting & gaming

Neo4j

- Intuitive
- Reliable (ACID transactions)
- Durable and Fast (custom storage engine)
- Scalable
- Highly available
- Expressive graph query language
- Fast
- Embeddable
- REST API

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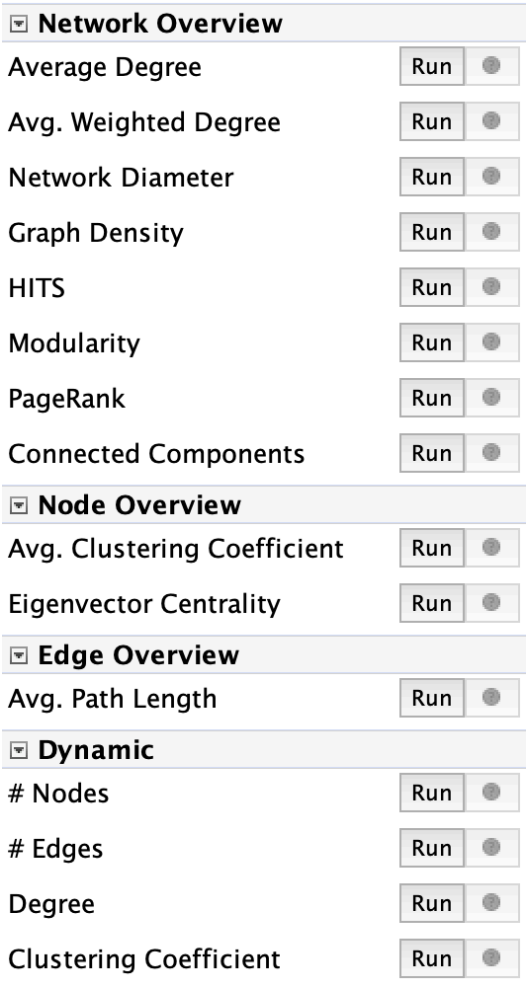
Gephi - Features

- Real-time visualisation
- Layouts
- Metrics
- Time Based Networks
- Cartography
- Dynamic Filtering
- Data Viewing and Editing
- Import/Export
- Extensible (plugins)



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Gephi - Limitations

- Single Node and Edge type.
- The future in it's current form is in question...
  https://gephi.wordpress.com/2018/11/01/is-gephi-obsolete-situation-and-perspectives/
  https://gephi.wordpress.com/2019/02/02/exploring-the-dystopian-future-of-a-javascript-gephi/
- Can be a little quirky!
- How to get started links in the resources.

Eduardo Ramos Ibáñez, Mathieu Bastian and Mathieu Jacomy

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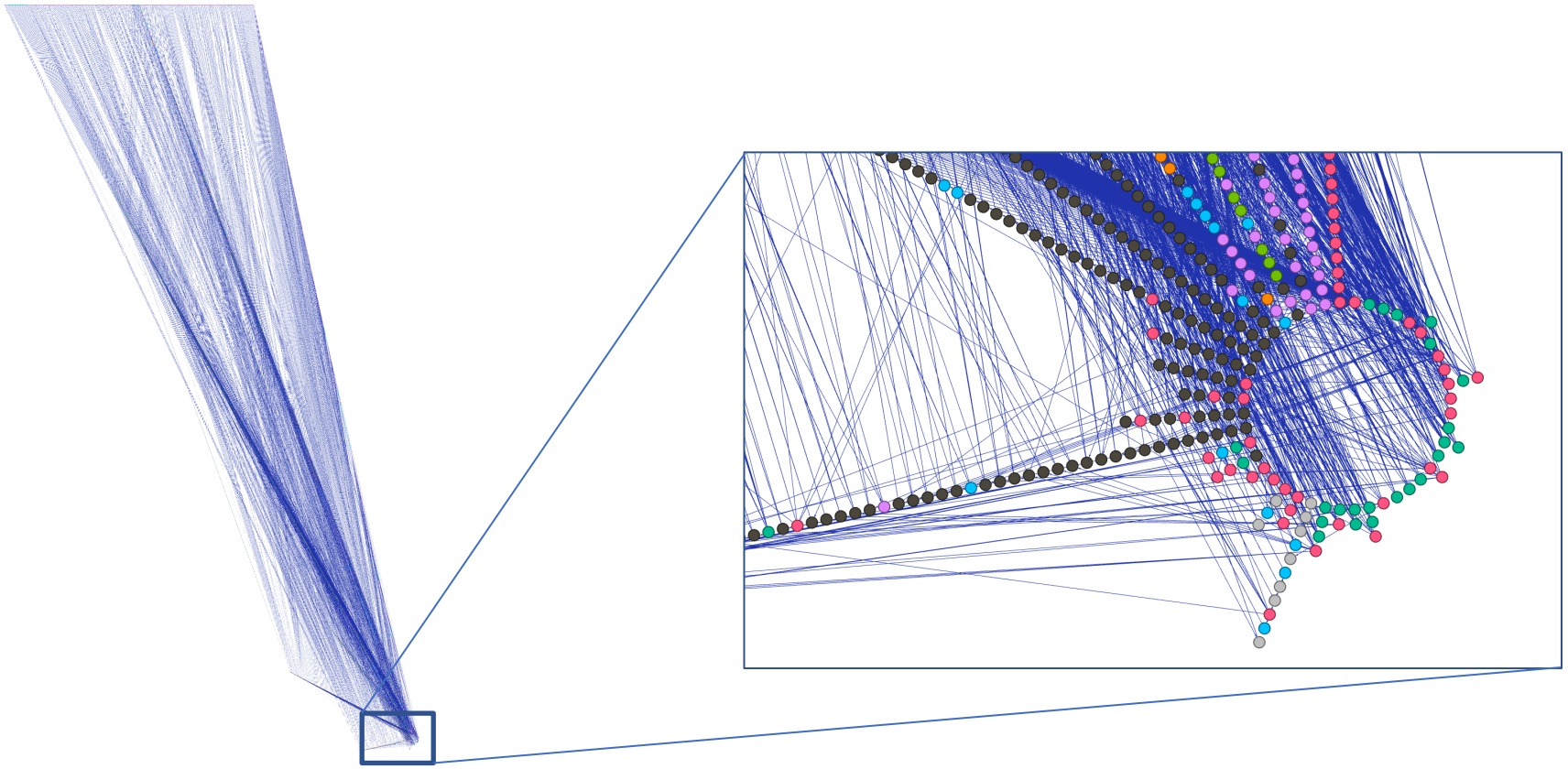
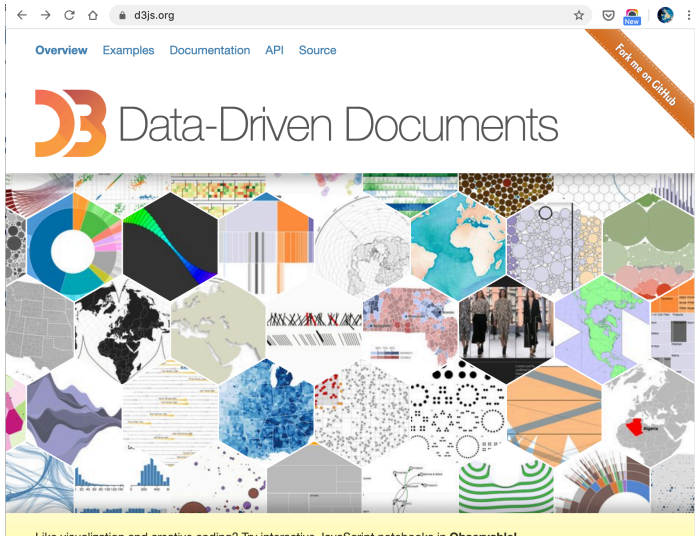
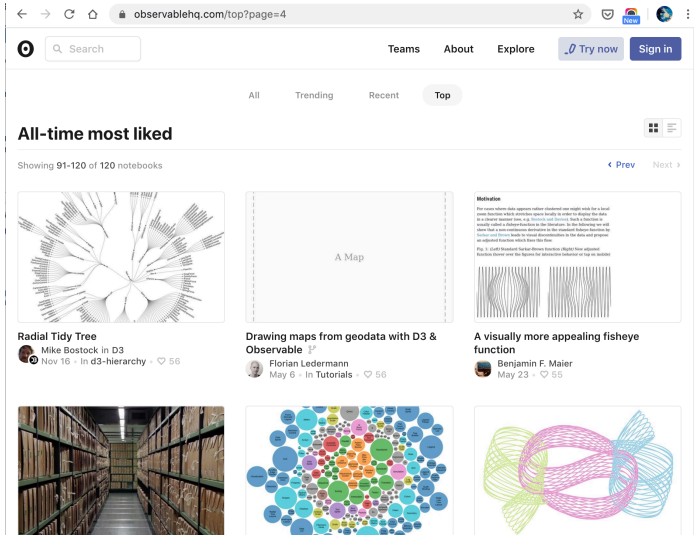
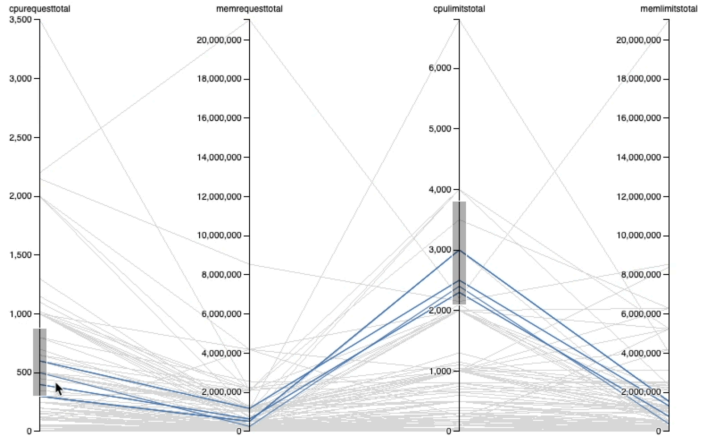
Other Visualisations



Other Visualisations –D3







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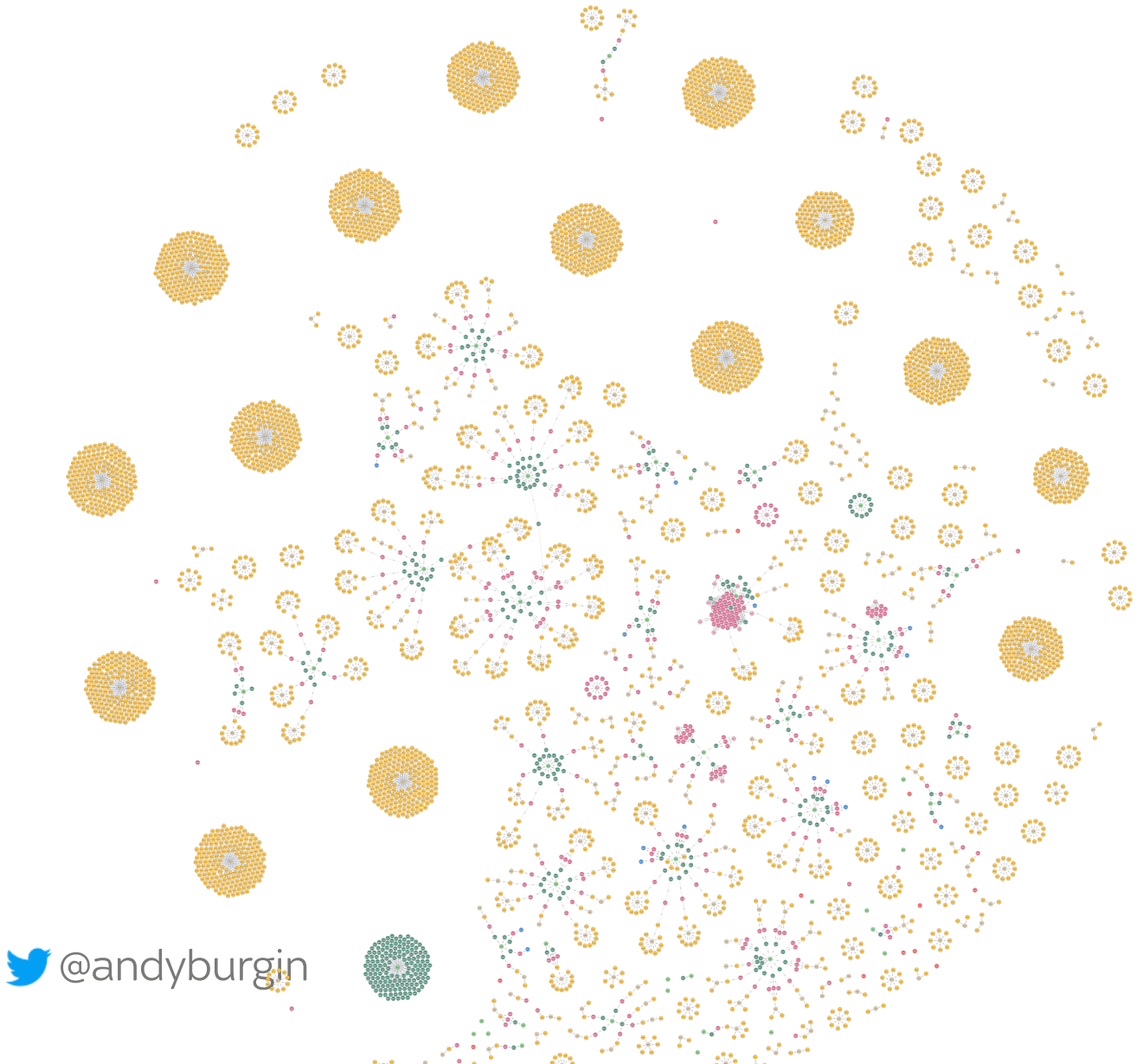
Learnings



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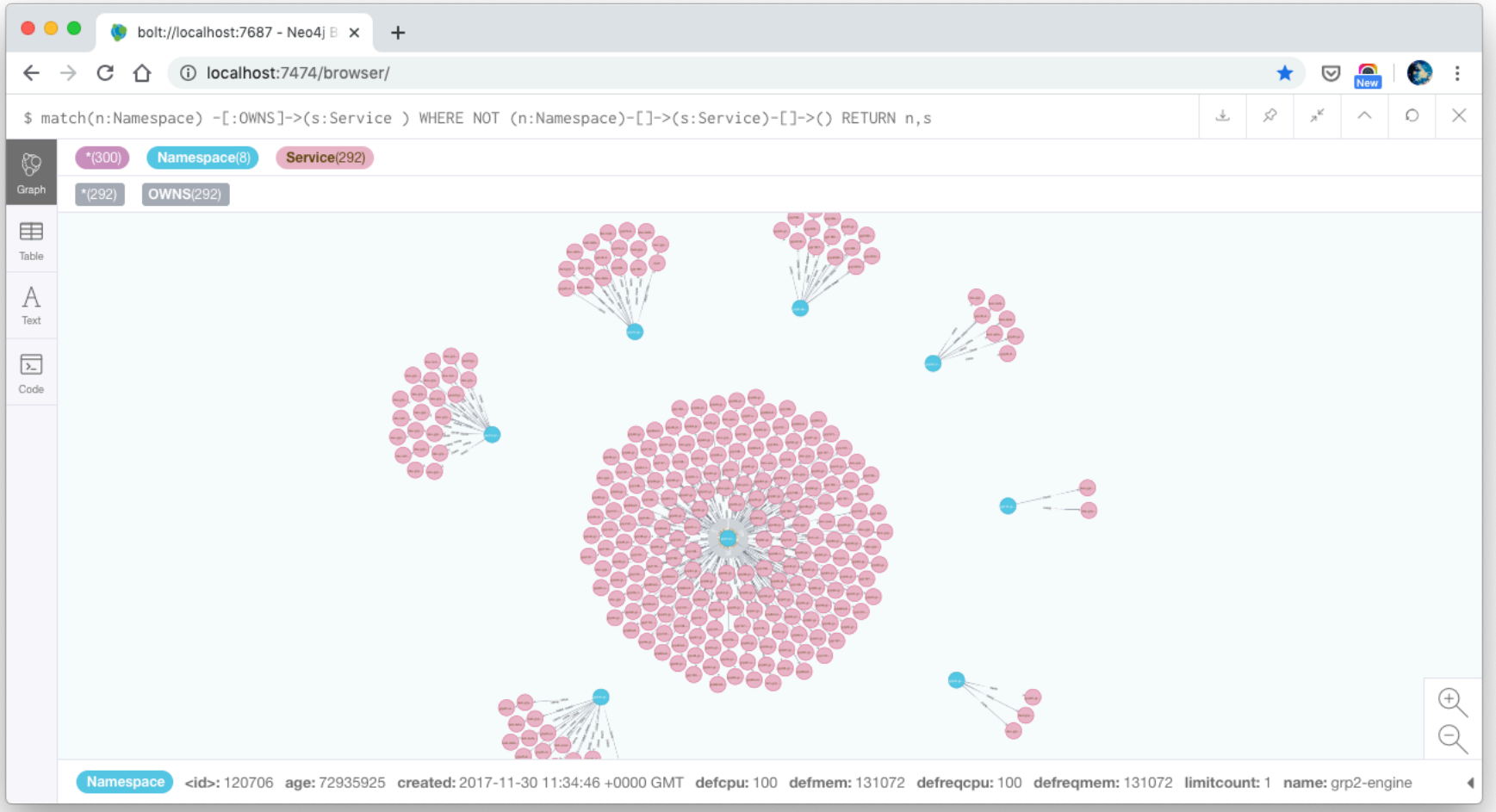
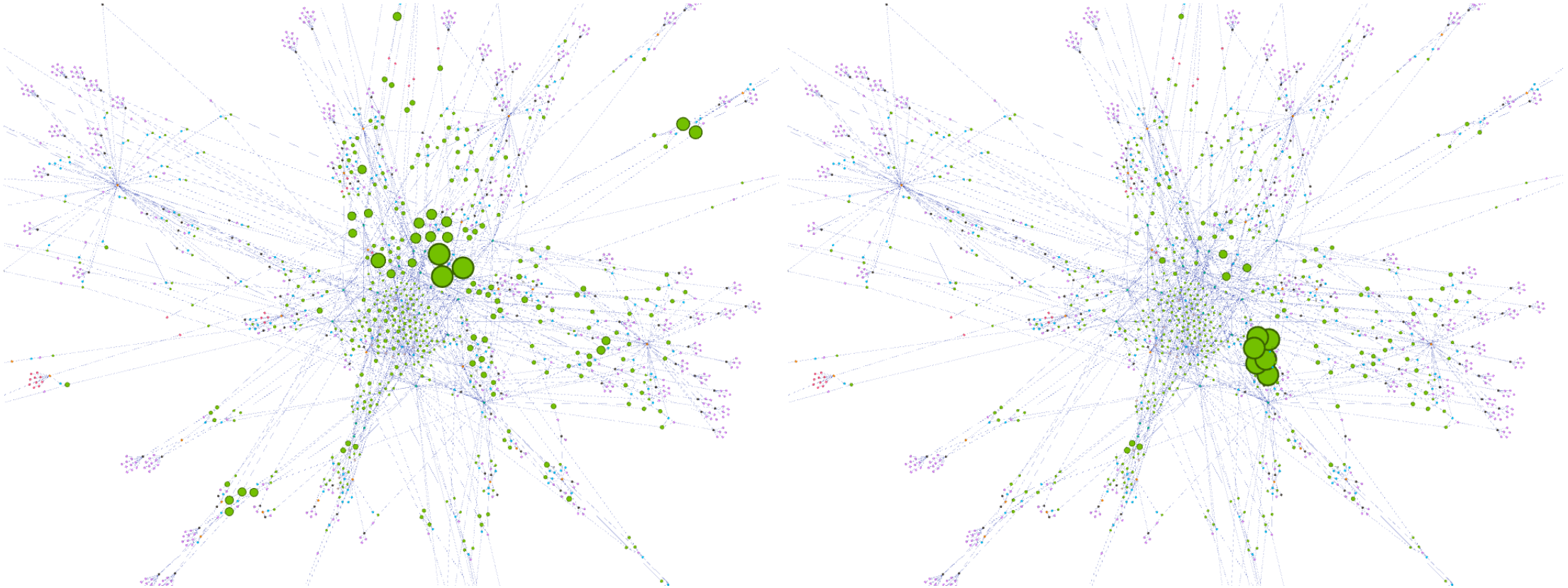
```
spec:
  progressDeadlineSeconds: 2147483647
  replicas: 1
  revisionHistoryLimit: 2147483647
  selector:
    matchLabels:
      app: test-test
  strategy:
    rollingUpdate:
      maxSurge: 1
      maxUnavailable: 1
    type: RollingUpdate
  template:
    metadata:
```



Simple Cypher query to find Services that don't expose any Pods

sky betting & gaming



Pods sized by CPU and memory requests

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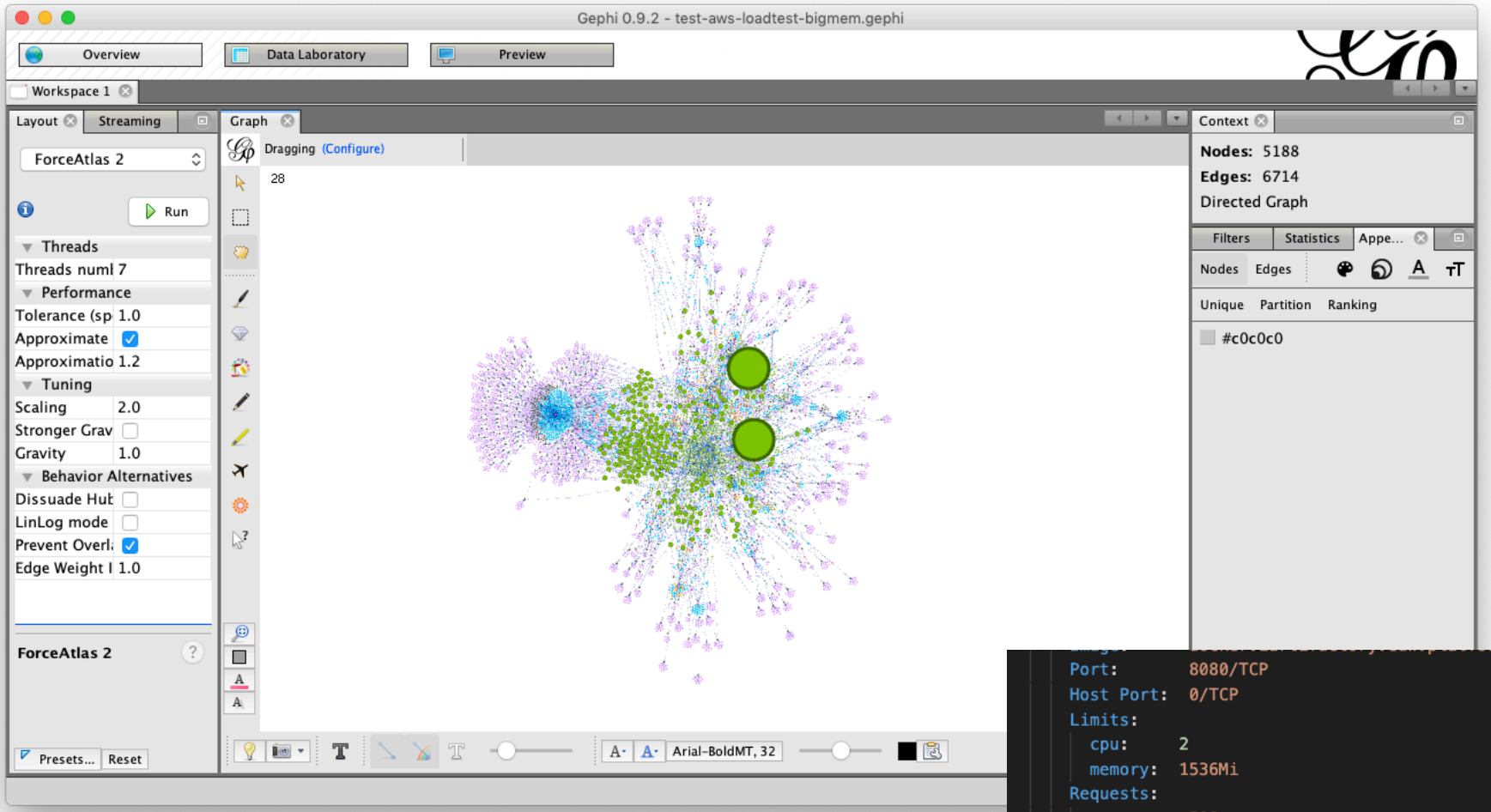
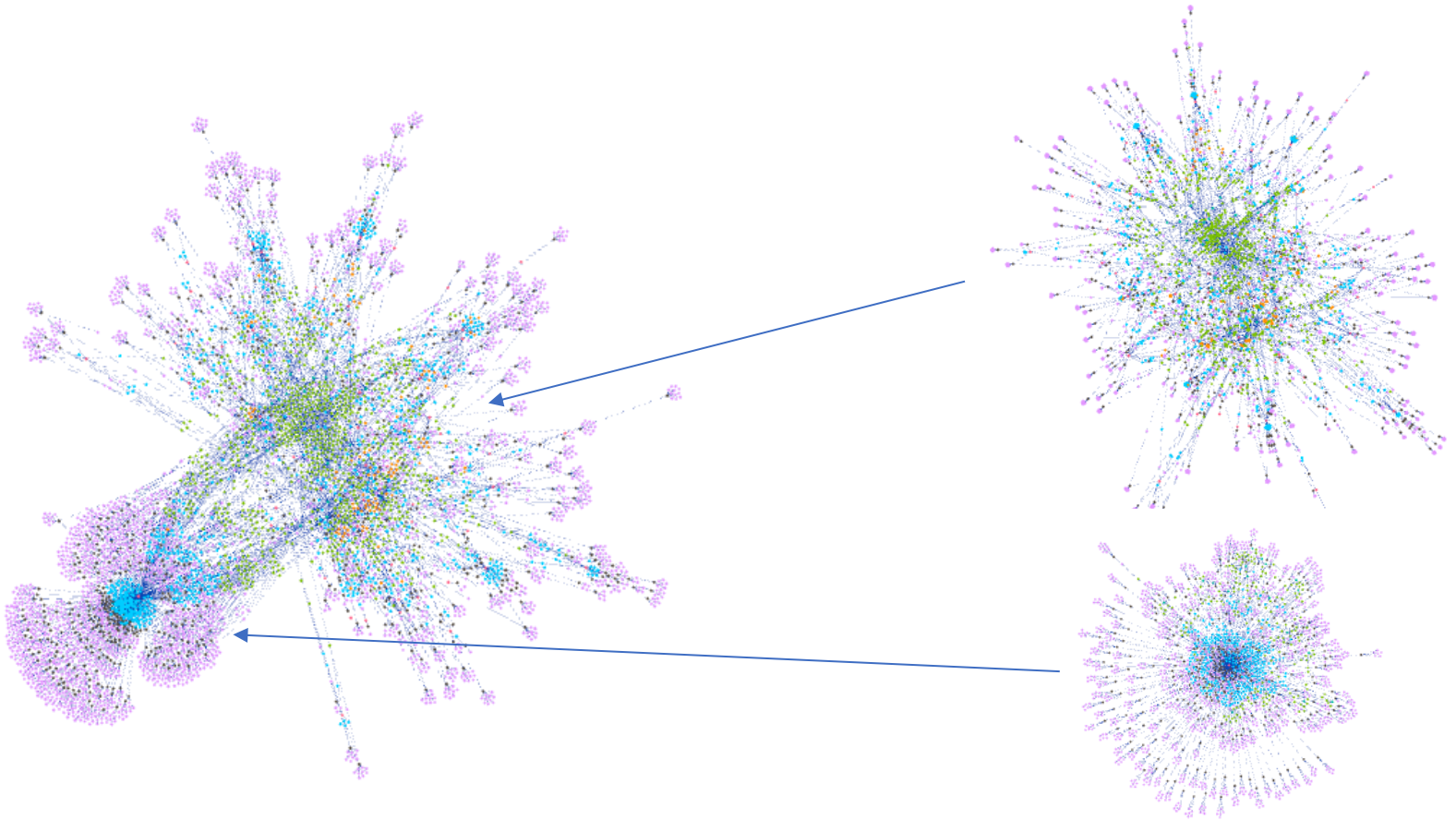
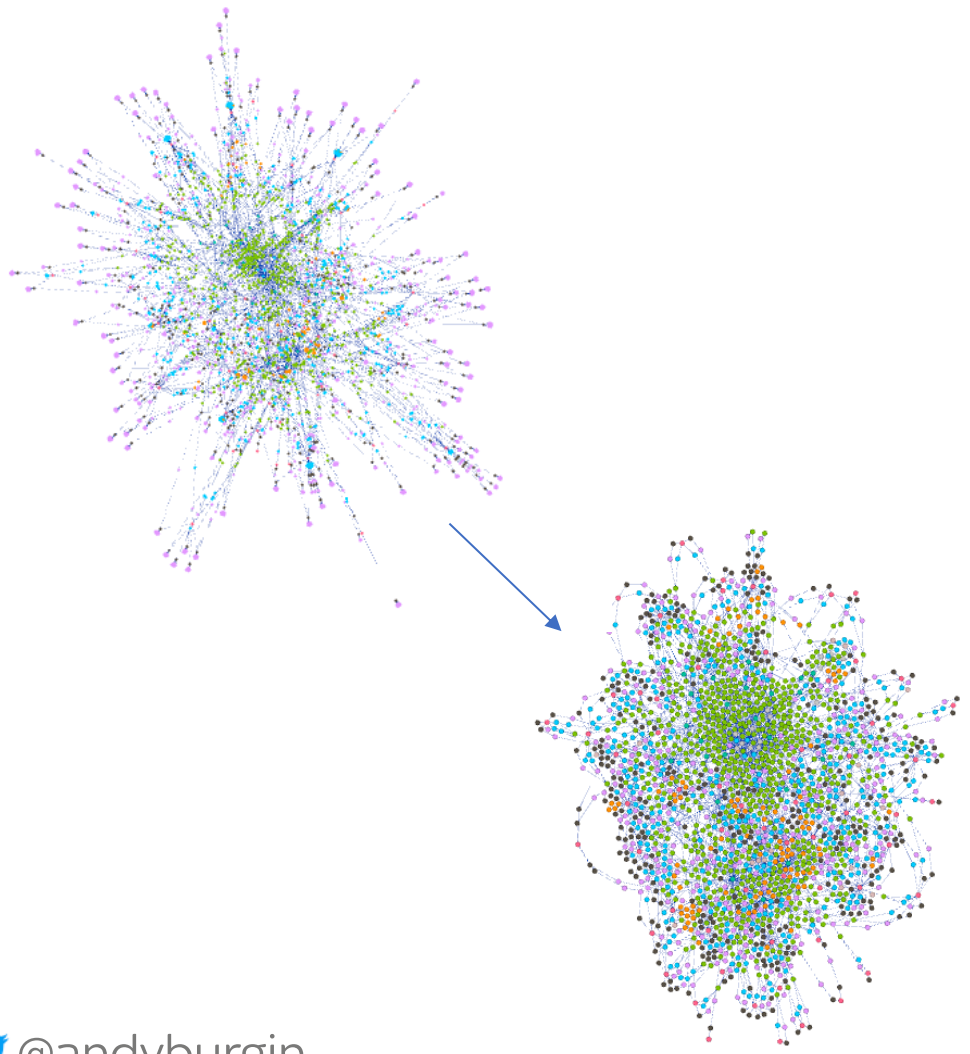


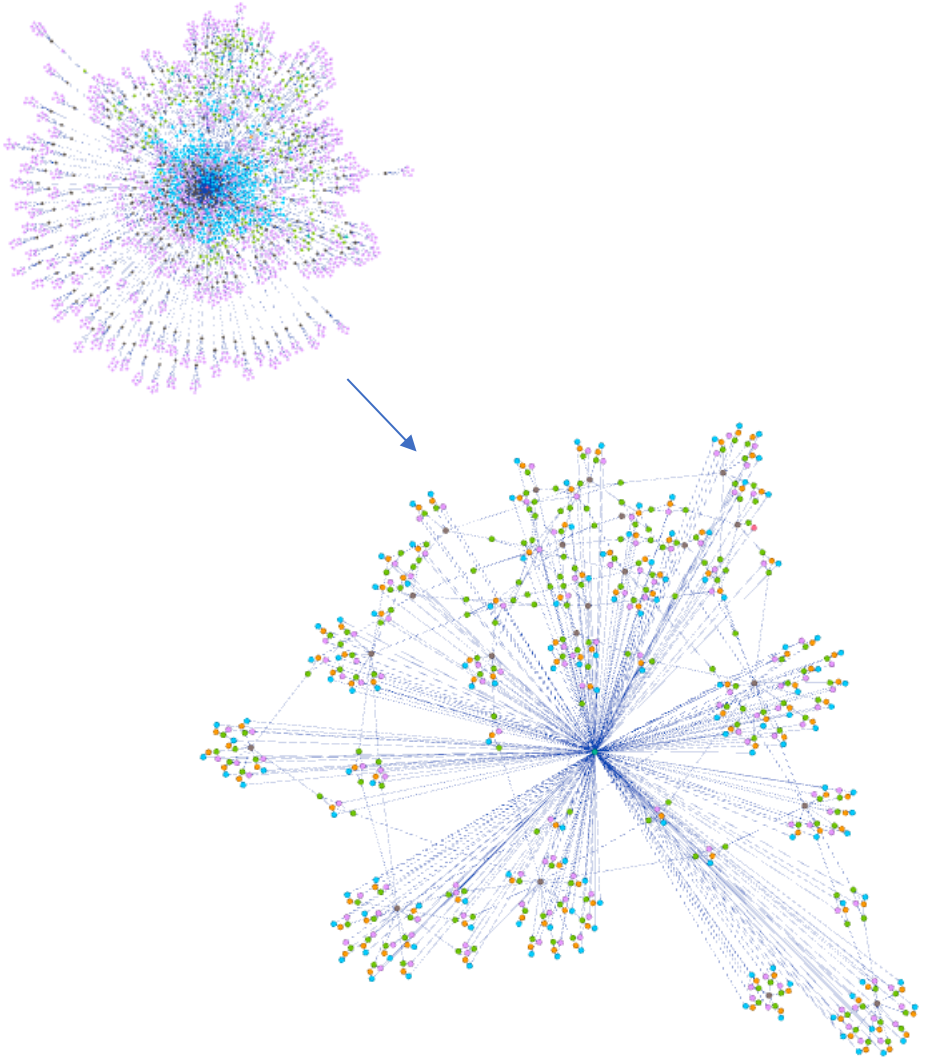

```
    Port:          8080/TCP
    Host Port:     0/TCP
    Limits:
      cpu:     2
      memory:  1536Mi
    Requests:
      cpu:     500m
      memory:  1288490188800m
    Readiness:  http-get http://:metrics/health delay=5s timeout=5s
    Mounts:
      /usr/local/certificates from certificate-storage (ro)
  Volumes:
    certificate-storage:
```

A rather large pod ?



Splitting the hairball





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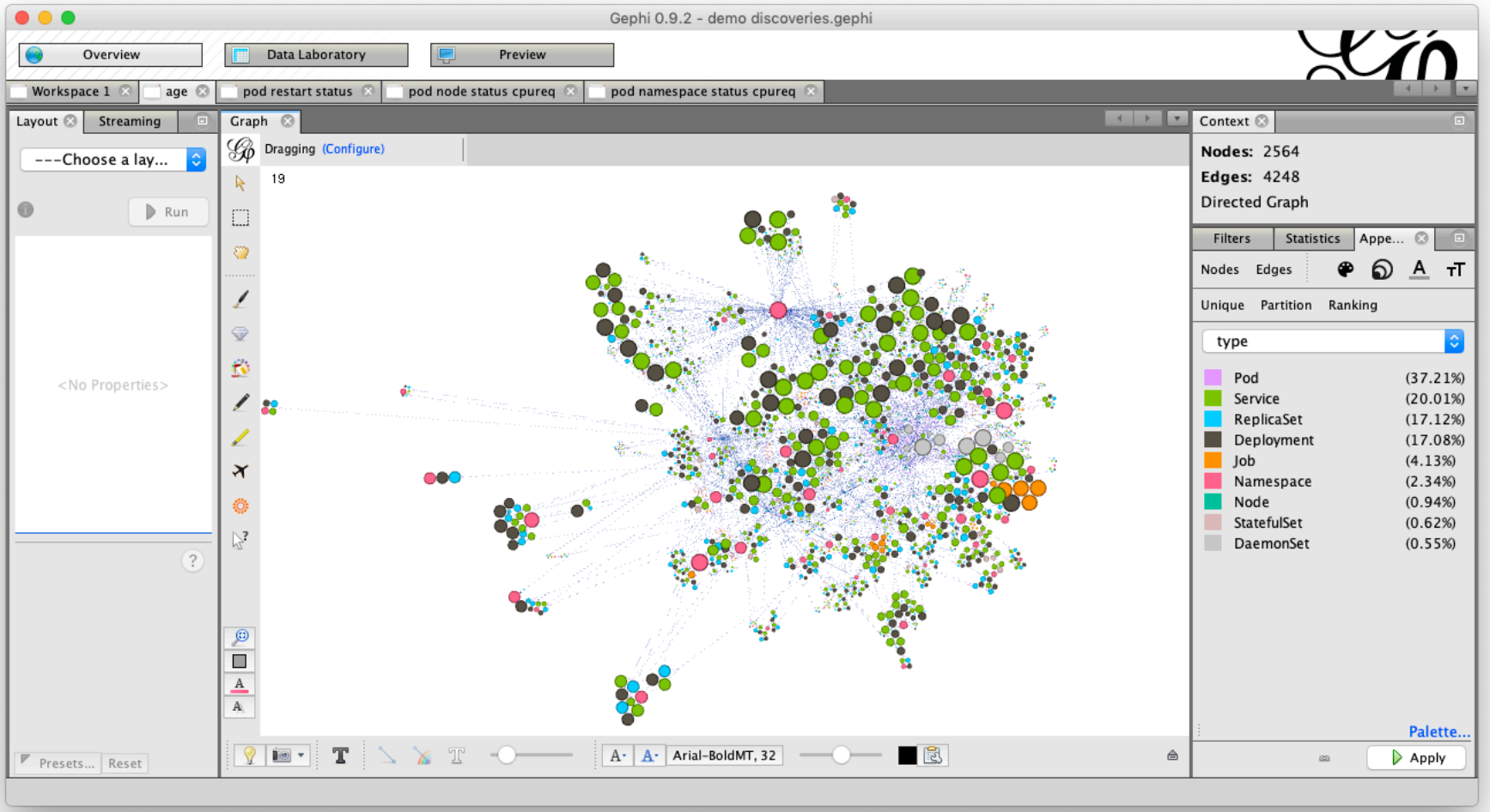
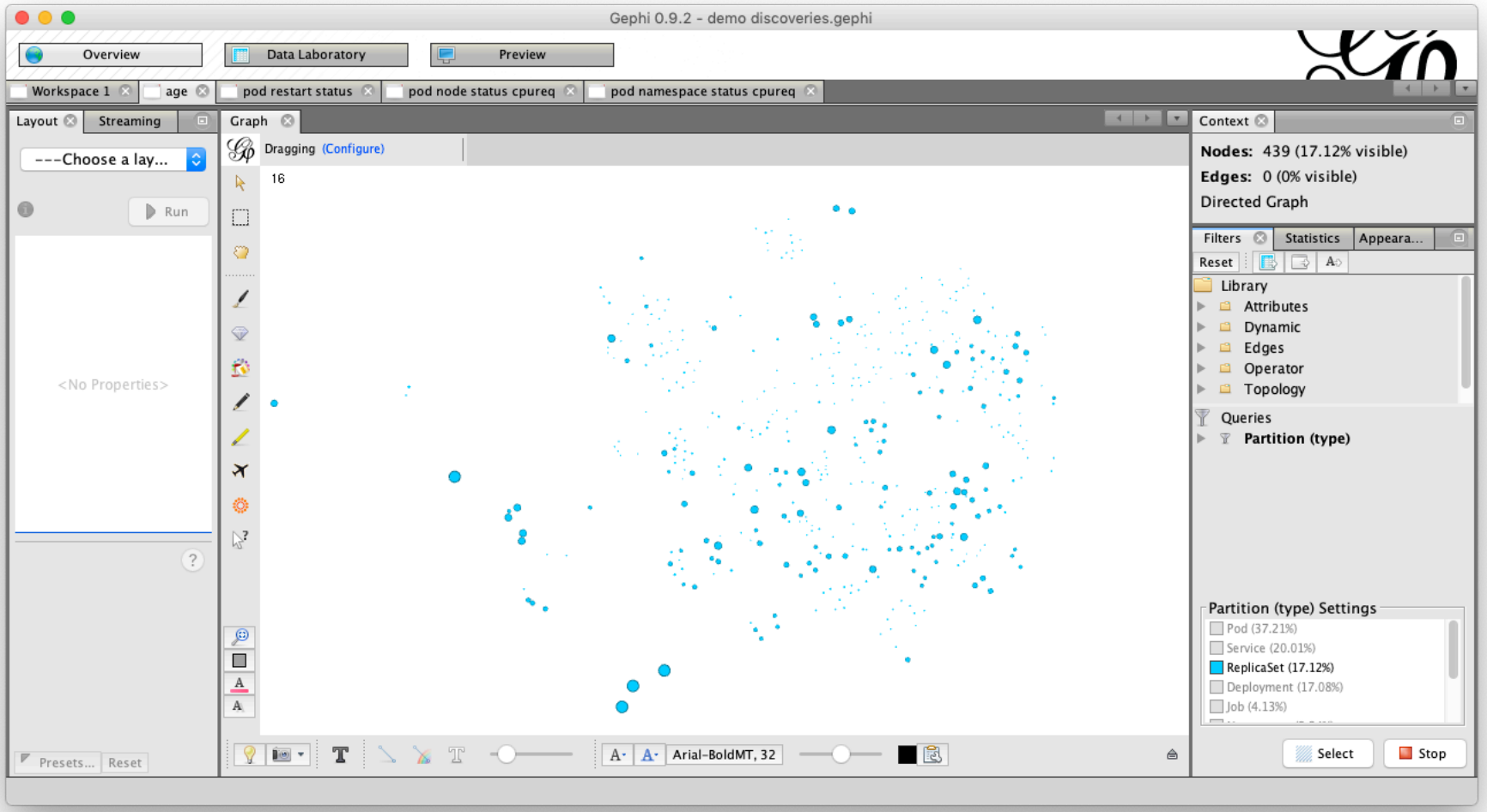


Simplified view of the cluster



View just the active Replicasets, sized by age, rebuild and redeploy ?

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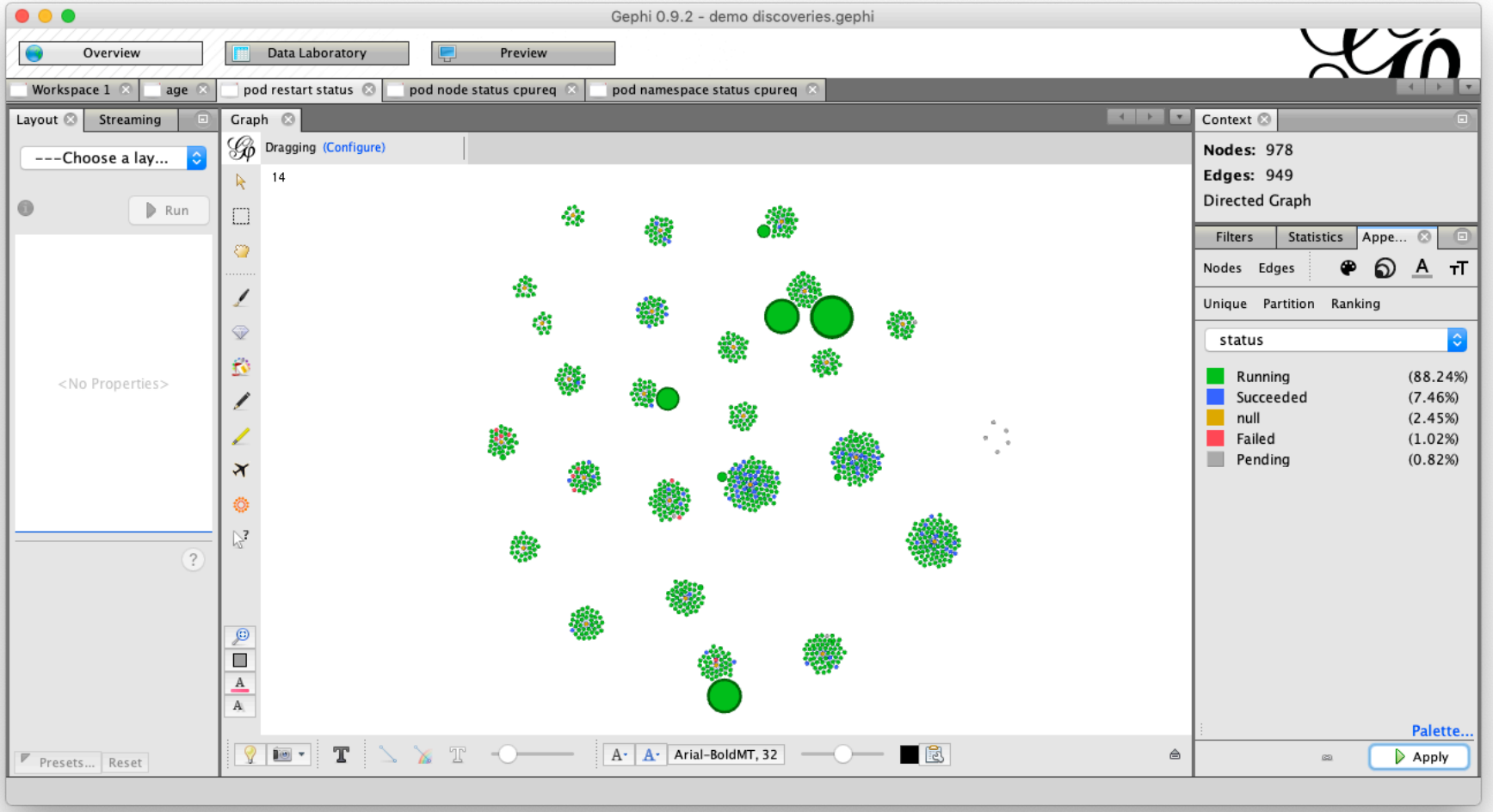

Pods sized by restarts, coloured by status

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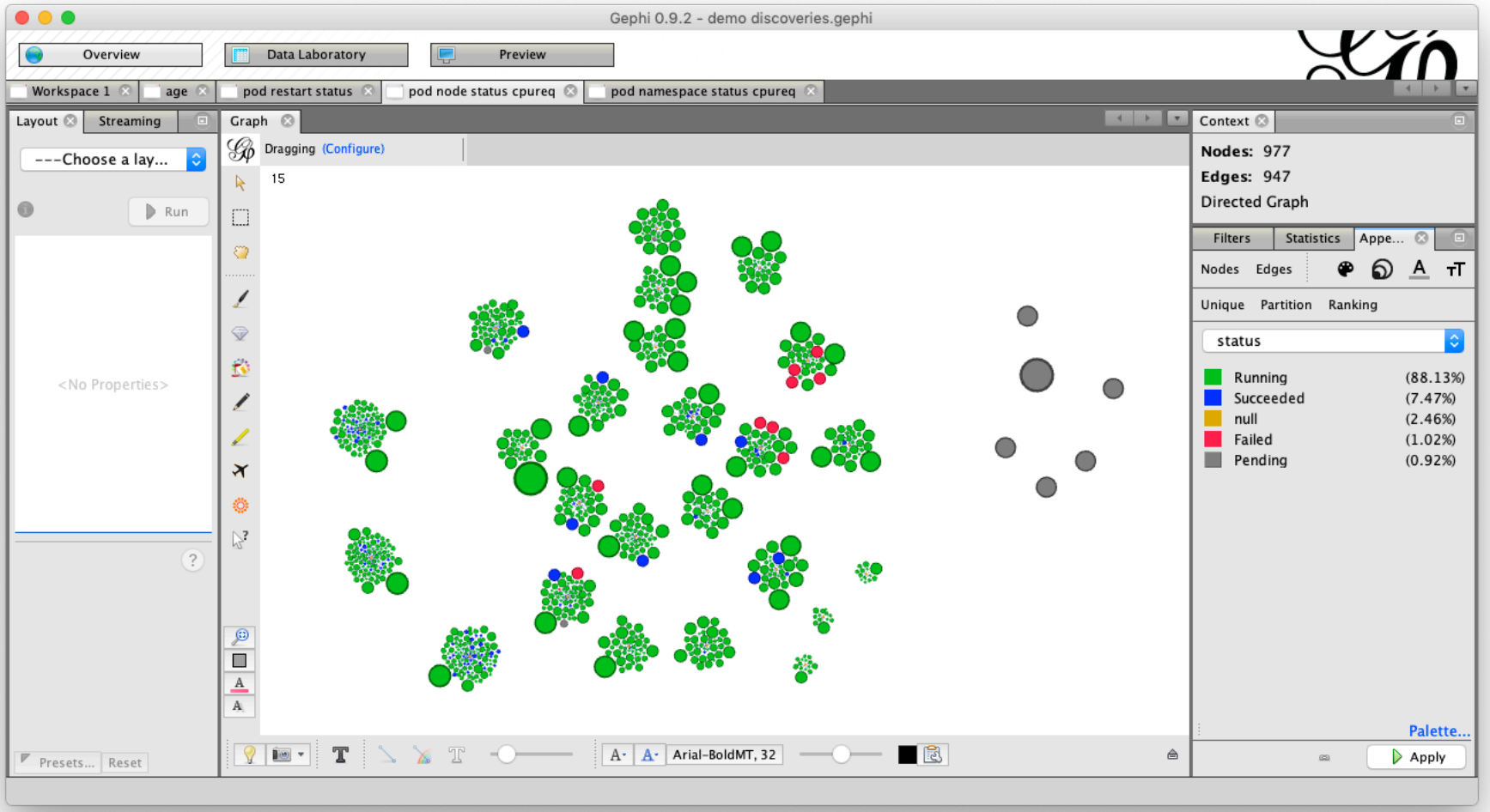

Pods sized by CPU request, coloured by status

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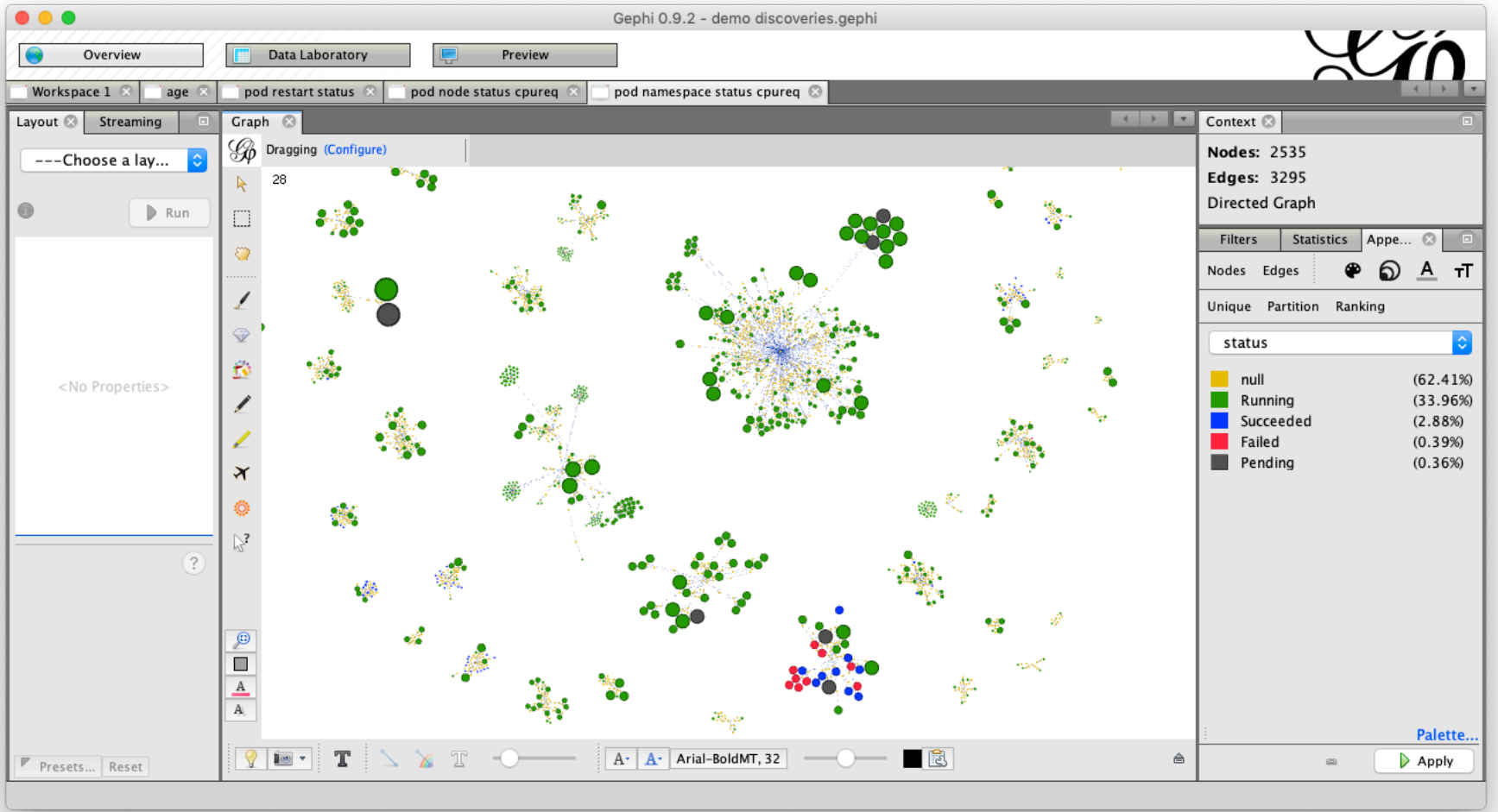

Pods grouped by namespace, coloured by status and sized by CPU request.

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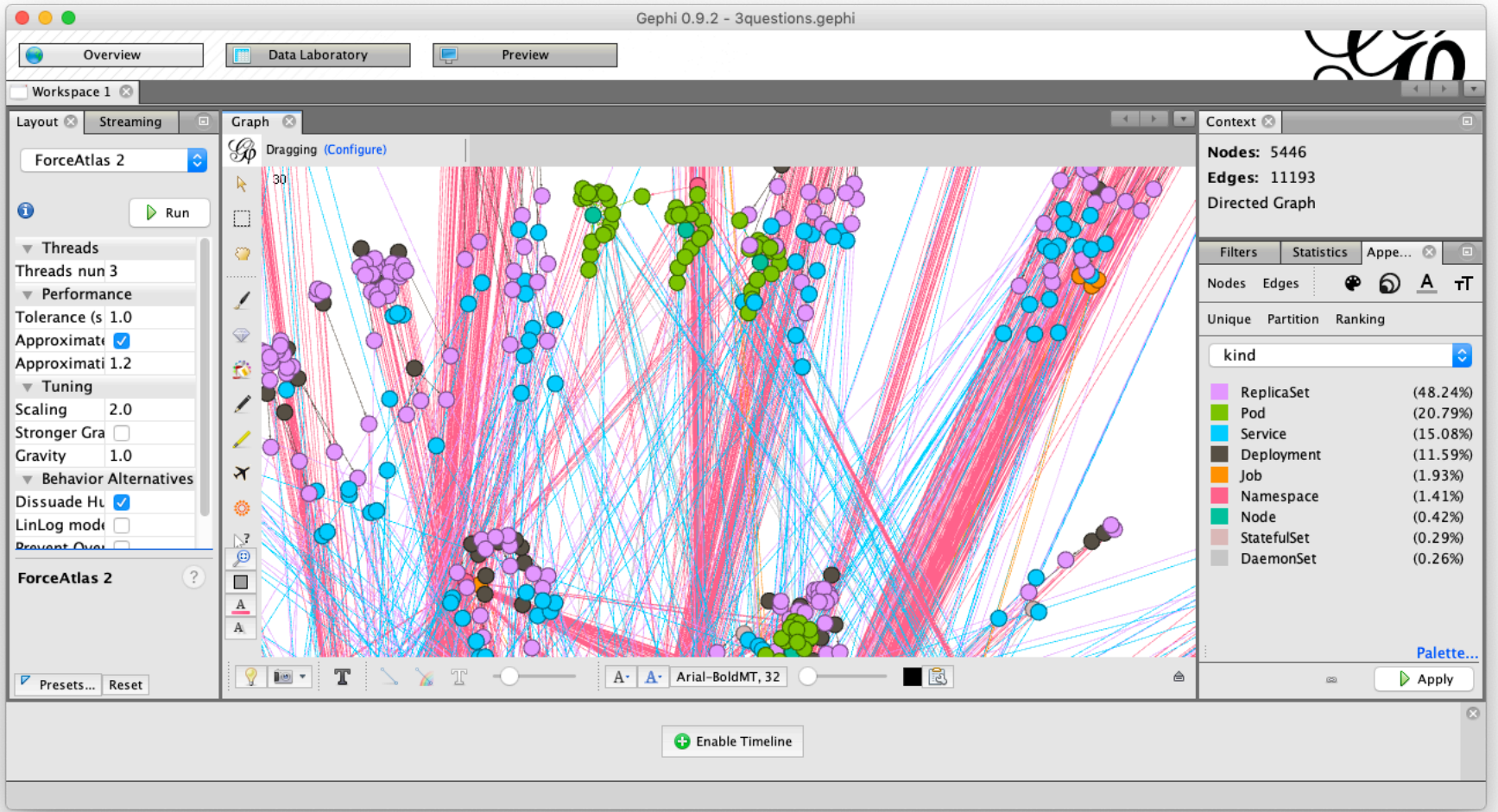
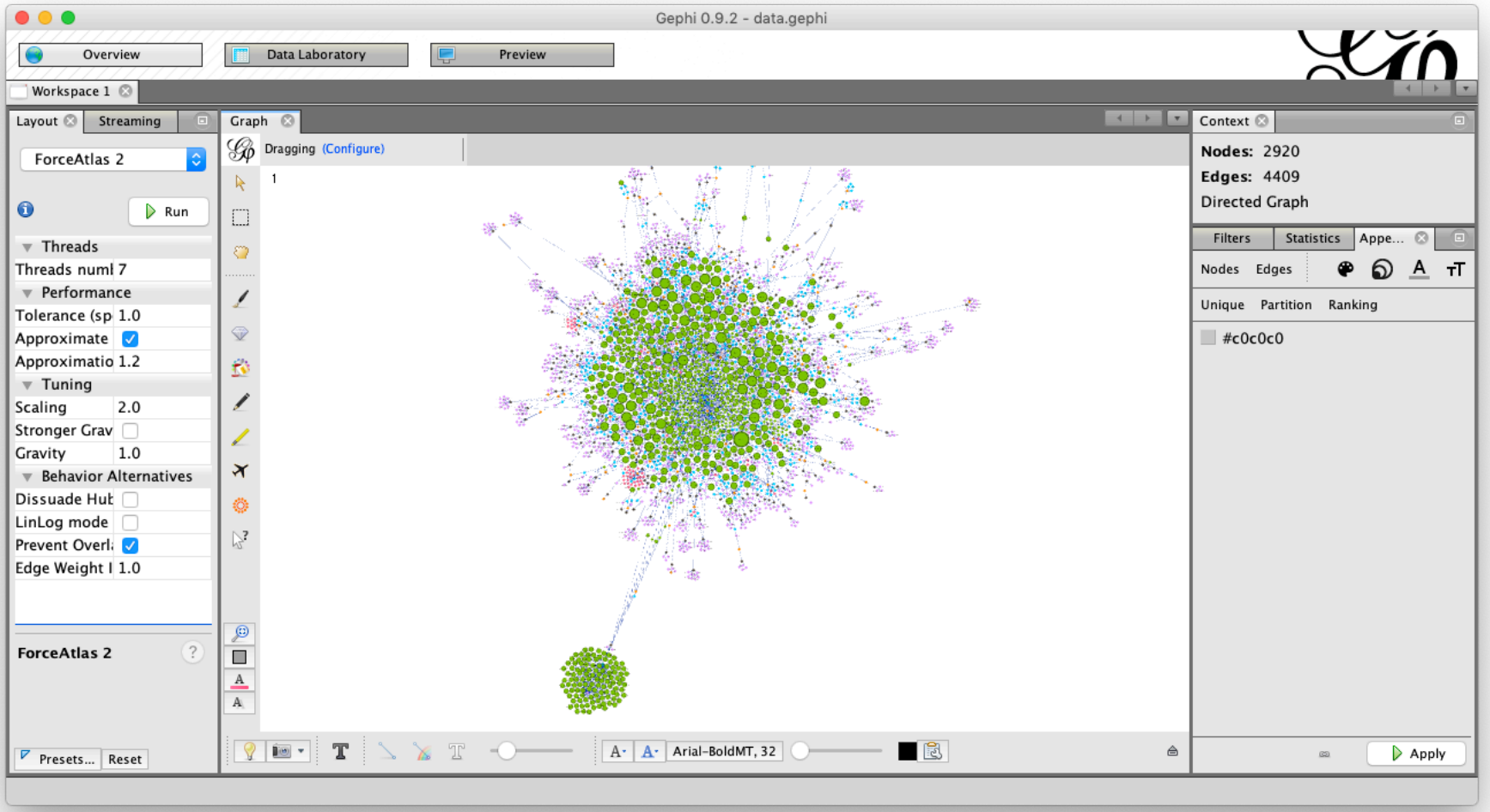


3 question marks ? What does that mean ?



I reacted to an anomaly

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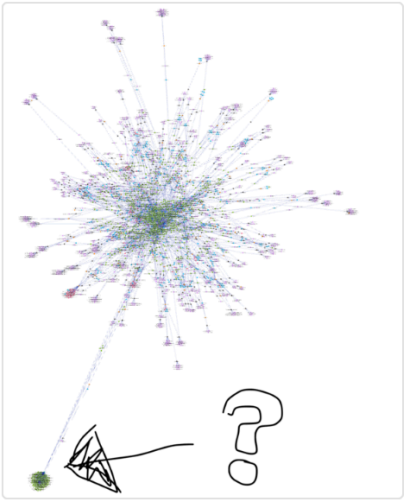
sky betting & gaming

Andrew Burgin 15:36

So when you do a bit of L&D and find something odd on your test cluster

Screenshot 2019-10-11 at 15.33.38.png



anyone know anything about sysbeanch ? (edited)

[redacted] 15:36

It's what [redacted] is using to perf test the physicals

YES 1

[redacted] 5:38

Yesterday I ran a single pod with as much memory as I could, I got up to nearly 450GB before the worker fell over.

Andrew Burgin 15:39

ah yes worket tst31 (edited)

phew!

Whoops!

@andyburgin

sky betting & gaming

More...

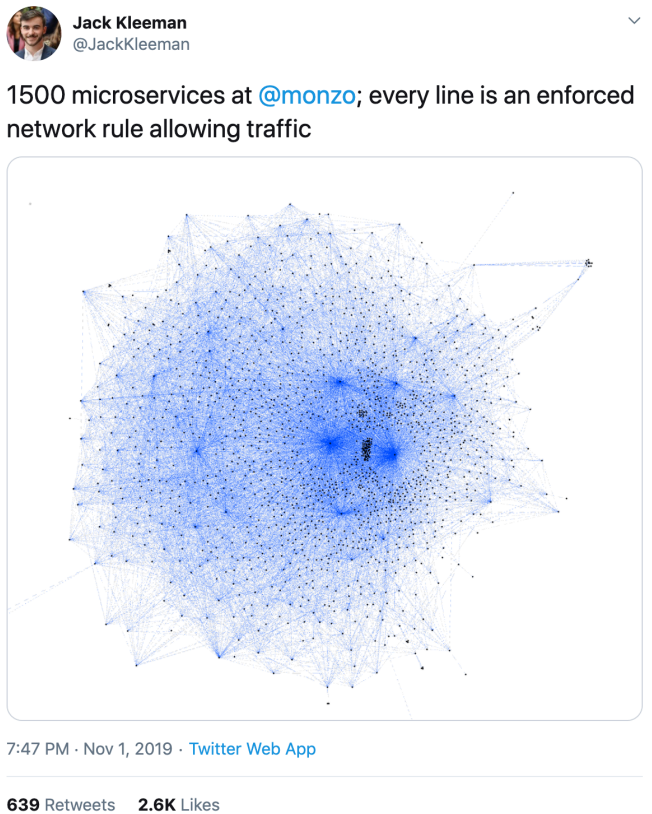
Kubernetes Objects:

- Explore Nodes objects.
- More real-time data (extracted from Metrics server and prometeus)
- Analyse configmaps and secrets usage.
- Volumes and storage usage.
- RBAC and permissions.

More...

Networks:

- Network Policies
- Services
- Service Mesh



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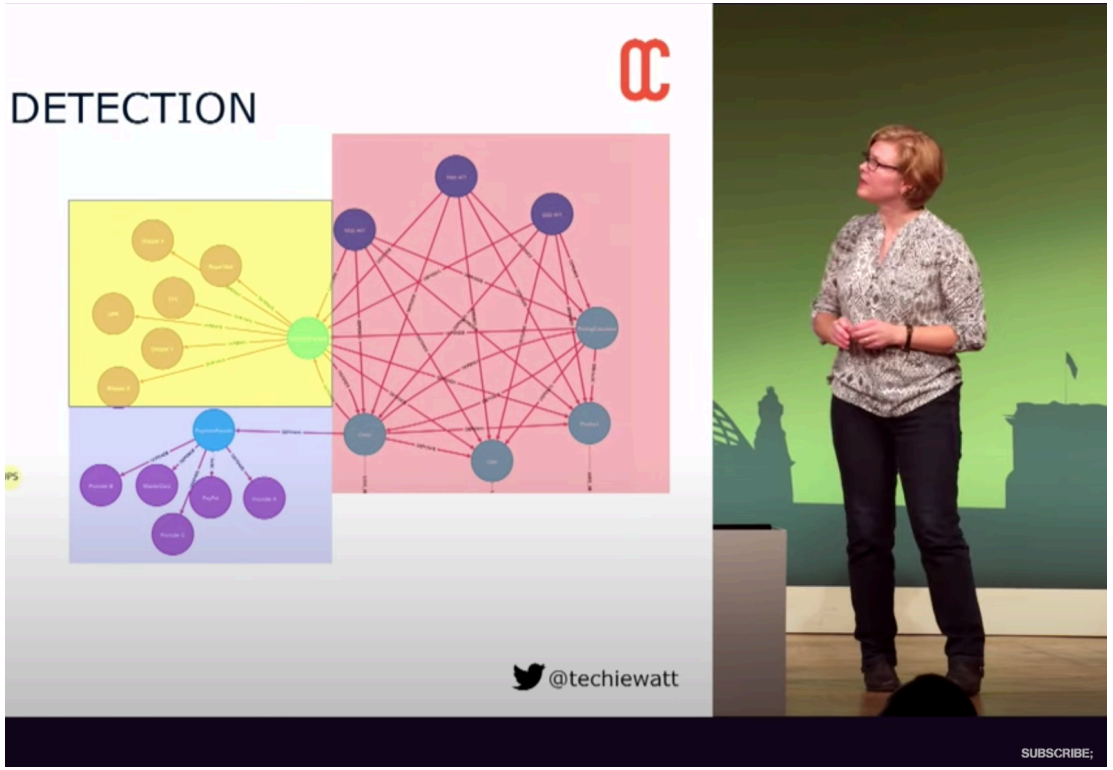
More...

Networks:

- Network Policies
- Services
- Service Mesh

Network Overview	
Average Degree	Run
Avg. Weighted Degree	Run
Network Diameter	Run
Graph Density	Run
HITS	Run
Modularity	Run
PageRank	Run
Connected Components	Run
Node Overview	
Avg. Clustering Coefficient	Run
Eigenvector Centrality	Run
Edge Overview	
Avg. Path Length	Run
Dynamic	
# Nodes	Run
# Edges	Run
Degree	Run
Clustering Coefficient	Run



https://www.youtube.com/watch?v=0G5O1ffYIPI

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Summary

DevOps FTW

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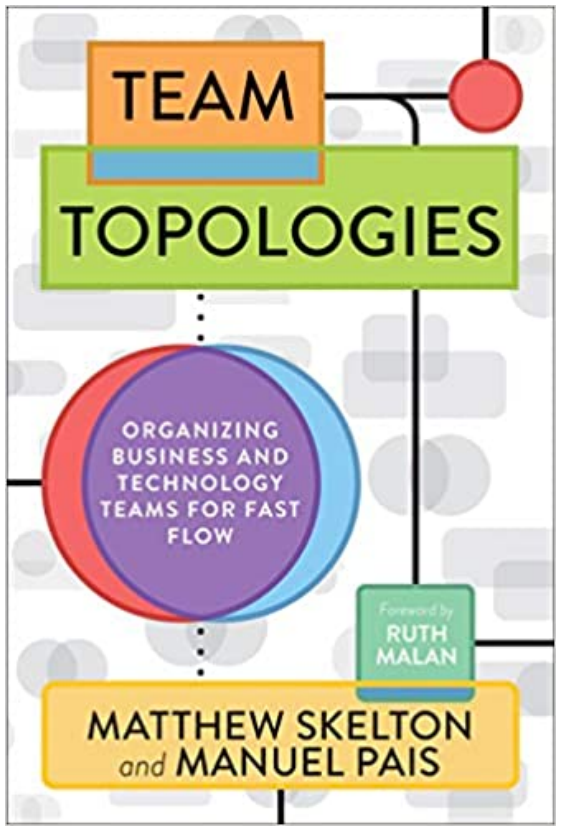
Collaboration

- Steam-aligned team.
- **Enabling team**.
- Complicated Subsystem team.
- Platform team.



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Stella Report ?

4 Supporting work through improved visualizations

STELLA

Report from the SNAFUcatchers Workshop on Coping With Complexity

Brooklyn NY, March 14-16, 2017

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Winter storm STELLA

Woods' Theorem: *As the complexity of a system increases, the accuracy of any single agent's own model of that system decreases rapidly.*

1. tl;dr and Executive Summary

1.1 tl;dr

A consortium workshop of high end techs reviewed postmortems to better understand how engineers cope with the complexity of anomalies (SNAFU and SNAFU catching episodes) and how to support them. These cases reveal common themes regarding factors that produce resilient performances. The themes that emerge also highlight opportunities to move forward.

1.2 Executive Summary

Current generation internet-facing technology platforms are complex and prone to brittle failure. Without the continuous effort of engineers to keep them running they would stop working -- many in days, most in weeks, all within a year. These platforms remain alive and functioning because workers are able to detect anomalies, diagnose their sources, remediate their effect, and repair their flaws and do so ceaselessly -- SNAFU Catching. Yet we know little about how they accomplish this vital work and

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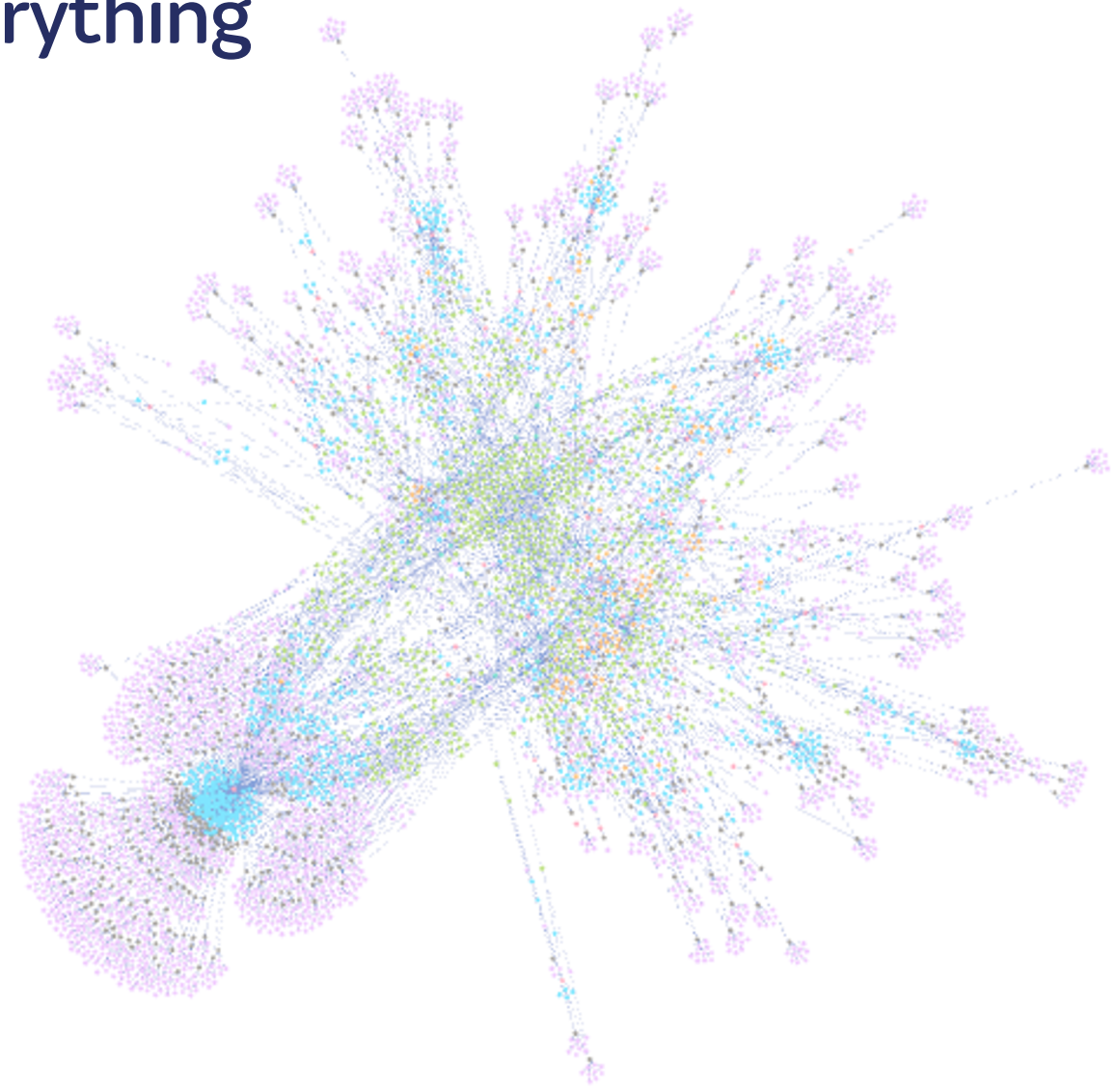
Context and Perspective is Everything

It’s hard to understand the hairball.

Remove as much noise as you can.

Select a perspective and apply the context

- Workload.
- Compute.
- Connections.
- Security.



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Just One More Thing....

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Resources

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Resources

How Your Systems Keep Running Day After Day - John Allspaw
https://www.youtube.com/watch?v=xA5U85LSk0M
http://stella.report

Kvizz
https://github.com/afbjorklund/kvizz

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Weavescope
https://www.weave.works/oss/scope/

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Using Neo4J to visualize a Kubernetes cluster – Bajal
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Resources

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Introduction to GEPHI - University of Kentucky Libraries
https://www.youtube.com/watch?v=2FqM4gKeNO4

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Resources

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Social Network Analysis - Lada Adamic - University of Michigan
http://www-personal.umich.edu/~ladamic/courses/
https://www.youtube.com/playlist?list=PL2rR6Wa-StjYOW7v6J8_npck6EDOKEbCN

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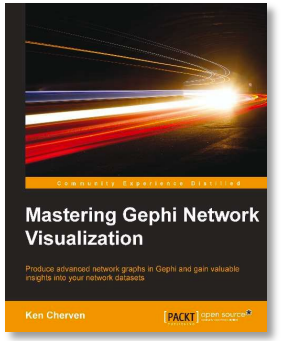
Resources

Mastering Gephi Network Visualization
Ken Cherven
https://www.packtpub.com/gb/networking-and-servers/mastering-gephi-network-visualization



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Michael Hausenblas and Stefan Schimanski
https://programming-kubernetes.info/

Go Source for extracting object data from k8s and writing log/gexf and Neo4j
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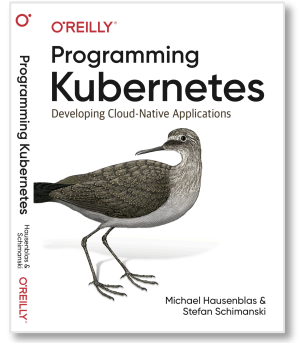

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Resources

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Observable
https://observablehq.com/explore

Parallel Coordinates - Jason Davies
https://bl.ocks.org/jasondavies/1341281

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Thank You