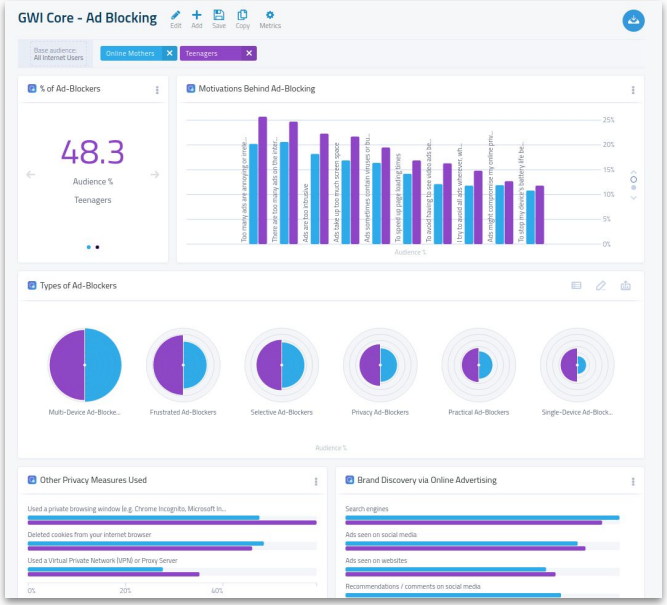
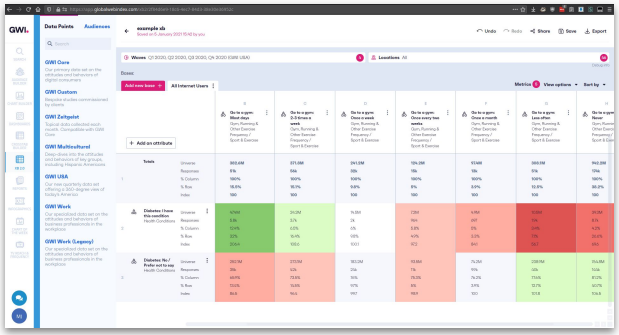
How an APL Prototype Helped Designing a Service

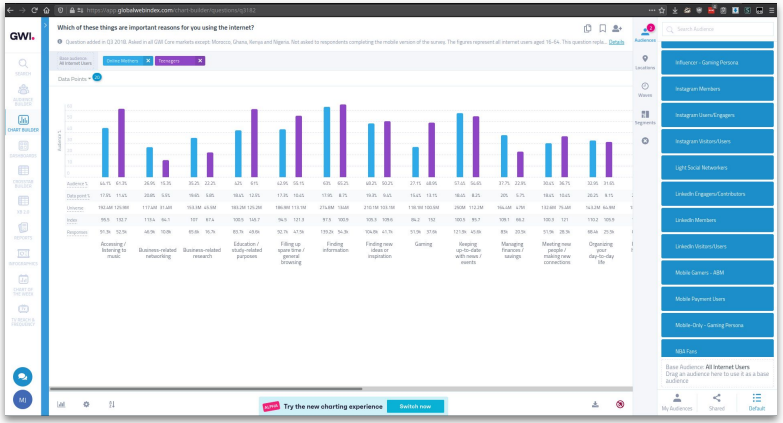
Martin Janiczek, GWI

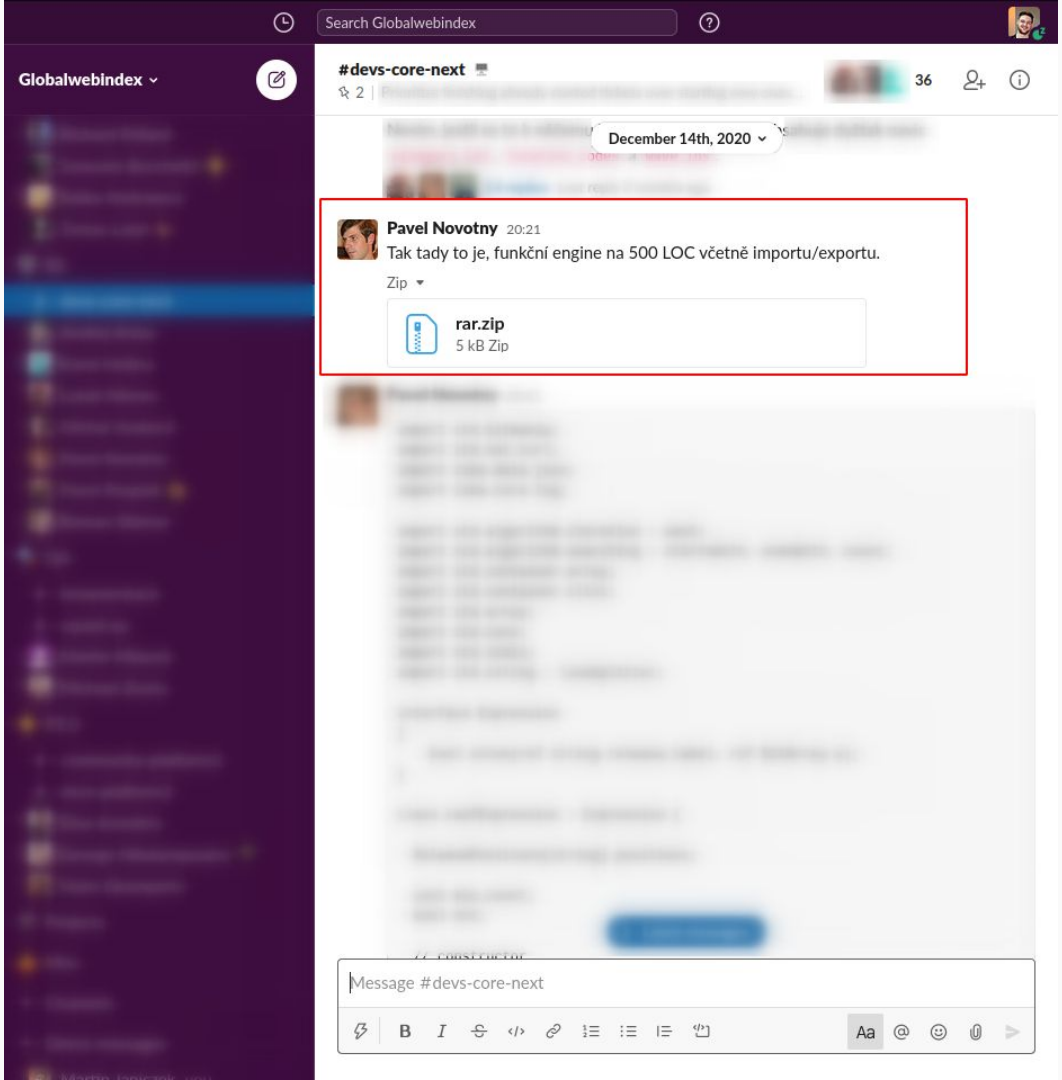
GWI.

- globalwebindex.com
- market research:
  - collecting surveys
  - cleaning the data
  - let users explore, query, plot, export the data








Search Globalwebindex
Globalwebindex
#devs-core-next
2
36
December 14th, 2020
Pavel Novotny 20:21
Tak tady to je, funkční engine na 500 LOC včetně importu/exportu.
Zip
rar.zip
5 kB Zip
Message #devs-core-next
Aa

README.md

N Chambers

A prototype distributed database for GWI

A distributed database and aggregation service optimised for GWI survey data, with heavy dependency on Redis, Google Pub/Sub and Roaring Bitmaps.

The project consists of 3 applications:

- odb is the calculation engine which responds to queries
- gza is the audience service which derives and creates audiences
- rza listens to pub/sub and writes updates to Redis

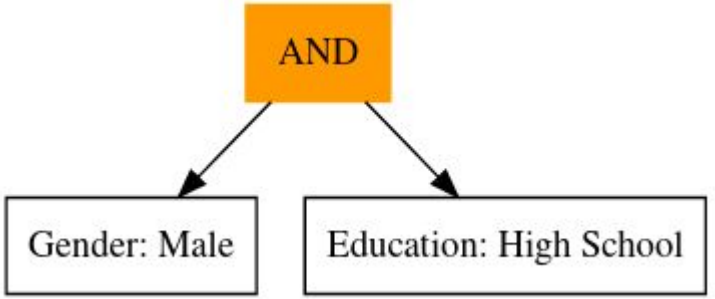
WARNING

This is not ready for general use yet.

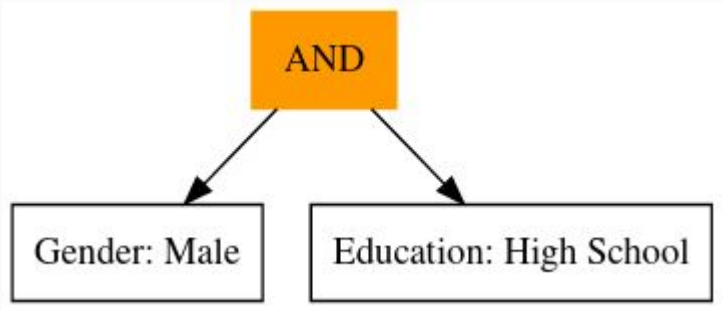
Advent of Code
sub y{2015}
[About] [Events] [Shop] [Settings] [Log Out] Martin Janiczek 50*
[Calendar] [AoC++] [Sponsors] [Leaderboard] [Stats]
25 **
24 **
23 **
22 **
21 **
20 **
19 **
18 **
17 **
16 **
15 **
14 **
13 **
12 **
11 **
10 **
9 **
8 **
7 **
6 **
5 **
4 **
3 **
2 **
1 **

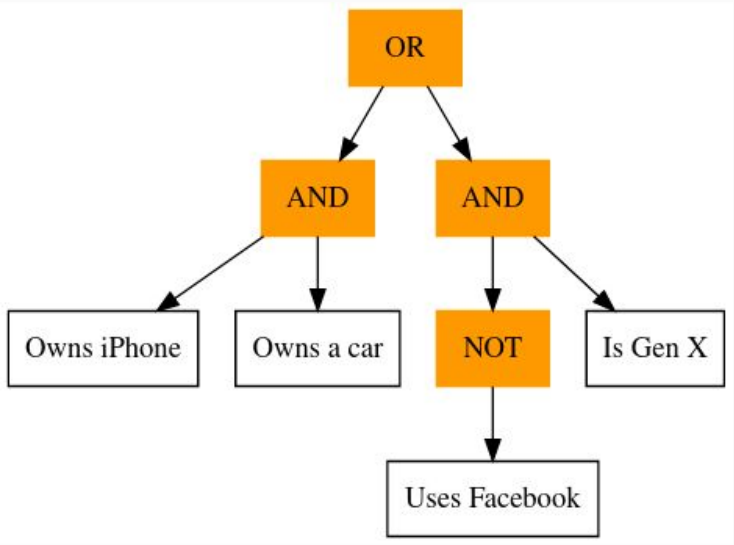
```
{
  "waves": ["q1_2020", "q2_2020", "q3_2020", "q4_2020"],
  "namespaces": ["core"],
  "expression": {
    "and": [
      {
        "datapoints": ["q2_1"], // gender: male
        "min_count": 1,
        "not": false
      },
      {
        "datapoints": ["q4_3"], // age group: 25-34
        "min_count": 1,
        "not": true
      }
    ]
  }
}
```

```
{
  "waves": ["q1_2020", "q2_2020", "q3_2020", "q4_2020"],
  "namespaces": ["core"],
  "expression": {
    "and": [
      {
        "datapoints": ["q2_1"], // gender: male
        "min_count": 1,
        "not": false
      },
      {
        "datapoints": ["q4_3"], // age group: 25-34
        "min_count": 1,
        "not": true
      }
    ]
  }
}
```



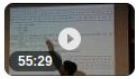
```
{
  "waves": ["q1_2020", "q2_2020", "q3_2020", "q4_2020"],
  "namespaces": ["core"],
  "expression": {
    "and": [
      {
        "datapoints": ["q2_1"], // gender: male
        "min_count": 1,
        "not": false
      },
      {
        "datapoints": ["q4_3"], // age group: 25-34
        "min_count": 1,
        "not": true
      }
    ]
  }
}
```





www.youtube.com › watch

Aaron Hsu - Parallel-by-construction Tree ... - YouTube

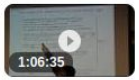


High-productivity, High-performance, Parallel-by-construction **Tree** Manipulation with **APL** - Part 1.

Dec 20, 2018 · Uploaded by LambdaConf

www.youtube.com › watch

Aaron Hsu - Parallel-by-construction Tree ... - YouTube



High-productivity, High-performance, Parallel-by-construction **Tree** Manipulation with **APL** - Part 1.

Dec 20, 2018 · Uploaded by LambdaConf

www.youtube.com › watch

Dyalog '18: High-performance Tree Wrangling, the APL Way ...

Aaron Hsu, Indiana University (U.S.A.)Don't let hierarchical **tree** like structures get you down in **APL**-land ...

Nov 30, 2018 · Uploaded by Dyalog Usermeeting

www.youtube.com › watch

Does APL Need a Type System? by Aaron W Hsu at ...

APL is known for its concise problem-solving expressiveness, and it is used very ... In this talk we will explore ...

Feb 26, 2019 · Uploaded by ConfEngine

www.youtube.com › watch

Array-oriented Functional Programming by Aaron W Hsu ...

APL is the original functional programming language, the grand-daddy, the Godfather, and the old workhorse ...

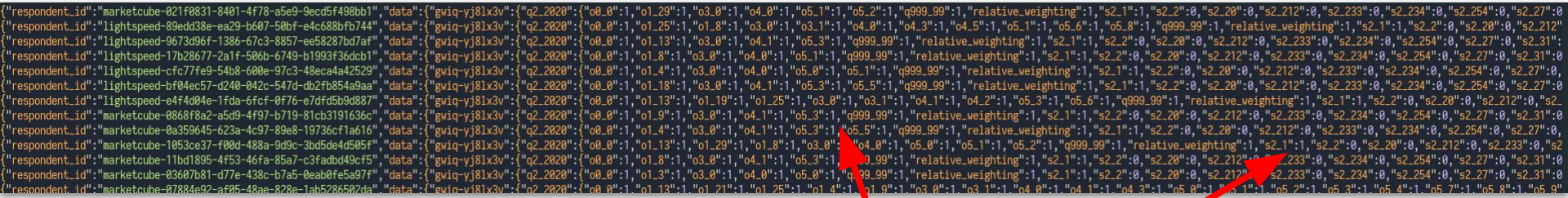
Feb 25, 2019 · Uploaded by ConfEngine

dyalog.tv › Dyalog18

Welcome to Dyalog Videos Page

Aaron Hsu, Indiana University (U.S.A.). Don't let hierarchical **tree** like structures get you down in **APL**-land ...

```
{"respondent_id":"marketcube-021f0831-8401-4f78-a5e9-9ecd5f498bb1","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_29":1,"o3_0":1,"o4_0":1,"o5_1":1,"o5_2":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2_234":0,"s2_254":0,"s2_27":0
{"respondent_id":"lightspeed-89edd38e-ea29-b607-50bf-e4c688bfb744","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_25":1,"o1_8":1,"o3_0":1,"o3_1":1,"o4_0":1,"o4_3":1,"o4_5":1,"o5_1":1,"o5_6":1,"o5_8":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212"
{"respondent_id":"lightspeed-9673d96f-1386-67c3-8857-ee58287bd7af","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_13":1,"o3_0":1,"o4_1":1,"o5_3":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2_234":0,"s2_254":0,"s2_27":0,"s2_31":
{"respondent_id":"lightspeed-17b28677-2a1f-506b-6749-b1993f36dcb1","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_8":1,"o3_0":1,"o4_0":1,"o5_1":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2_234":0,"s2_254":0,"s2_27":0,"s2_31":0
{"respondent_id":"lightspeed-cfc77fe9-54b8-600e-97c3-48eca4a42529","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_4":1,"o3_0":1,"o4_0":1,"o5_0":1,"o5_1":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2_234":0,"s2_254":0,"s2_27":0,
{"respondent_id":"lightspeed-bf04ec57-d240-042c-547d-db2fb854a9aa","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_18":1,"o3_0":1,"o4_1":1,"o5_3":1,"o5_5":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2_234":0,"s2_254":0,"s2_27":0
{"respondent_id":"lightspeed-e4f4d04e-1fda-6fcf-0f76-e7dfd5b9d887","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_13":1,"o1_19":1,"o1_25":1,"o3_0":1,"o3_1":1,"o4_1":1,"o4_2":1,"o5_3":1,"o5_6":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_
{"respondent_id":"marketcube-0868f8a2-a5d9-4f97-b719-81cb3191636c","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_9":1,"o3_0":1,"o4_1":1,"o5_3":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2_234":0,"s2_254":0,"s2_27":0,"s2_31":0
{"respondent_id":"marketcube-0a359645-623a-4c97-89e8-19736cf1a616","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_4":1,"o3_0":1,"o4_1":1,"o5_3":1,"o5_5":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2_234":0,"s2_254":0,"s2_27":0,
{"respondent_id":"marketcube-1053ce37-f00d-488a-9d9c-3bd5de4d505f","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_13":1,"o1_29":1,"o1_8":1,"o3_0":1,"o4_0":1,"o5_0":1,"o5_1":1,"o5_2":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2
{"respondent_id":"marketcube-11bd1895-4f53-46fa-85a7-c3fadbd49cf5","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_8":1,"o3_0":1,"o4_1":1,"o5_3":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2_234":0,"s2_254":0,"s2_27":0,"s2_31":0
{"respondent_id":"marketcube-03607b81-d77e-438c-b7a5-0eab0fe5a97f","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_3":1,"o3_0":1,"o4_0":1,"o5_0":1,"q999_99":1,"relative_weighting":1,"s2_1":1,"s2_2":0,"s2_20":0,"s2_212":0,"s2_233":0,"s2_234":0,"s2_254":0,"s2_27":0,"s2_31":0
{"respondent_id":"marketcube-07884e92-af05-48ae-828e-1ab5286502da","data":{"gwiq-yj8lx3v":{"q2_2020":{"o0_0":1,"o1_13":1,"o1_21":1,"o1_25":1,"o1_4":1,"o1_9":1,"o3_0":1,"o3_1":1,"o4_0":1,"o4_1":1,"o4_3":1,"o5_0":1,"o5_1":1,"o5_2":1,"o5_3":1,"o5_4":1,"o5_7":1,"o5_8":1,"o5_9"
```



hey, those are bits! mostly shared! I sense a bit matrix...

Distilled

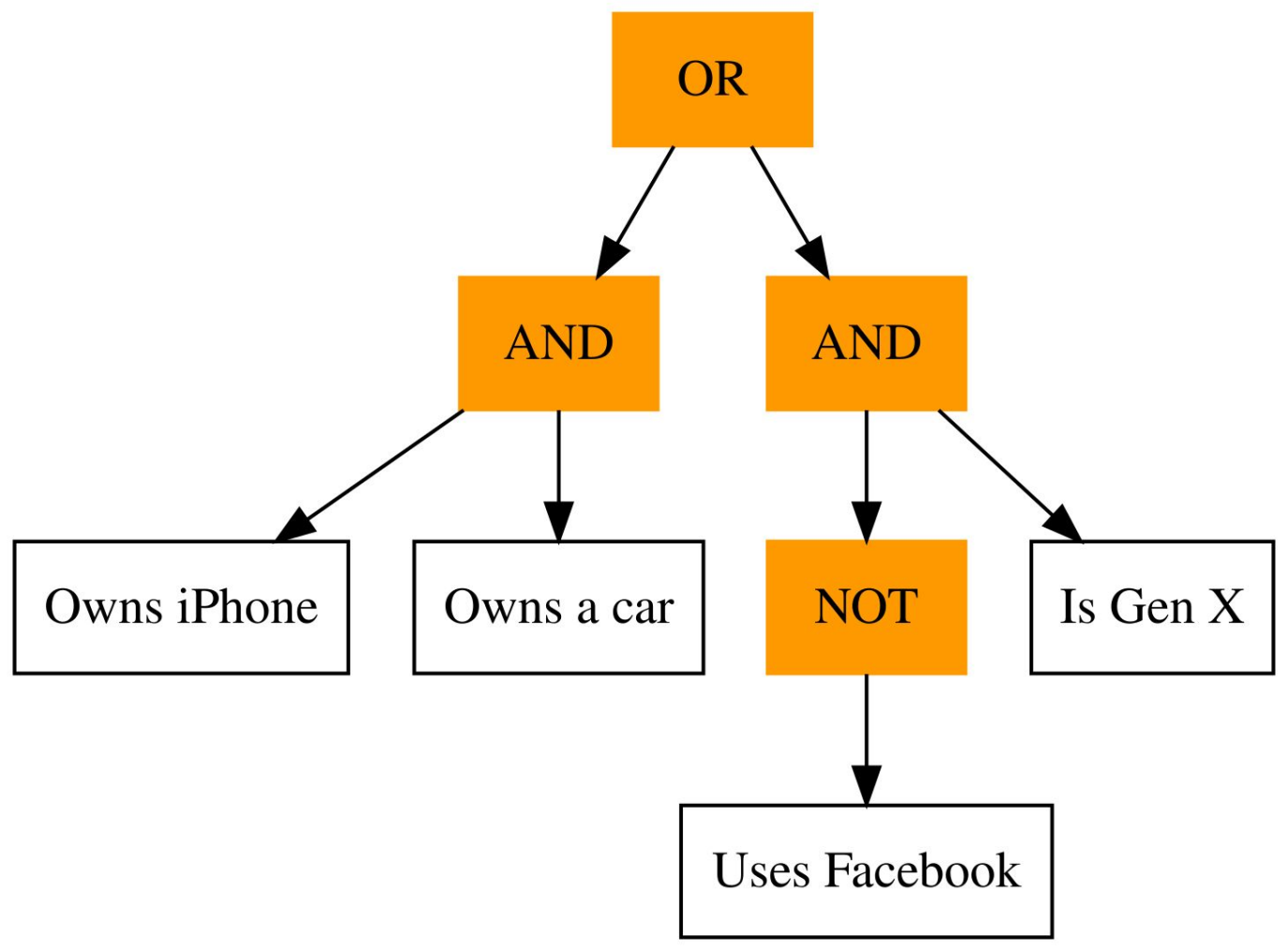
Three arrays per "release":

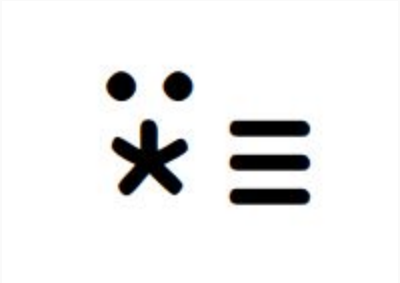
5GB JSON

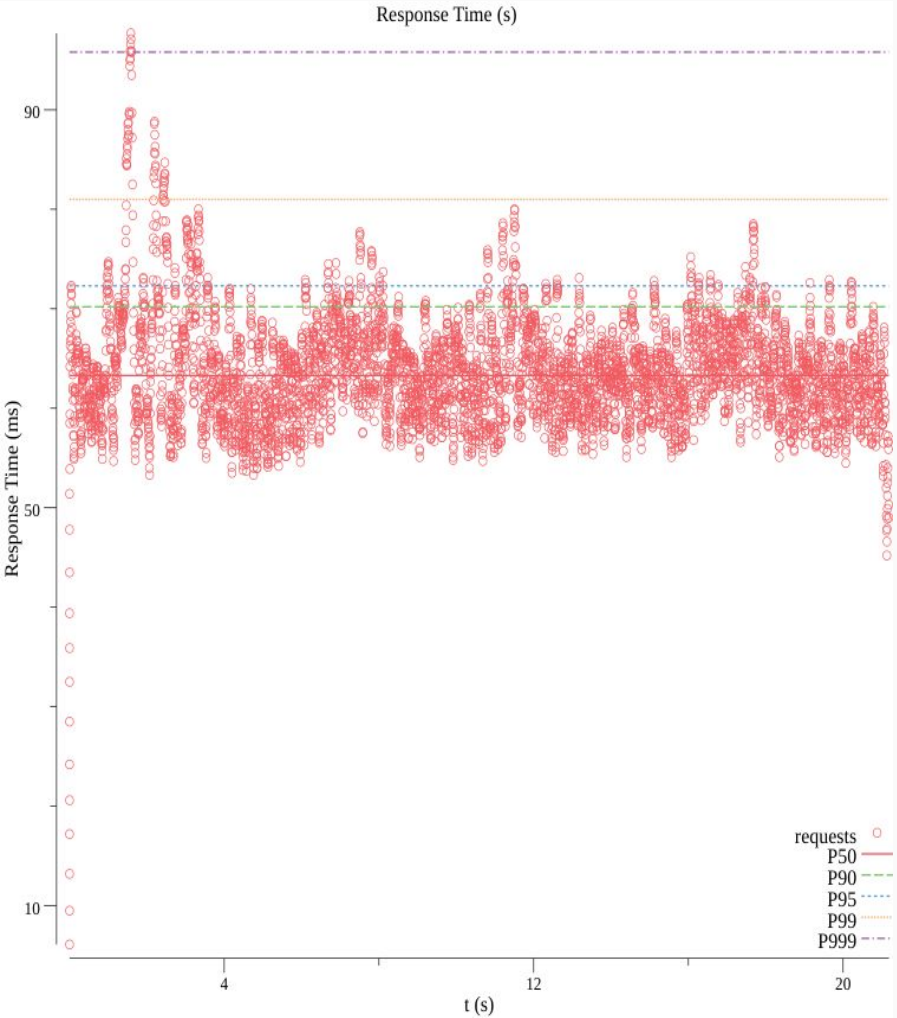
↓

50MB when ΔMPUT!

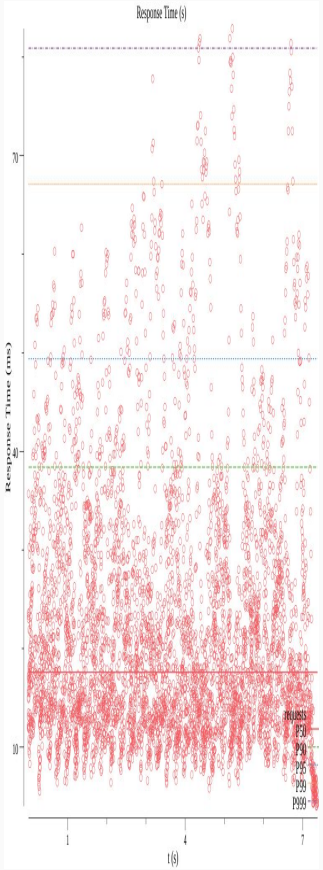
		Datapoints (question answers):										
		q2_1	q2_2	s2_1	s2_2	s2_3	s2_4	s2_5	s2_6	q4_2	q4_3	q4_4
Respondents:	Answers:											
weighting												
12121		0	1	1	0	0	0	0	0	0	1	0
23232		1	0	0	0	1	0	0	0	1	0	0
34343		1	0	0	0	0	0	0	1	0	0	1
45454		1	0	0	1	0	0	0	0	0	0	1
56565		0	1	0	1	0	0	0	0	0	1	0
67676		0	1	1	0	0	0	0	0	0	0	1
78787		1	0	0	0	0	1	0	0	1	0	0


OR
AND
AND
Owns iPhone
Owns a car
NOT
Is Gen X
Uses Facebook

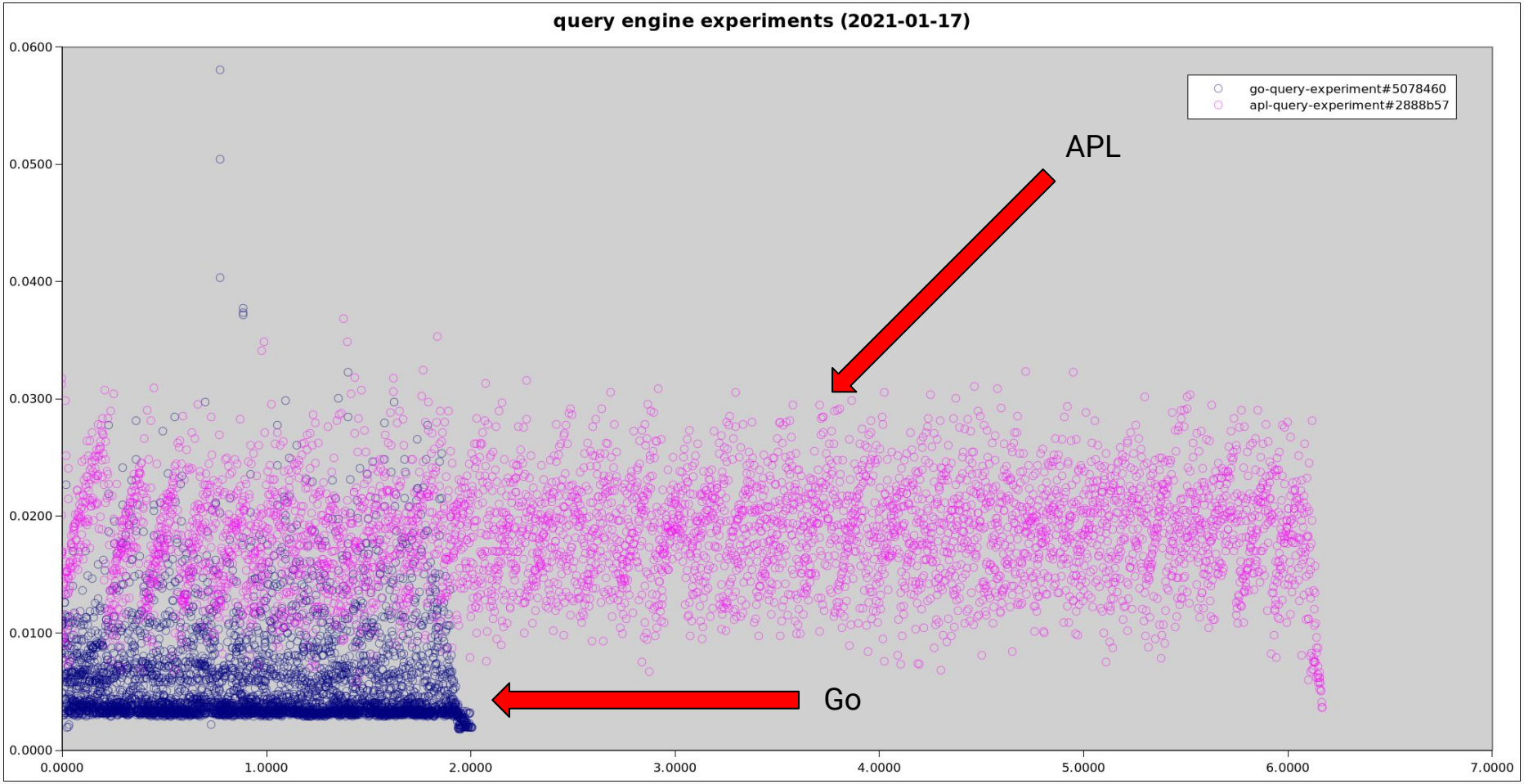




← single-core
↓ 8x single-core process, load-balanced with NGINX



(tried to make them to scale - sorry)


query engine experiments (2021-01-17)
go-query-experiment#5078460
apl-query-experiment#2888b57
APL
Go
0.0600
0.0500
0.0400
0.0300
0.0200
0.0100
0.0000
0.0000
1.0000
2.0000
3.0000
4.0000
5.0000
6.0000
7.0000

Thank you:

- Richard Park: https://rikedyp.uk/APLWorkshop/

Thank you:

- Richard Park: https://rikedyp.uk/APLWorkshop/
- Adám and APL Orchard: https://apl.chat/

Thank you:

- Richard Park: https://rikedyp.uk/APLWorkshop/
- Adám and APL Orchard: https://apl.chat/
- Morten and Brian from Dyalog

Thank you:

- Richard Park: https://rikedyp.uk/APLWorkshop/
- Adám and APL Orchard: https://apl.chat/
- Morten and Brian from Dyalog
- Aaron Hsu and the art of tree wrangling: https://is.gd/hsu_dissertation

Thank you:

- Richard Park: https://rikedyp.uk/APLWorkshop/
- Adám and APL Orchard: https://apl.chat/
- Morten and Brian from Dyalog
- Aaron Hsu and the art of tree wrangling: https://is.gd/hsu_dissertation
- YOU, for listening!