solarwinds msp

Analysis and interpretation of monitoring data

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About me

Principal developer
SolarWinds Backup

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Why is this worth talking about?

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Life after release: expectation

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Life after release: reality

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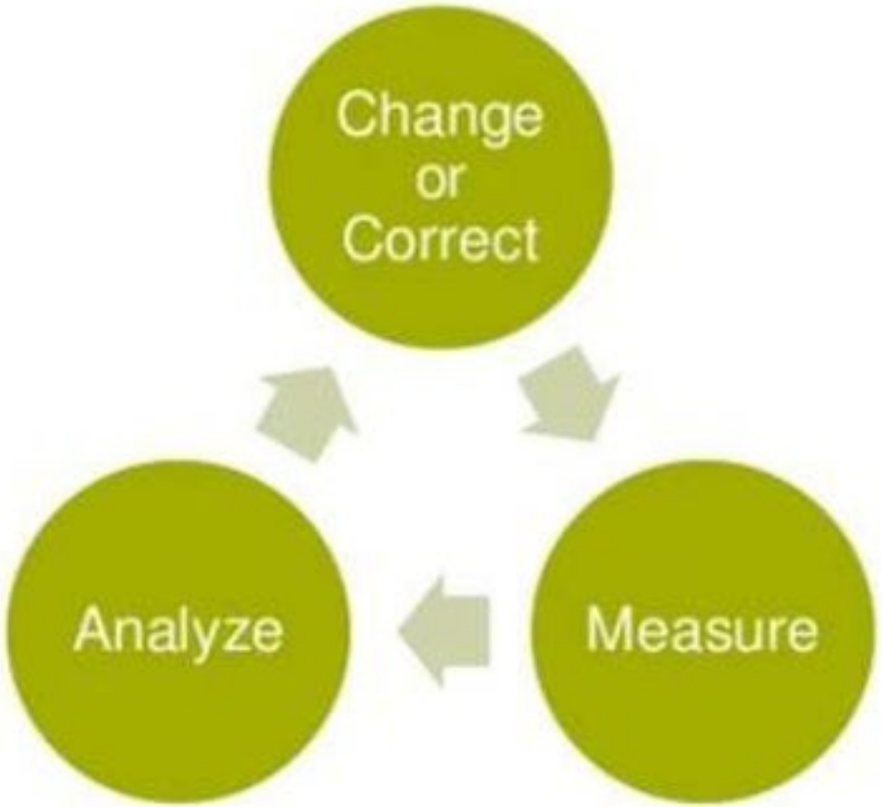
Any product evolution lifecycle



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Monitoring metrics

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Monitoring metrics

- Common
  - Load average
  - CPU/memory/disk usage
  - IO/network bandwidth

- Application specific
  - Request count/timing
  - Version/States
  - Backup duration/status
  - Used/Selected /Processed/Changed size

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Monitoring goals

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Monitoring goals

- **Alerts & Notifications**

  Fast, Precise, Reliable

- **Investigation tool** (dashboard)

  Fast, Simple & Self-sufficient, High definition, Medium retention

- **Status report** (dashboard)

  Big retention, Hard to misinterpret, Annotated

- **Exploration tool**

  Plenty of historical data, Flexible

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Example:
Status report & Investigation tool

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Dashboard

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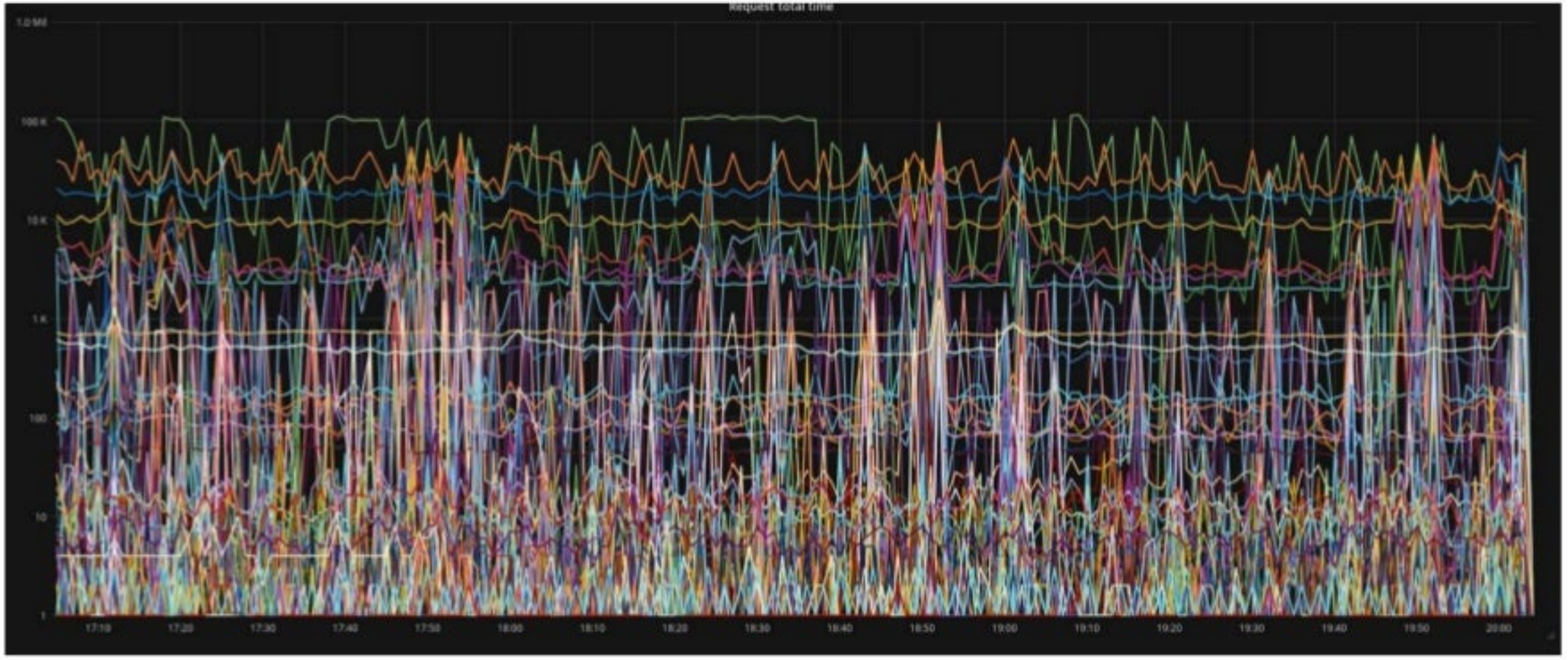

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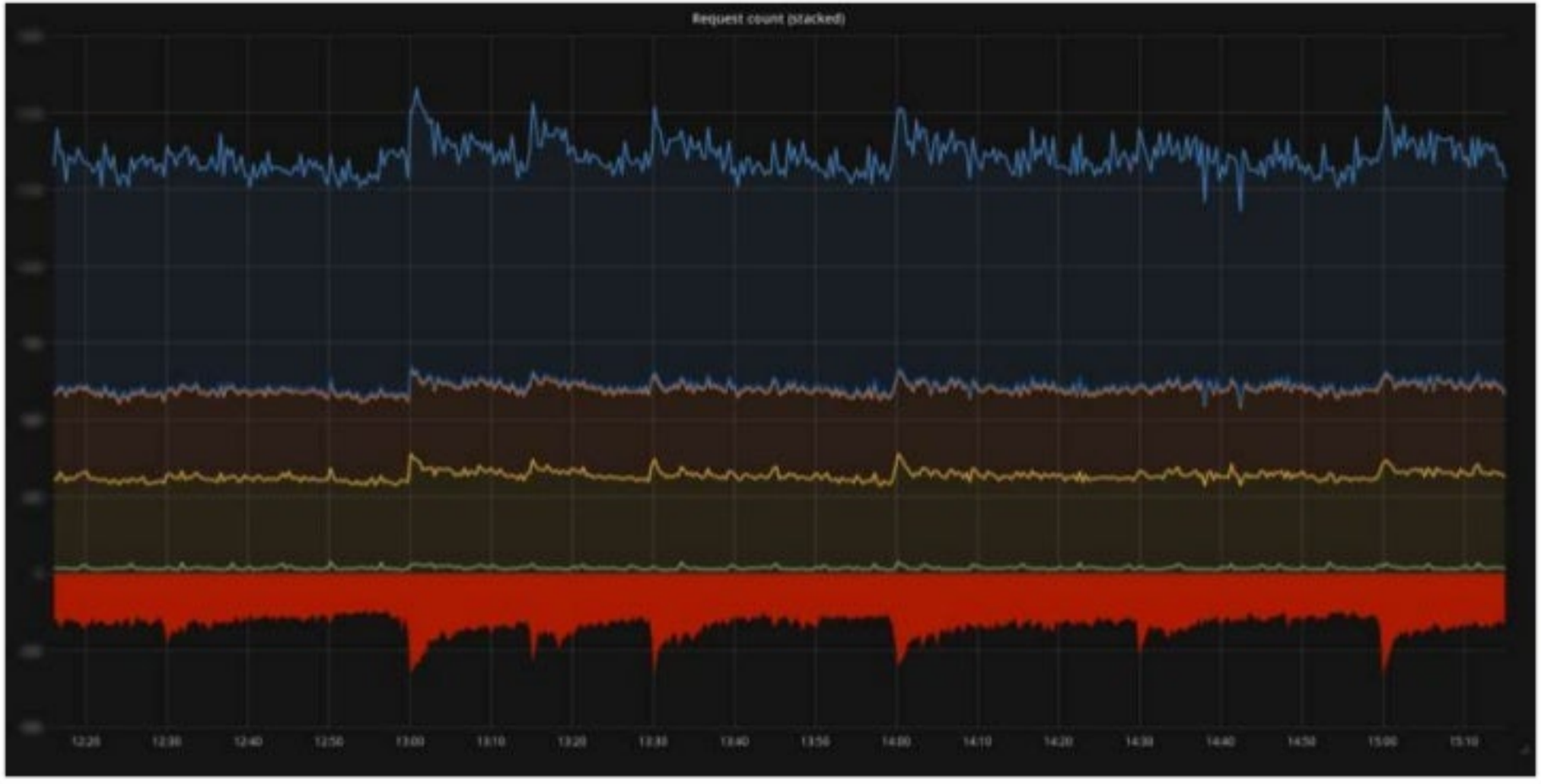

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There are three kinds of lies: lies, damned lies and statistics.

- Mark Twain

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Lies, damned lies and statistics

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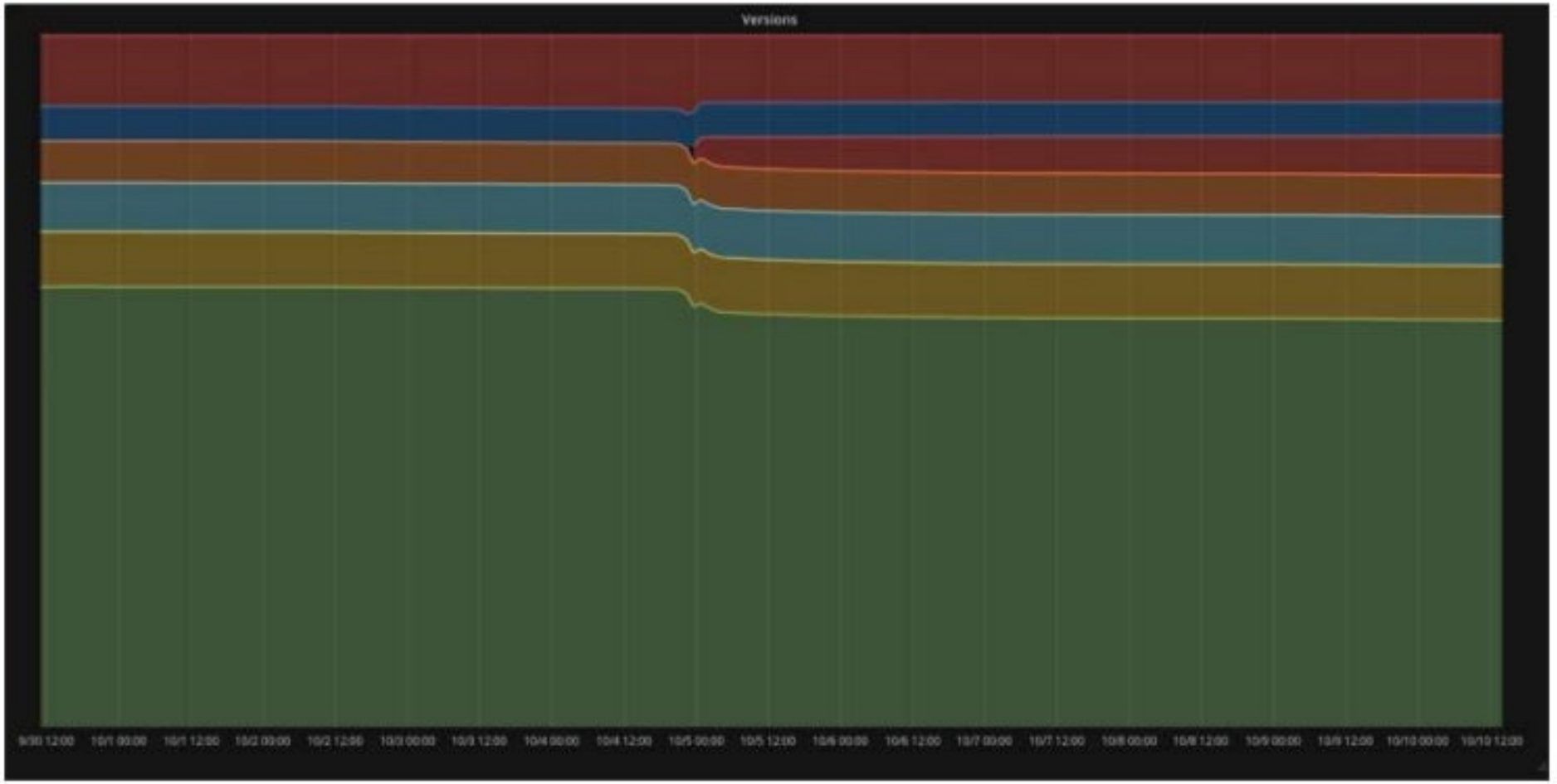
Stacked graph



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Stacked graph

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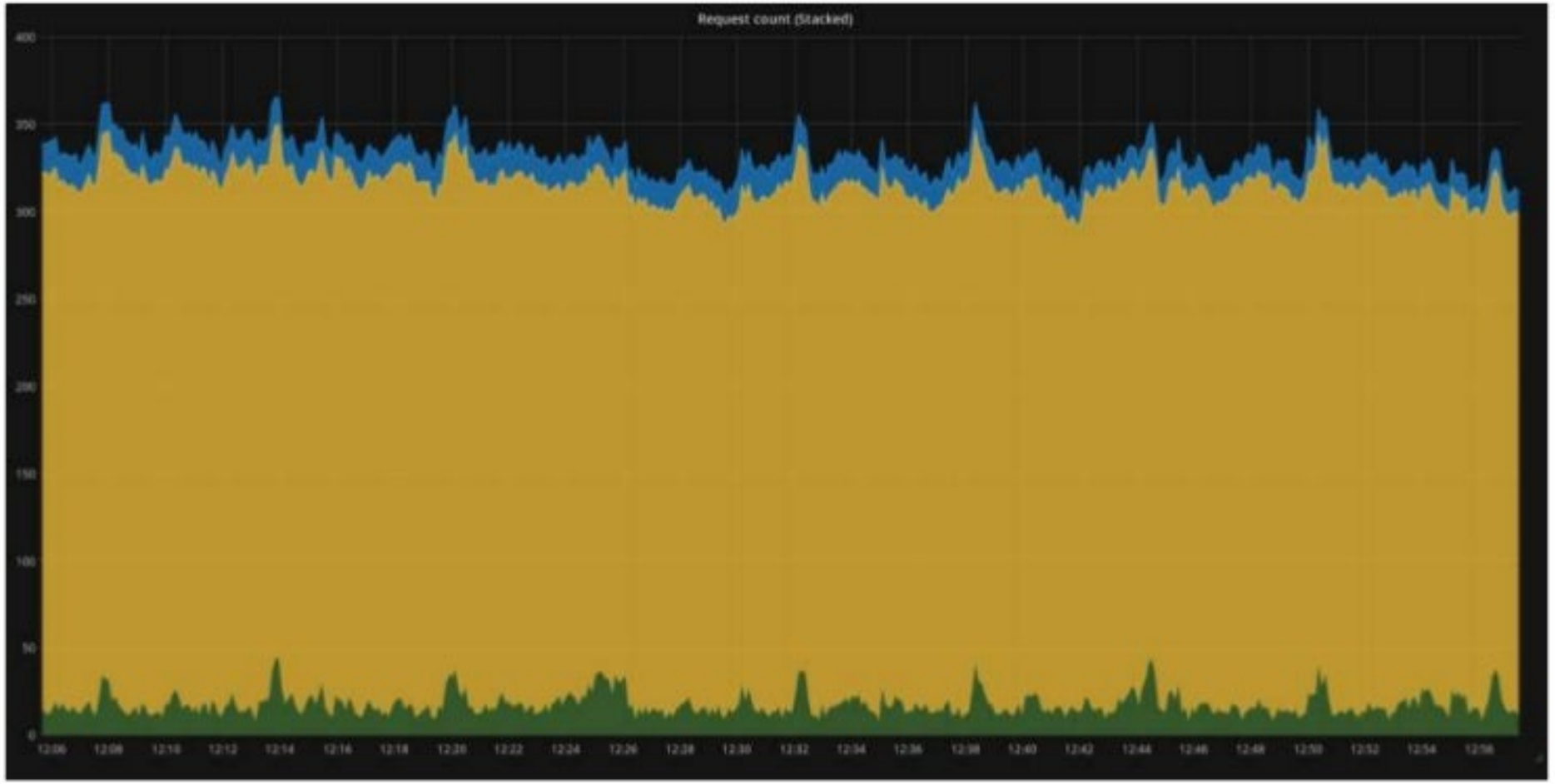
Stacked graph



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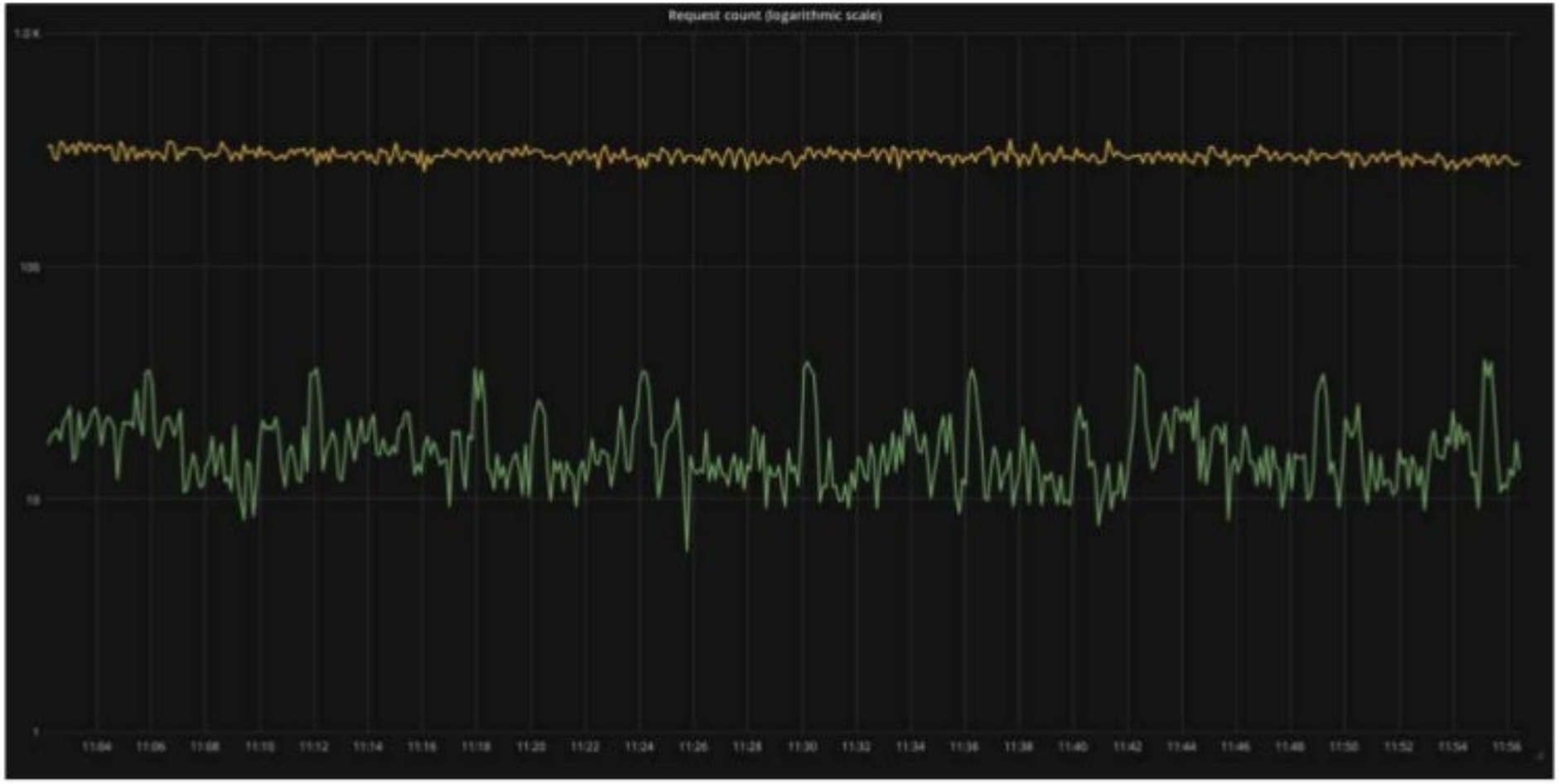
Logarithmic scale



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Non-zero y-min

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Non-zero y-min

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Exploration tool

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How to analyze data?

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- Collect data

  logs, SQL, ansible, ...
- Prepare data

  grep, awk, sed, SQL, ...
- Visualize data

  Excel, SQL, R, Matlab/Octave, ...

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Visualization

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Restore DB from dump

[2017-10-10 18:26:09.971335] Processing chunk [1, 1048577)
[2017-10-10 18:26:27.909452] Processing chunk [1048577, 2097153)
[2017-10-10 18:26:48.278841] Processing chunk [2097153, 3145729)
[2017-10-10 18:27:08.590043] Processing chunk [3145729, 4194305)
[2017-10-10 18:27:28.872476] Processing chunk [4194305, 5242881)
[2017-10-10 18:27:49.330426] Processing chunk [5242881, 6291457)
[2017-10-10 18:28:09.565986] Processing chunk [6291457, 7340033)
[2017-10-10 18:28:29.925240] Processing chunk [7340033, 8388609)

… 1000 lines

[2017-10-10 18:54:12.593898] Processing chunk [87576316, 87633909)

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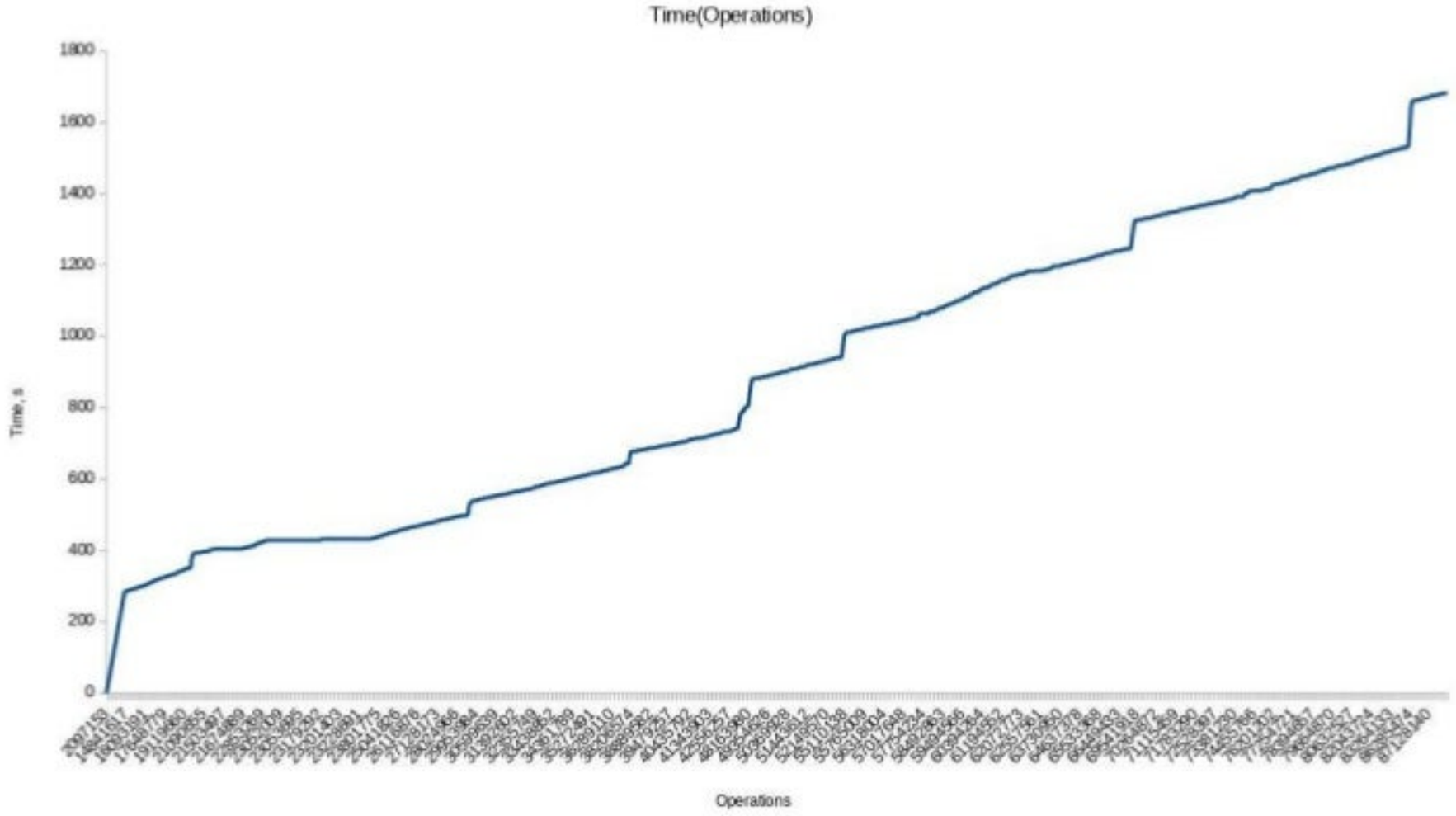
Restore DB from dump



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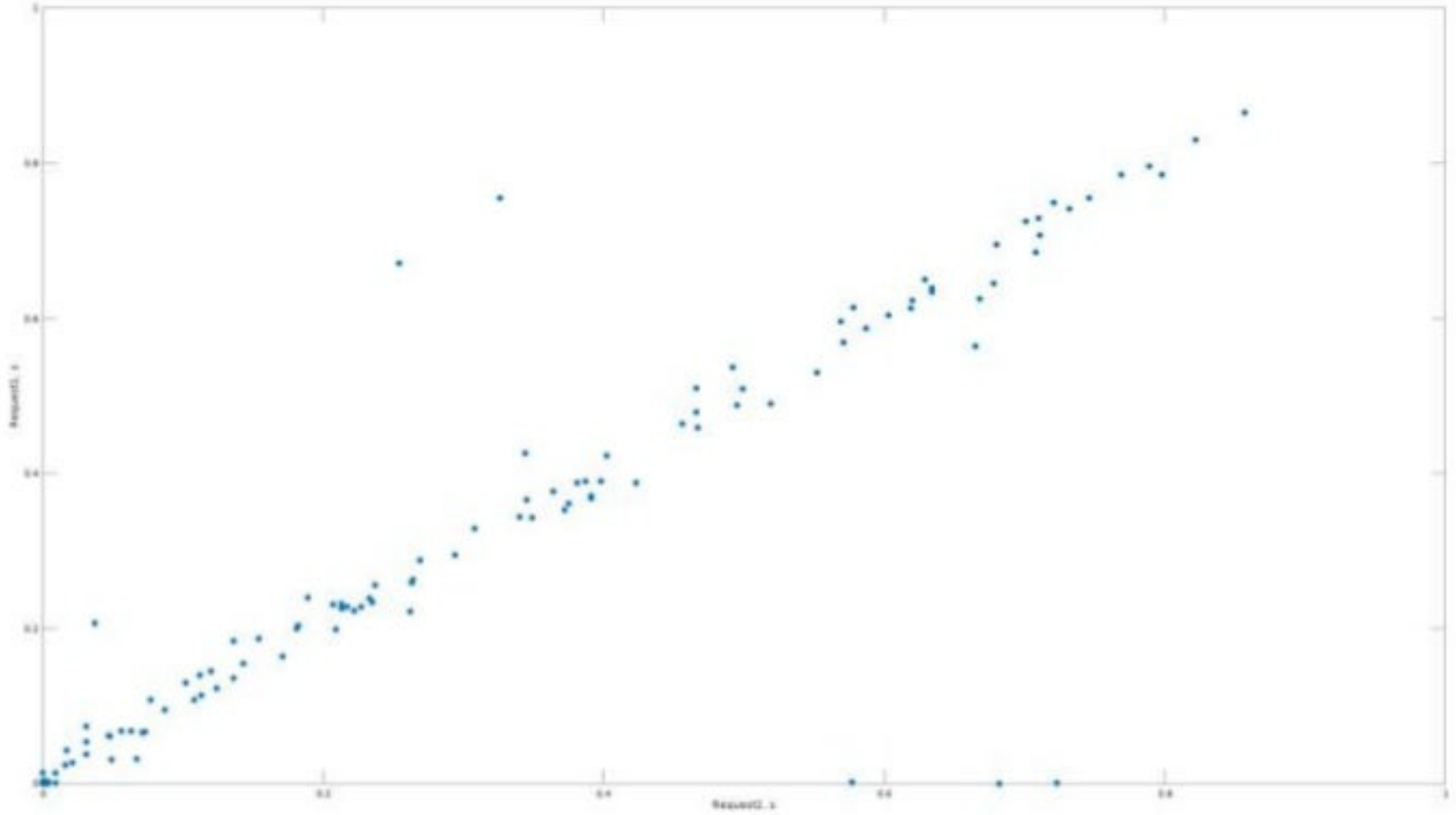
Entanglement detection

	Request1	Request2
1	0.00100	0.00100
2	0.00000	0.00100
3	0.00000	0.00100
4	0.00000	0.00000
5	0.39100	0.36800
6	0.00000	0.00100
7	0.00000	0.00100
8	0.00000	0.00000
9	0.00000	0.00100
10	0.00000	0.00000
11	0.00000	0.00000
12	0.00000	0.00000
13	0.00000	0.00100
14	0.00100	0.00100
15	0.00000	0.00000
16	0.00000	0.00000
17	0.00000	0.00000
18	0.00000	0.00100
	...	...



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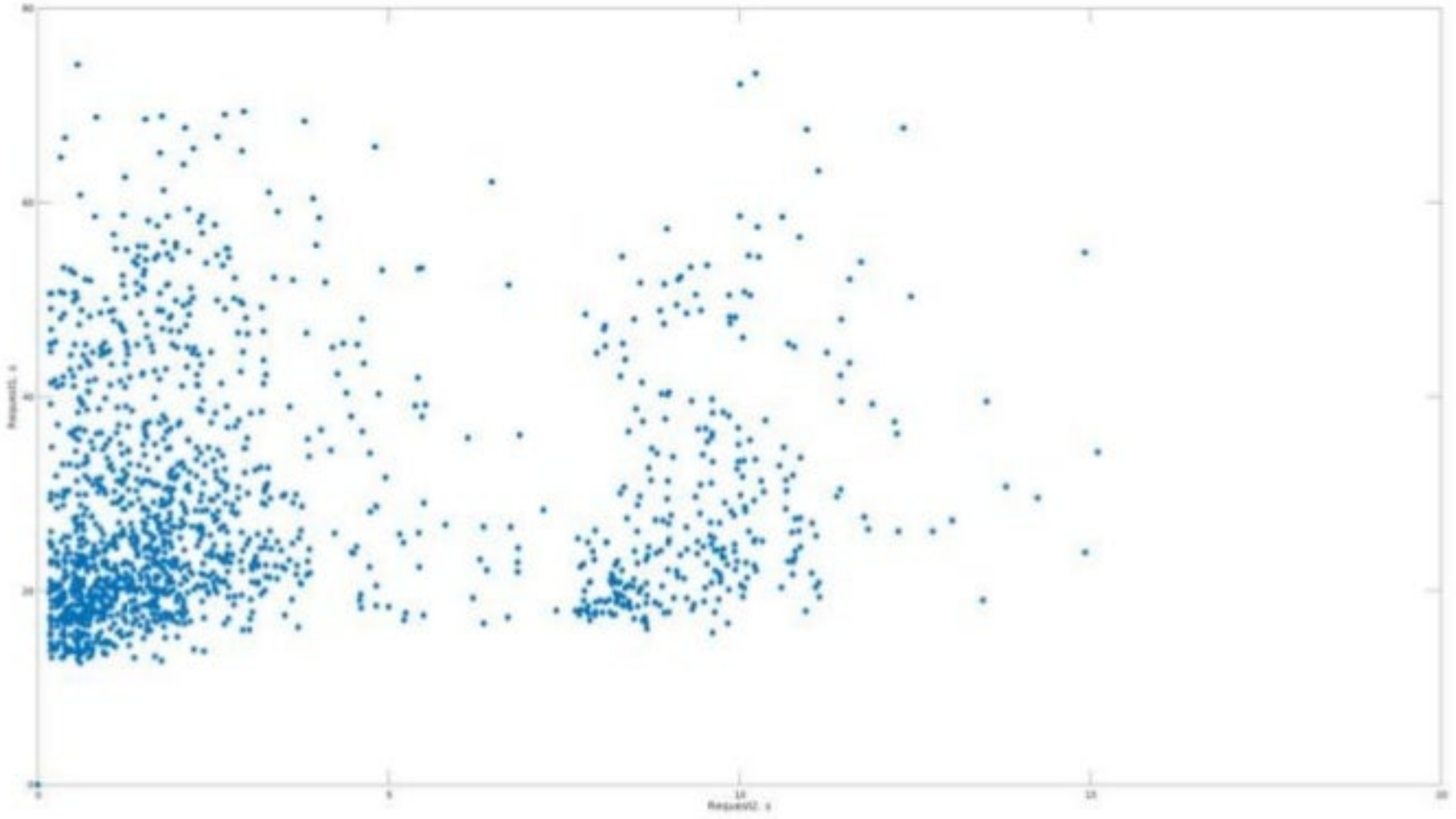
Entanglement detection

	Request1	Request2
1	3.583	23.174
2	4.398	40.414
3	1.541	54.097
4	0.401	23.830
5	0.971	18.446
6	0.938	23.164
7	9.645	17.802
8	0.959	39.820
9	10.864	27.506
10	8.992	17.809
11	0.174	50.634
12	1.162	31.359
13	3.520	29.936
14	9.758	24.268
15	1.212	28.426
16	8.579	29.744
17	7.819	17.952
18	3.045	22.624
	...	...



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Entanglement detection

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```
data = load("~/data/requests.csv");

[_ n] = size(data);

for i = 1:n
  for j = i + 1:n

      c = corr(data(:, [i j]))(1, 2);

      if c > 0.9
        fprintf('request%d request%d correlation: %f\n', i, j, c);
        plot(data(:, i), data(:, j), "marker", "*", "linestyle", "none")
        pause();
      end

  end
end
```

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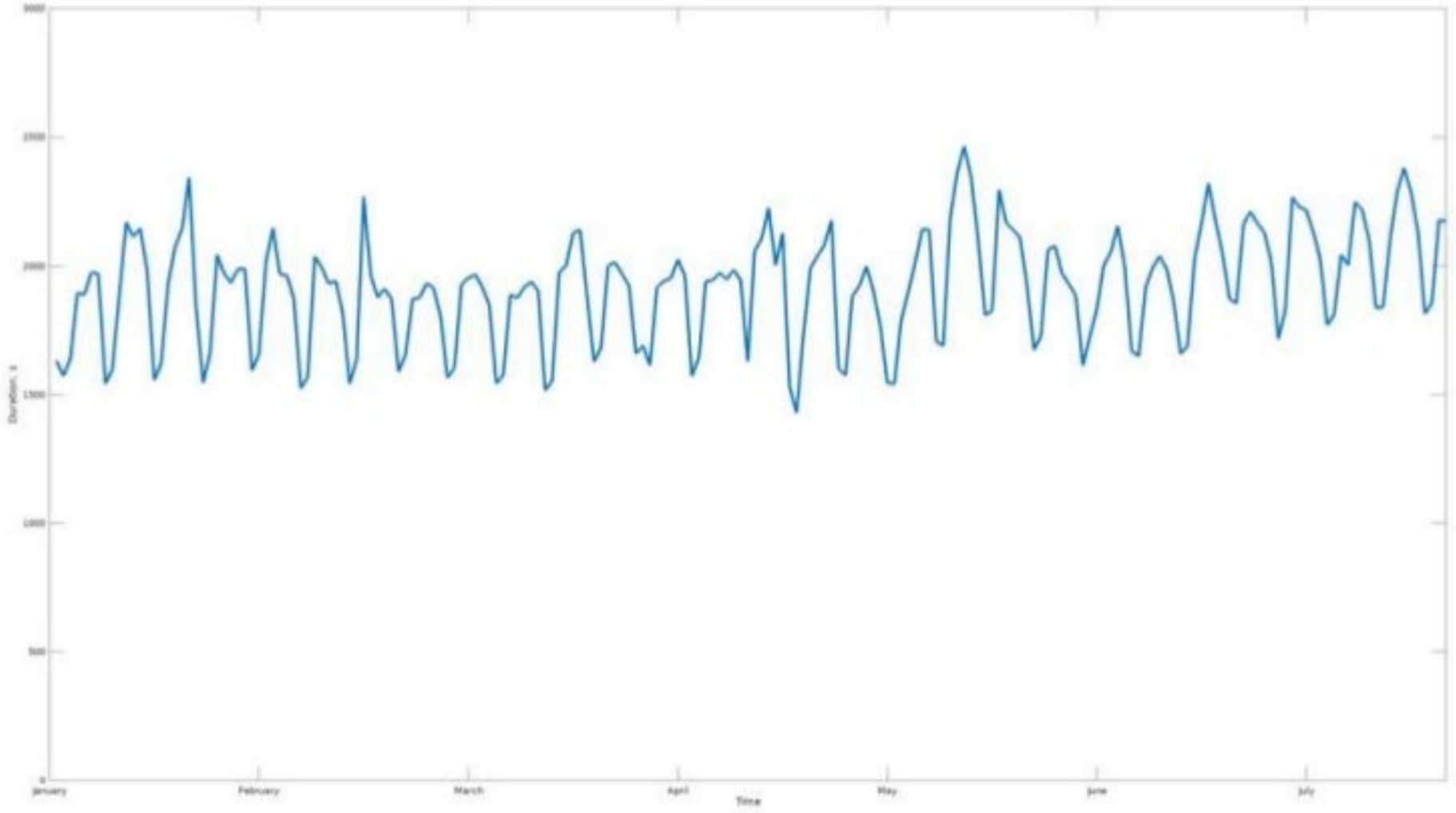
Backup duration: average



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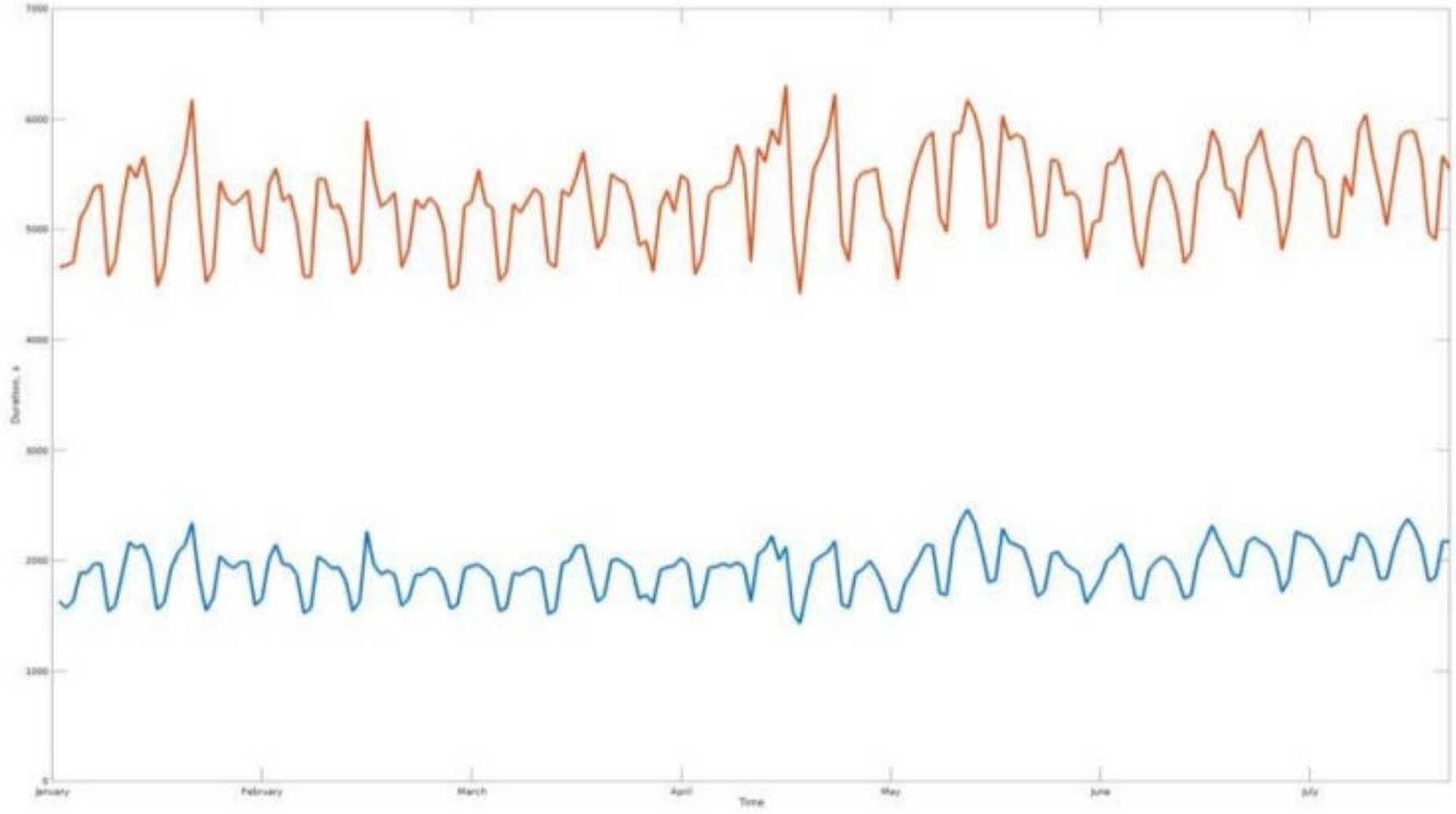
Backup duration: average + std



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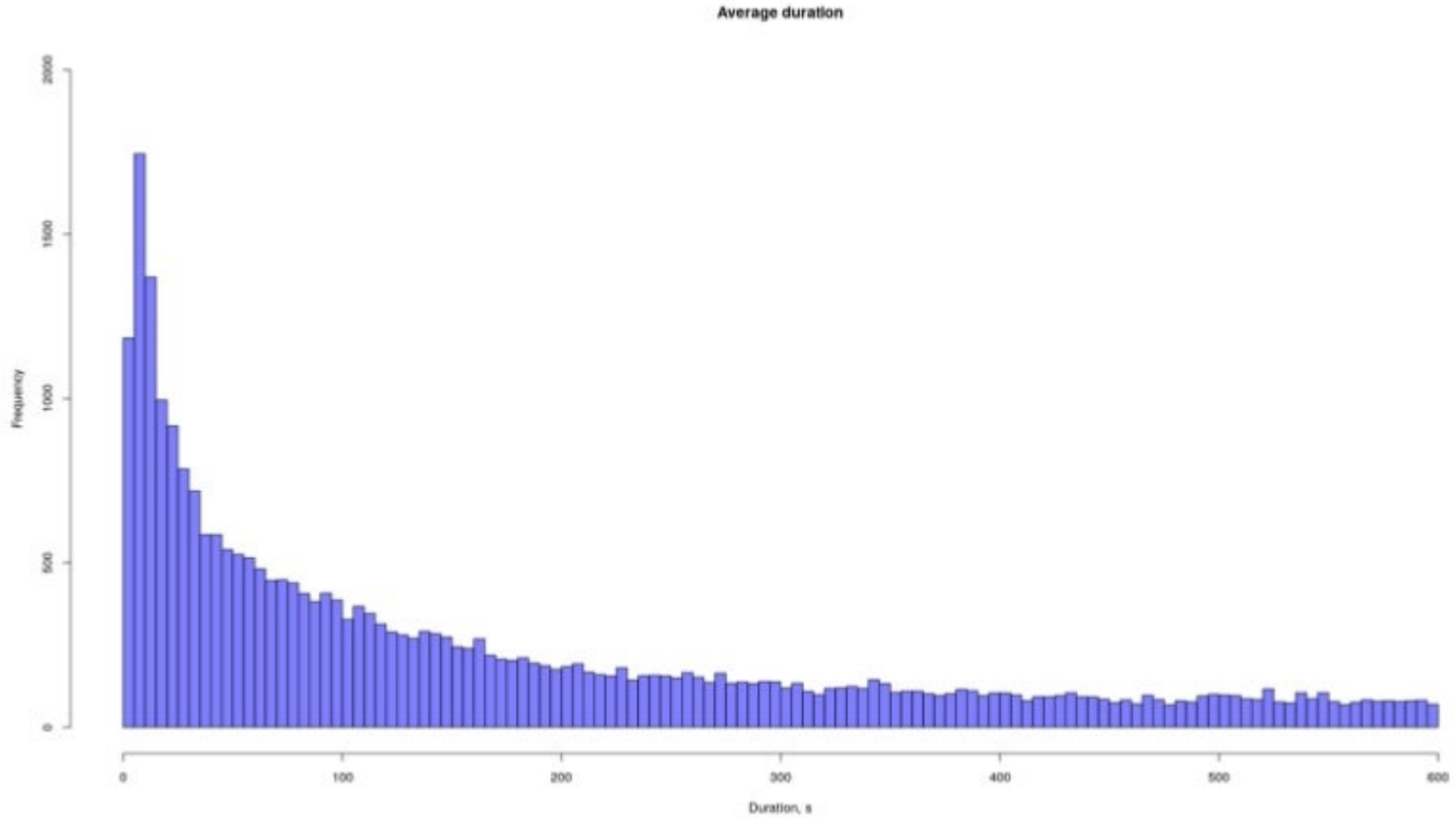
Backup duration: histogram



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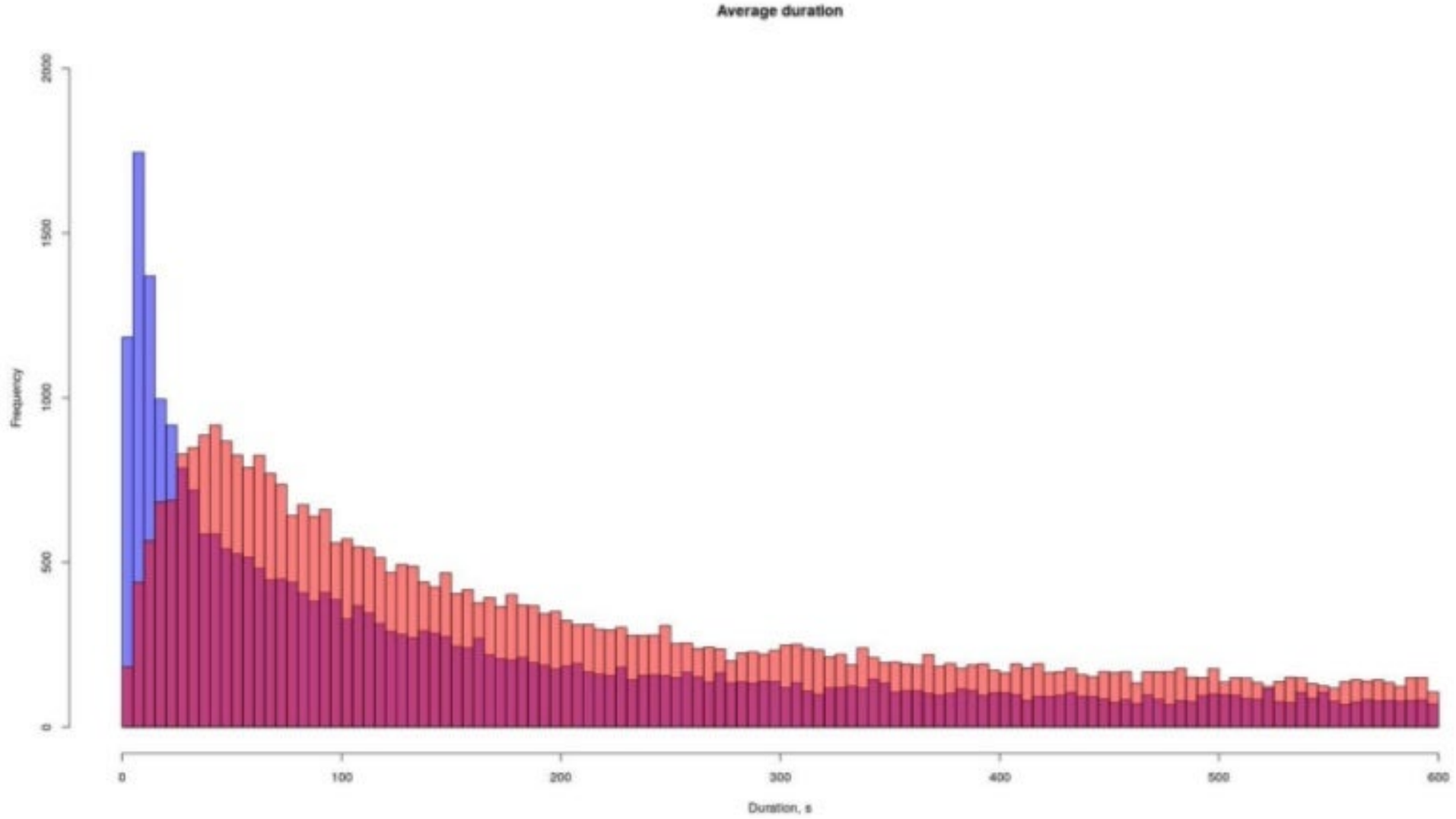
Backup duration: histogram



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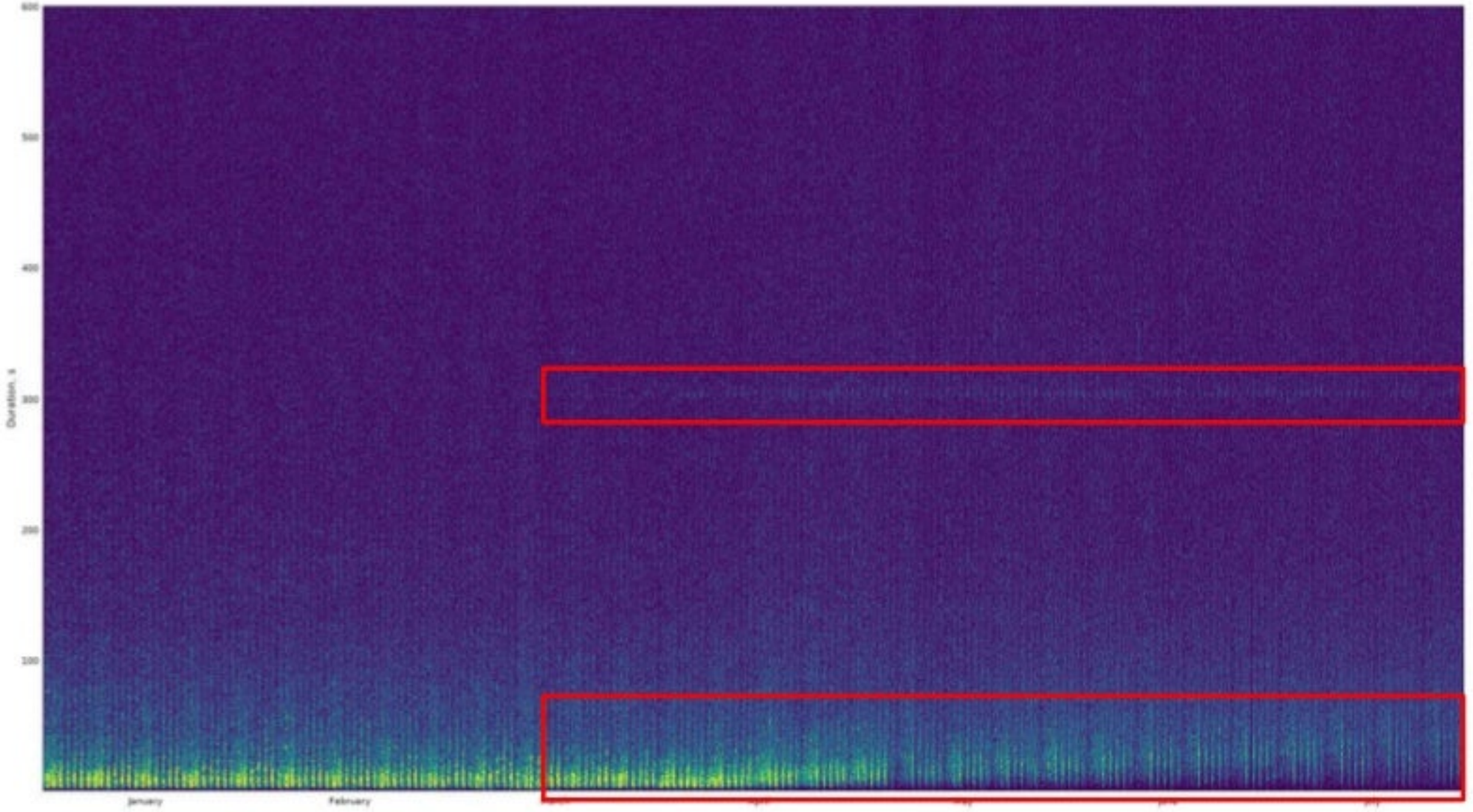
Backup duration: heatmap



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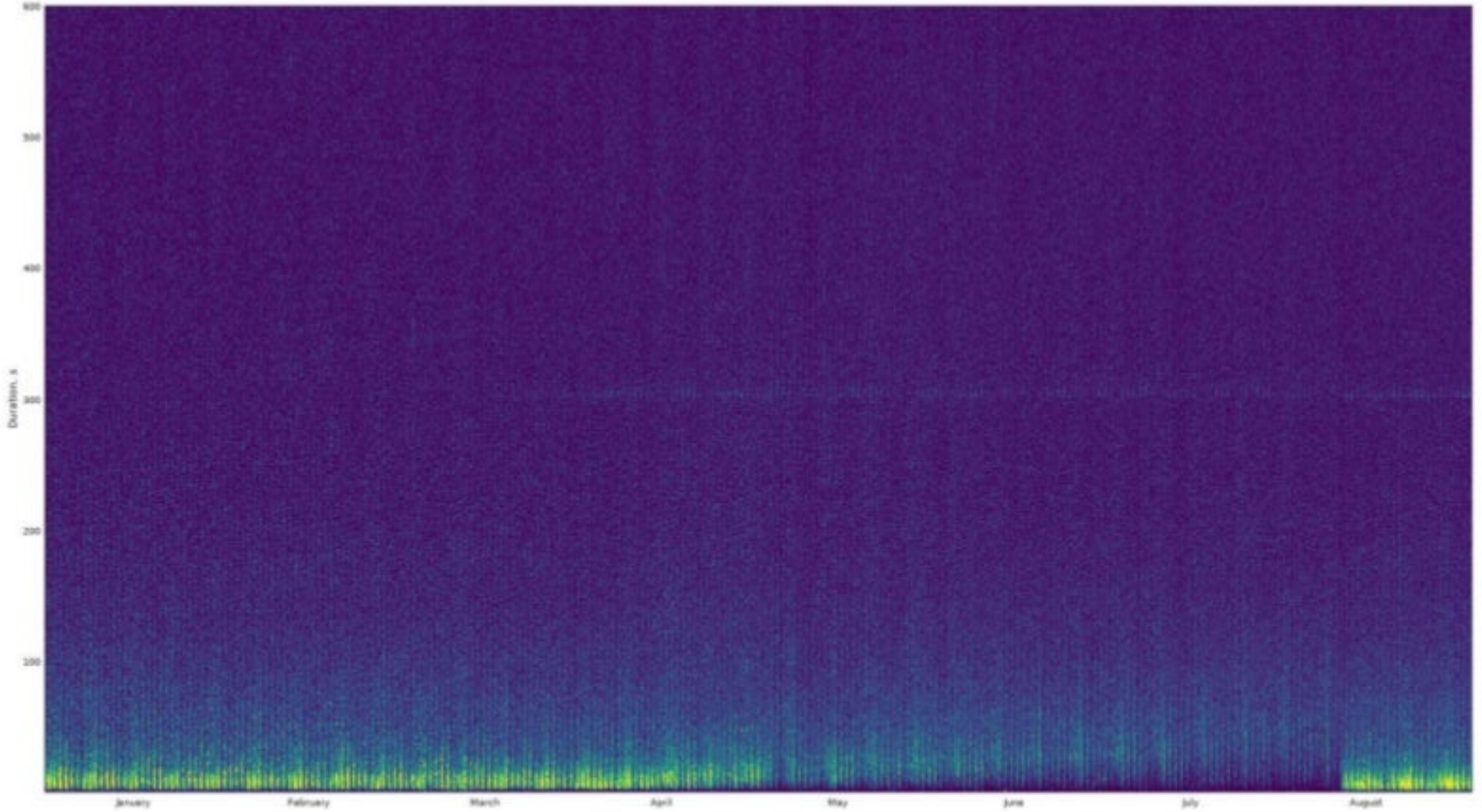
Backup duration: heatmap



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Lies, damned lies and statistics

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It ain’t what you don’t know that gets you into trouble.
It’s what you know for sure that just ain’t so.

– Mark Twain

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Troubles with data interpretation

- Miss existing problem
- Find unexisting problem

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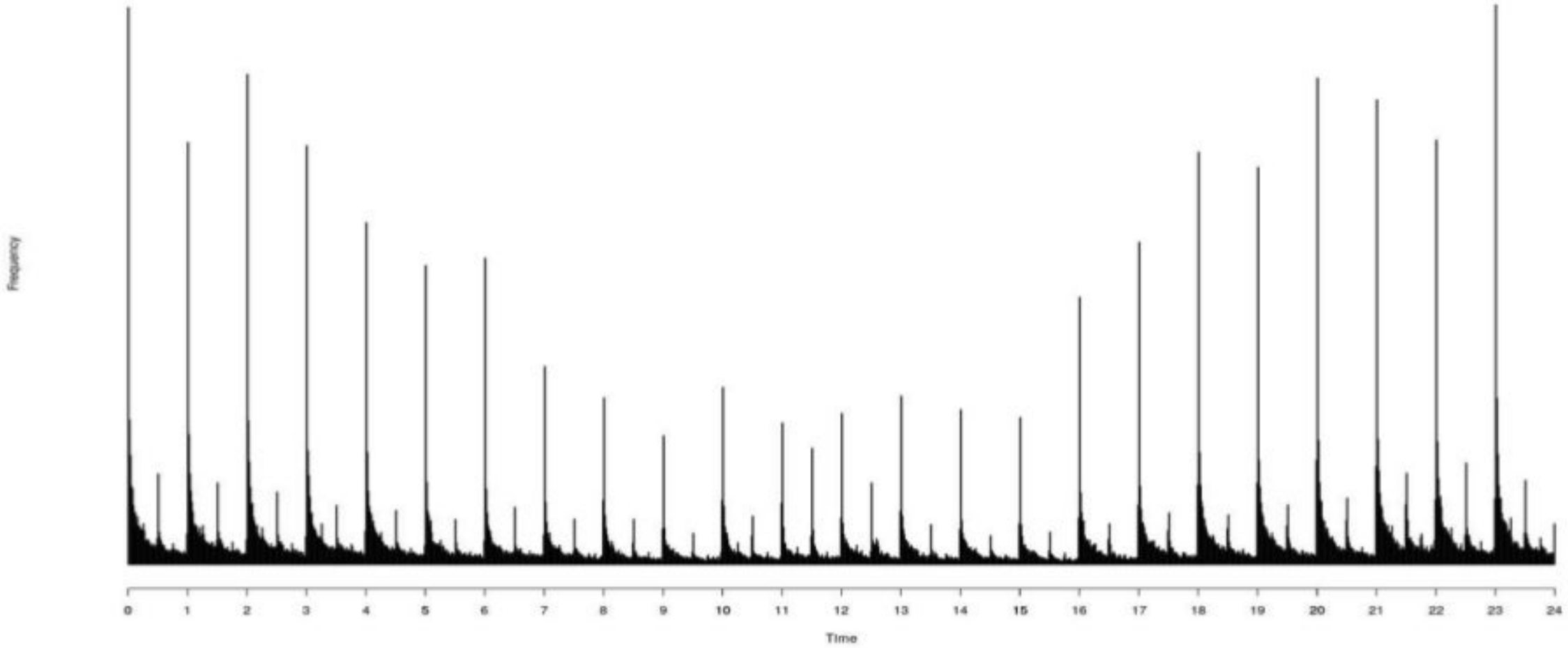
Backup start time



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Auto-update

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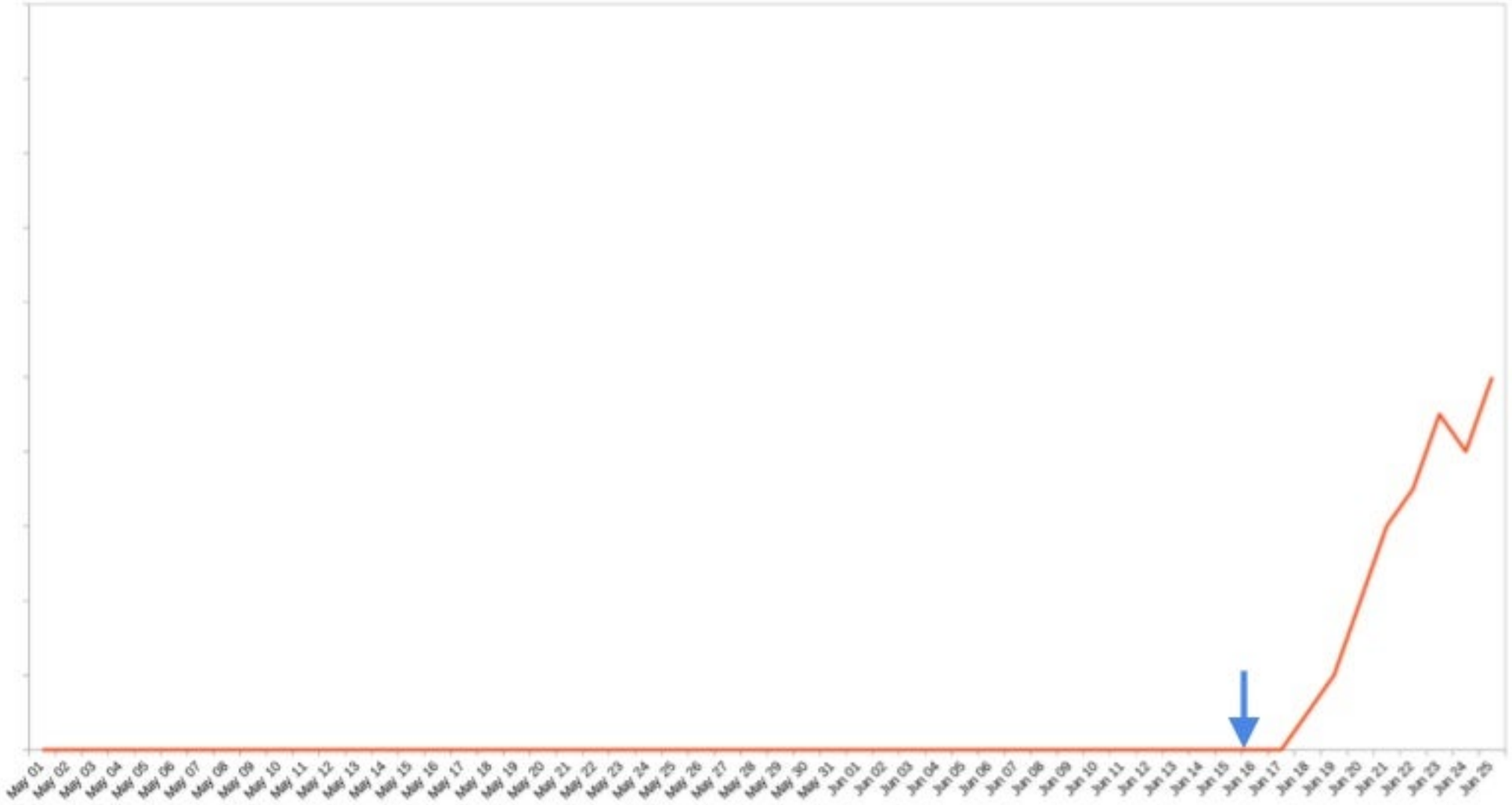
Server update



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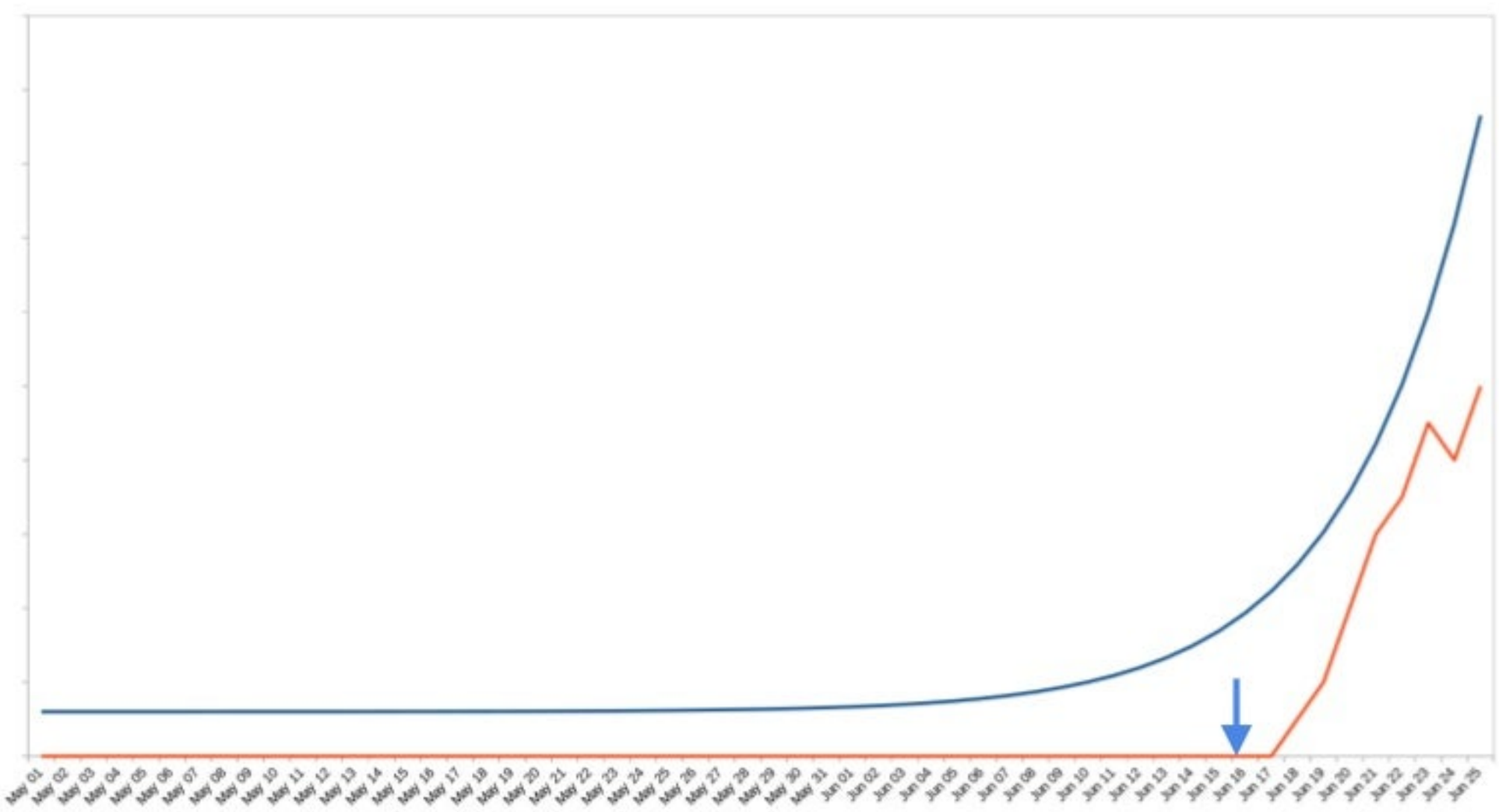
Server update



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Tooling

- Grafana https://github.com/grafana/grafana
- Prometheus https://github.com/prometheus/prometheus
- Graphite https://github.com/graphite-project
- R https://www.r-project.org/
- Octave https://www.gnu.org/software/octave/

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Questions

?

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