TASK 3: DB BENCHMARKING OPERATIONS

DB Benchmarking adalah pengukuran dan evaluasi kinerja dari basis data. DB Benchmarking dilakukan untuk mengetahui efisiensi dari basis data yang telah dibuat supaya bisa mengetahui workload yang mampu ditangani oleh basis data. DB Benchmarking dilakukan pada basis data Good Reading Bookstore Database yaitu pada API yang telah dibuat apa GRB API. Terdapat 11 Endpoint pada API tersebut seperti pada lampiran.

Benchmark dilakukan dengan mengumpulkan data kecepatan eksekusi antara Postgre SQL, Postman dengan pengiriman sekali, Postman dengan pengiriman berkali-kali. Postman sekali kirim memiliki rata-rata paling besar sebesar 89,15 ms dan standard deviasi sebesar 23,36 ms. Pemilik rata-rata terbesar kedua yaitu Postgre SQL dengan nilai sebesar 59,12 dan standard deviasi sebesar 17,7 ms.

Berdasarkan plot setiap endpoint yang ada pada lampiran, terlihat kecepatan eksekusi query yang dilakukan oleh postgre SQL, Postman dengan satu kali pengiriman, dan Postman dengan pengiriman terus menerus. Kecepatan eskekusi dari postman sekali kirim terlihat paling besar dibandingkan dengan kecepatan lain. Hal tersebut berbanding terbalik dengan kecepatan eksekusi dari Postman yang dikirim secara terus menerus dimana kecepatan runtime jauh terlihat lebih cepat dibandingkan yang lain.

Berdasarkan plot setiap metode, persebaran eksekusi terlihat bahwa Postman sekali kirim memiliki runtime terlama, disusul Postgre SQL dan Postman berkali-kali kirim. Pada methods GET dan POST pada Postman berkali-kali kirim memiliki kecepatan yang jauh lebih cepat dari pada yang lain karena persebaran waktu eksekusi terpusan pada sebelah kiri. Pada methode PUT dan DELETE juga menunjukkan hasil yang serupa namun dengan selisih yang tidak terlalu menojol seperti pada methods GET dan POST.

Uji Paired T dilakukan untuk mengetahui kecepatan paling besar atau paling lama diantara Postgre SQL, Postgran dengan sekali kirim, dan Postman dengan berkali-kali kirim. Tingkat pengujian dilakukan 3 kali yaitu antara Postman sekali kirim dan Postgre SQL, Postgre SQL dan Postman dengan berkali-kali kirim, serta yang terakhir antara Postman sekali kirim dengan Postman berkali-kali kirim. Pengujian dilakukan dengan tingkat kepercayaan sebesar 95%. Pada pengujian pertama antara Postman sekali kirim dan Postgre SQL diketahui nilai probabilitas sebesar 5,72E-37 bernilai kurang dari alpha sebesar 0,05 sehingga dapat disimpulkan bahwa Postman sekali kirim memiliki kecepatan eksekusi lebih lama dibandingkan dengan Postgre SQL. Pada pengujian antara Postgre SQL dan Postman berkali-kali kirim, nilai probabilitas lebih kecil dari pada 0,05 sehingga dapat disimpulkan bahwa Postgre SQL memiliki kecepatan eksekusi lebih lama dibandingkan dengan Postman berkali-kali kirim. Pada pengujian terakhir juga terjadi hal serupa sehingga dapat disimpulkan bahwa Postman yang dirikim sekali lebih lama dibandingkan dengan Postman yang dikirim berkali-kali.

Pada DB Benchmarking Operation, kecepatan eksekusi menggunakan Postman dapat lebih cepat maupun lebih lambat daripada Postgre SQL bergantung bagaimana cara pengiriman. Pengiriman secara sekali akan lebih lama dibandingkan pengiriman berkali-kali secara berurutan. Pengiriman pertama akan lebih lama karena postman api belum mengoptimalisasi

eksekusi tersebut. Pada pengiriman berkali-kali dapat lebih optimal karena dapat menggunakan cache dalam eksekusi. Postman dapat menyimpan respon dari endpoint yang sering digunakan sehingga dapat mengurangi beban langsung dari basis data.

Lampiran Hasil Pengumpulan Data

No	Iterasi	Endpoint	Methods	Postgr e SQL	Postma n One Time	Postman Continu
1	1	showAllBooks	GET	136	69	e 4
2	2	showAllBooks	GET	63	65	6
3	3	showAllBooks	GET	74	73	5
4	4	showAllBooks	GET	52	63	5
5	5	showAllBooks	GET	40	71	5
6	6	showAllBooks	GET	46	65	4
7	7	showAllBooks	GET	55	71	4
8	8	showAllBooks	GET	65	64	4
9	9	showAllBooks	GET	63	62	7
10	10	showAllBooks	GET	57	68	5
11	11	showAllBooks	GET	61	66	4
12	12	showAllBooks	GET	60	69	5
13	13	showAllBooks	GET	56	68	5
14	14	showAllBooks	GET	40	66	5
15	15	showAllBooks	GET	43	72	5
16	16	showAllBooks	GET	40	74	6
17	17	showAllBooks	GET	62	72	4
18	18	showAllBooks	GET	56	74	4
19	19	showAllBooks	GET	65	64	4
20	20	showAllBooks	GET	56	69	5
21	1	showBooksRating	GET	132	65	11
22	2	showBooksRating	GET	66	70	7
23	3	showBooksRating	GET	57	64	5
24	4	showBooksRating	GET	53	66	5
25	5	showBooksRating	GET	51	69	4
26	6	showBooksRating	GET	70	71	5
27	7	showBooksRating	GET	64	64	5
28	8	showBooksRating	GET	60	64	5
29	9	showBooksRating	GET	55	65	7
30	10	showBooksRating	GET	50	65	9
31	11	showBooksRating	GET	67	71	7
32	12	showBooksRating	GET	53	64	6
33	13	showBooksRating	GET	55	67	5
34	14	showBooksRating	GET	36	68	4
35	15	showBooksRating	GET	39	66	5
36	16	showBooksRating	GET	44	66	46
37	17	showBooksRating	GET	59	71	9
38	18	showBooksRating	GET	75	71	6
39	19	showBooksRating	GET	55	71	5
40	20	showBooksRating	GET	53	69	6

42	42							
43	43	41	1	showAllReviews	GET	64	68	8
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45	45	43	3	showAllReviews	GET	60	64	4
46	46	44	4	showAllReviews	GET	67	65	8
47	47	45	5	showAllReviews	GET	57	78	4
48 8 showAllReviews GET 57 69 49 9 showAllReviews GET 58 65 50 10 showAllReviews GET 62 64 4 51 11 showAllReviews GET 39 76 52 12 showAllReviews GET 39 78 53 13 showAllReviews GET 42 75 54 14 showAllReviews GET 39 72 55 15 showAllReviews GET 39 76 56 16 showAllReviews GET 39 77 58 18 showAllReviews GET 39 77 59 19 showAllReviews GET 55 74 60 20 showAllWishlist GET 39 63 61 1 showAllWishlist GET 49 89 62 2	48 8 showAllReviews GET 57 69 4 49 9 showAllReviews GET 58 65 8 50 10 showAllReviews GET 62 64 43 51 11 showAllReviews GET 39 76 4 52 12 showAllReviews GET 39 76 4 53 13 showAllReviews GET 42 75 5 54 14 showAllReviews GET 39 72 5 55 15 showAllReviews GET 39 76 6 56 16 showAllReviews GET 39 77 4 57 17 showAllReviews GET 39 77 4 59 19 showAllWishlist GET 39 77 4 59 19 showAllWishlist GET 39 63 5	46	6	showAllReviews	GET	70	64	5
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52 12 showAllReviews GET 39 78 53 13 showAllReviews GET 42 75 54 14 showAllReviews GET 39 72 55 15 showAllReviews GET 39 76 56 16 showAllReviews GET 37 64 57 17 showAllReviews GET 40 66 58 18 showAllReviews GET 39 77 59 19 showAllWeishist GET 39 63 61 1 showAllWeishist GET 39 63 61 1 showAllWishlist GET 169 102 63 3 showAllWishlist GET 43 89 64 4 showAllWishlist GET 49 89 65 5 showAllWishlist GET 49 89 66 6 showA	52 12 showAllReviews GET 39 78 5 53 13 showAllReviews GET 42 75 5 54 14 showAllReviews GET 39 72 5 55 15 showAllReviews GET 39 76 6 56 16 showAllReviews GET 37 64 4 57 17 showAllReviews GET 39 77 4 59 19 showAllReviews GET 39 77 4 60 20 showAllWishlist GET 39 63 5 61 1 showAllWishlist GET 49 89 5 63 3 showAllWishlist GET 43 89 5 64 4 showAllWishlist GET 49 89 5 65 5 showAllWishlist GET 49 89 5	50	10	showAllReviews	GET	62	64	43
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58 18 showAllReviews GET 39 77 59 19 showAllReviews GET 55 74 60 20 showAllReviews GET 39 63 61 1 showAllWishlist GET 66 64 1 62 2 showAllWishlist GET 169 102 63 3 showAllWishlist GET 43 89 64 4 showAllWishlist GET 49 89 65 5 showAllWishlist GET 44 97 67 7 showAllWishlist GET 40 85 68 8 showAllWishlist GET 53 90 70 10 showAllWishlist GET 69 107 71 11 showAllWishlist GET 55 86 72 12 showAllWishlist GET 39 90 74 14	58 18 showAllReviews GET 39 77 4 59 19 showAllReviews GET 55 74 5 60 20 showAllReviews GET 39 63 5 61 1 showAllWishlist GET 66 64 10 62 2 showAllWishlist GET 169 102 5 63 3 showAllWishlist GET 43 89 5 64 4 showAllWishlist GET 49 89 5 65 5 showAllWishlist GET 49 89 5 66 6 showAllWishlist GET 40 85 5 67 7 showAllWishlist GET 40 87 6 69 9 showAllWishlist GET 53 90 5 70 10 showAllWishlist GET 55 86 5 <td>56</td> <td>16</td> <td>showAllReviews</td> <td>GET</td> <td>37</td> <td>64</td> <td>4</td>	56	16	showAllReviews	GET	37	64	4
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64 4 showAllWishlist GET 37 99 65 5 showAllWishlist GET 49 89 66 6 showAllWishlist GET 44 97 67 7 showAllWishlist GET 40 85 68 8 showAllWishlist GET 40 87 69 9 showAllWishlist GET 53 90 70 10 showAllWishlist GET 69 107 71 11 showAllWishlist GET 55 86 72 12 showAllWishlist GET 50 97 4 73 13 showAllWishlist GET 39 90 74 14 showAllWishlist GET 39 87 75 15 showAllWishlist GET 36 95 77 17 showAllWishlist GET 58 103 79 <td< td=""><td>64 4 showAllWishlist GET 37 99 5 65 5 showAllWishlist GET 49 89 5 66 6 showAllWishlist GET 44 97 5 67 7 showAllWishlist GET 40 85 5 68 8 showAllWishlist GET 40 87 6 69 9 showAllWishlist GET 53 90 5 70 10 showAllWishlist GET 69 107 5 71 11 showAllWishlist GET 55 86 5 72 12 showAllWishlist GET 50 97 48 73 13 showAllWishlist GET 39 90 5 74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 36 95 5</td><td>62</td><td>2</td><td>showAllWishlist</td><td>GET</td><td>169</td><td>102</td><td>5</td></td<>	64 4 showAllWishlist GET 37 99 5 65 5 showAllWishlist GET 49 89 5 66 6 showAllWishlist GET 44 97 5 67 7 showAllWishlist GET 40 85 5 68 8 showAllWishlist GET 40 87 6 69 9 showAllWishlist GET 53 90 5 70 10 showAllWishlist GET 69 107 5 71 11 showAllWishlist GET 55 86 5 72 12 showAllWishlist GET 50 97 48 73 13 showAllWishlist GET 39 90 5 74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 36 95 5	62	2	showAllWishlist	GET	169	102	5
65 5 showAllWishlist GET 49 89 66 6 showAllWishlist GET 44 97 67 7 showAllWishlist GET 40 85 68 8 showAllWishlist GET 40 87 69 9 showAllWishlist GET 53 90 70 10 showAllWishlist GET 69 107 71 11 showAllWishlist GET 55 86 72 12 showAllWishlist GET 39 90 74 14 showAllWishlist GET 39 87 75 15 showAllWishlist GET 36 95 76 16 showAllWishlist GET 66 90 78 18 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 95 81 1 <t< td=""><td>65 5 showAllWishlist GET 49 89 5 66 6 showAllWishlist GET 44 97 5 67 7 showAllWishlist GET 40 85 5 68 8 showAllWishlist GET 40 87 6 69 9 showAllWishlist GET 53 90 5 70 10 showAllWishlist GET 69 107 5 71 11 showAllWishlist GET 55 86 5 72 12 showAllWishlist GET 50 97 48 73 13 showAllWishlist GET 39 90 5 74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 36 95 5 77 17 showAllWishlist GET 58 103 <td< td=""><td>63</td><td>3</td><td>showAllWishlist</td><td>GET</td><td>43</td><td>89</td><td>5</td></td<></td></t<>	65 5 showAllWishlist GET 49 89 5 66 6 showAllWishlist GET 44 97 5 67 7 showAllWishlist GET 40 85 5 68 8 showAllWishlist GET 40 87 6 69 9 showAllWishlist GET 53 90 5 70 10 showAllWishlist GET 69 107 5 71 11 showAllWishlist GET 55 86 5 72 12 showAllWishlist GET 50 97 48 73 13 showAllWishlist GET 39 90 5 74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 36 95 5 77 17 showAllWishlist GET 58 103 <td< td=""><td>63</td><td>3</td><td>showAllWishlist</td><td>GET</td><td>43</td><td>89</td><td>5</td></td<>	63	3	showAllWishlist	GET	43	89	5
66 6 showAllWishlist GET 44 97 67 7 showAllWishlist GET 40 85 68 8 showAllWishlist GET 40 87 69 9 showAllWishlist GET 53 90 70 10 showAllWishlist GET 69 107 71 11 showAllWishlist GET 55 86 72 12 showAllWishlist GET 50 97 4 73 13 showAllWishlist GET 39 87 74 14 showAllWishlist GET 39 87 75 15 showAllWishlist GET 36 95 77 17 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81	66 6 showAllWishlist GET 44 97 5 67 7 showAllWishlist GET 40 85 5 68 8 showAllWishlist GET 40 87 6 69 9 showAllWishlist GET 53 90 5 70 10 showAllWishlist GET 69 107 5 71 11 showAllWishlist GET 55 86 5 72 12 showAllWishlist GET 50 97 48 73 13 showAllWishlist GET 39 90 5 74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 36 95 5 76 16 showAllWishlist GET 58 103 5 78 18 showAllWishlist GET 58 103 <	64	4	showAllWishlist	GET	37	99	5
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68 8 showAllWishlist GET 40 87 69 9 showAllWishlist GET 53 90 70 10 showAllWishlist GET 69 107 71 11 showAllWishlist GET 55 86 72 12 showAllWishlist GET 50 97 4 73 13 showAllWishlist GET 39 90 74 14 showAllWishlist GET 39 87 75 15 showAllWishlist GET 70 85 76 16 showAllWishlist GET 36 95 77 17 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 <	68 8 showAllWishlist GET 40 87 6 69 9 showAllWishlist GET 53 90 5 70 10 showAllWishlist GET 69 107 5 71 11 showAllWishlist GET 55 86 5 72 12 showAllWishlist GET 50 97 48 73 13 showAllWishlist GET 39 90 5 74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 70 85 5 76 16 showAllWishlist GET 36 95 5 77 17 showAllWishlist GET 58 103 5 79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95	66	6	showAllWishlist	GET	44	97	5
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70 10 showAllWishlist GET 69 107 71 11 showAllWishlist GET 55 86 72 12 showAllWishlist GET 50 97 4 73 13 showAllWishlist GET 39 90 74 14 showAllWishlist GET 39 87 75 15 showAllWishlist GET 70 85 76 16 showAllWishlist GET 36 95 77 17 showAllWishlist GET 66 90 78 18 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 50 85	70 10 showAllWishlist GET 69 107 5 71 11 showAllWishlist GET 55 86 5 72 12 showAllWishlist GET 50 97 48 73 13 showAllWishlist GET 39 90 5 74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 70 85 5 76 16 showAllWishlist GET 36 95 5 77 17 showAllWishlist GET 66 90 5 78 18 showAllWishlist GET 58 103 5 79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72	68	8	showAllWishlist	GET	40	87	6
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72 12 showAllWishlist GET 50 97 4 73 13 showAllWishlist GET 39 90 74 14 showAllWishlist GET 39 87 75 15 showAllWishlist GET 70 85 76 16 showAllWishlist GET 36 95 77 17 showAllWishlist GET 66 90 78 18 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	72 12 showAllWishlist GET 50 97 48 73 13 showAllWishlist GET 39 90 5 74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 70 85 5 76 16 showAllWishlist GET 36 95 5 77 17 showAllWishlist GET 66 90 5 78 18 showAllWishlist GET 58 103 5 79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	70	10	showAllWishlist	GET	69	107	5
73 13 showAllWishlist GET 39 90 74 14 showAllWishlist GET 39 87 75 15 showAllWishlist GET 70 85 76 16 showAllWishlist GET 36 95 77 17 showAllWishlist GET 66 90 78 18 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	73 13 showAllWishlist GET 39 90 5 74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 70 85 5 76 16 showAllWishlist GET 36 95 5 77 17 showAllWishlist GET 66 90 5 78 18 showAllWishlist GET 58 103 5 79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	71	11	showAllWishlist	GET	55	86	5
74 14 showAllWishlist GET 39 87 75 15 showAllWishlist GET 70 85 76 16 showAllWishlist GET 36 95 77 17 showAllWishlist GET 66 90 78 18 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	74 14 showAllWishlist GET 39 87 5 75 15 showAllWishlist GET 70 85 5 76 16 showAllWishlist GET 36 95 5 77 17 showAllWishlist GET 66 90 5 78 18 showAllWishlist GET 58 103 5 79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	72	12	showAllWishlist	GET	50	97	48
75 15 showAllWishlist GET 70 85 76 16 showAllWishlist GET 36 95 77 17 showAllWishlist GET 66 90 78 18 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	75 15 showAllWishlist GET 70 85 5 76 16 showAllWishlist GET 36 95 5 77 17 showAllWishlist GET 66 90 5 78 18 showAllWishlist GET 58 103 5 79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	73	13	showAllWishlist	GET	39	90	5
76 16 showAllWishlist GET 36 95 77 17 showAllWishlist GET 66 90 78 18 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	76 16 showAllWishlist GET 36 95 5 77 17 showAllWishlist GET 66 90 5 78 18 showAllWishlist GET 58 103 5 79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	74	14	showAllWishlist	GET	39	87	5
77 17 showAllWishlist GET 66 90 78 18 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	77 17 showAllWishlist GET 66 90 5 78 18 showAllWishlist GET 58 103 5 79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	75	15	showAllWishlist	GET	70	85	5
78 18 showAllWishlist GET 58 103 79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	78 18 showAllWishlist GET 58 103 5 79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	76	16	showAllWishlist	GET	36	95	5
79 19 showAllWishlist GET 59 101 80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	79 19 showAllWishlist GET 59 101 5 80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	77	17	showAllWishlist	GET	66	90	5
80 20 showAllWishlist GET 59 95 81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	80 20 showAllWishlist GET 59 95 5 81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	78	18	showAllWishlist	GET	58	103	5
81 1 addWishlist POST 143 72 82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	81 1 addWishlist POST 143 72 8 82 2 addWishlist POST 67 89 8	79	19	showAllWishlist	GET	59	101	5
82 2 addWishlist POST 67 89 83 3 addWishlist POST 50 85	82 2 addWishlist POST 67 89 8	80	20	showAllWishlist	GET	59	95	5
83 3 addWishlist POST 50 85		81	1	addWishlist	POST	143	72	8
	83 3 addWishlist POST 50 85 7	82	2	addWishlist	POST	67	89	8
		83	3	addWishlist	POST	50	85	7
84 4 addWishlist POST 45 89	84 4 addWishlist POST 45 89 7	84	4	addWishlist	POST	45	89	7

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85	5	addWishlist	POST	76	85	6
86	6	addWishlist	POST	66	162	5
87	7	addWishlist	POST	67	177	6
88	8	addWishlist	POST	57	124	7
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100	20	addWishlist	POST	82	86	5
101	1	deleteWishlist	DELET	78	61	58
			E			
102	2	deleteWishlist	DELET E	60	170	56
103	3	deleteWishlist	DELET E	61	159	56
104	4	deleteWishlist	DELET E	61	105	6
105	5	deleteWishlist	DELET E	60	86	9
106	6	deleteWishlist	DELET E	59	77	50
107	7	deleteWishlist	DELET E	77	77	7
108	8	deleteWishlist	DELET E	41	85	49
109	9	deleteWishlist	DELET E	66	99	54
110	10	deleteWishlist	DELET E	58	127	58
111	11	deleteWishlist	DELET E	59	80	7
112	12	deleteWishlist	DELET E	62	90	7
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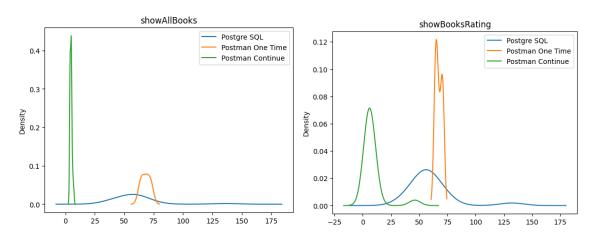
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119	19	deleteWishlist	DELET	61	89	5
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120	20	deleteWishlist	DELET	56	89	12
121	1	AddReviews	E POST	50	102	71
121	1 2			50	102	71
122		AddReviews	POST	52	82	47
123	3	AddReviews	POST	88	64	11
124	4	AddReviews	POST	72	86	6
125	5	AddReviews	POST	56	88	6
126	6	AddReviews	POST	47	83	5
127	7	AddReviews	POST	70	98	5
128	8	AddReviews	POST	63	99	9
129	9	AddReviews	POST	60	83	10
130	10	AddReviews	POST	64	111	8
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132	12	AddReviews	POST	76	78	7
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136	16	AddReviews	POST	79	83	10
137	17	AddReviews	POST	56	84	6
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139	19	AddReviews	POST	71	98	6
140	1	UpdateReviews	PUT	55	99	12
141	2	UpdateReviews	PUT	74	90	7
142	3	UpdateReviews	PUT	45	82	8
143	4	UpdateReviews	PUT	49	84	8
144	5	UpdateReviews	PUT	46	95	16
145	6	UpdateReviews	PUT	48	86	9
146	7	UpdateReviews	PUT	47	96	10
147	8	UpdateReviews	PUT	48	88	11
148	9	UpdateReviews	PUT	74	81	9
149	10	UpdateReviews	PUT	69	83	63
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153	14	UpdateReviews	PUT	69	95	6
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155	16	UpdateReviews	PUT	65	80	6
133	10	opuaterceviews	FUI	UJ	ðU	υ

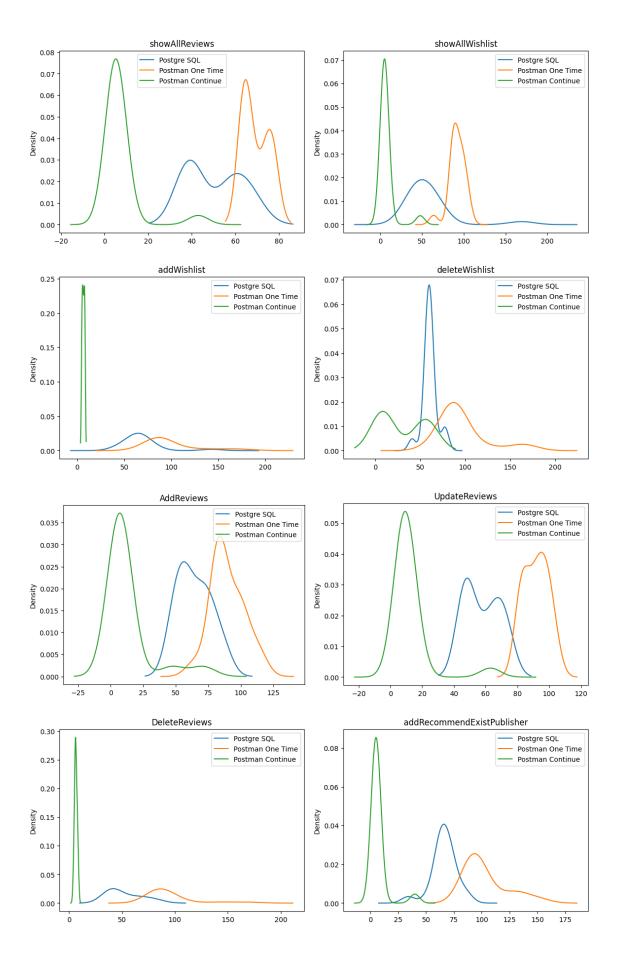
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160	1	UpdateReviews	PUT	46	93	7
161	2	DeleteReviews	DELET	35	85	8
			Е			
162	3	DeleteReviews	DELET	42	85	7
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163	4	DeleteReviews	DELET	56	168	9
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164	5	DeleteReviews	DELET	52	93	6
4.5			E	2.5	0.2	
165	6	DeleteReviews	DELET	36	83	7
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166	7	DeleteReviews	DELET	41	141	6
167	8	DeleteReviews	E DELET	43	85	-
107	8	DeleteReviews	E	43	85	6
168	9	DeleteReviews	DELET	66	82	5
100	7	Deletereviews	E	00	02	3
169	10	DeleteReviews	DELET	44	103	8
107	10	Beletereviews	E		103	O
170	11	DeleteReviews	DELET	85	82	7
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171	12	DeleteReviews	DELET	41	82	5
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172	13	DeleteReviews	DELET	63	81	4
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173	14	DeleteReviews	DELET	69	92	6
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174	15	DeleteReviews	DELET	39	88	6
155			E	2.5	0.1	
175	16	DeleteReviews	DELET	35	81	7
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176	17	DeleteReviews	DELET E	80	88	6
177	18	DeleteReviews	DELET	40	94	5
1//	10	Deletereviews	E	40	94	3
178	19	DeleteReviews	DELET	74	106	6
170	17	Deletereviews	E	, , ,	100	O
179	20	DeleteReviews	DELET	51	82	8
1//	20	Beleterteviews	E		02	O
180	1	addRecommendExistPublish	POST	34	100	5
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181	2	addRecommendExistPublish	POST	52	95	8
		er				
182	3	addRecommendExistPublish	POST	75	91	8
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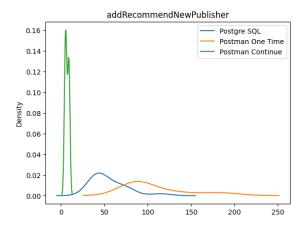
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8	addRecommendExistPublish	POST	65	104	5
9	addRecommendExistPublish	POST	62	152	5
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11	addRecommendExistPublish	POST	63	89	5
12	addRecommendExistPublish	POST	69	87	5
13	addRecommendExistPublish	POST	82	138	5
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16	addRecommendExistPublish	POST	70	128	40
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18	addRecommendExistPublish er	POST	63	130	5
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20	addRecommendExistPublish	POST	70	88	5
1	addRecommendNewPublishe r	POST	56	84	6
2	addRecommendNewPublishe r	POST	48	182	4
3	addRecommendNewPublishe r	POST	45	109	10
4	addRecommendNewPublishe r	POST	68	86	5
5	addRecommendNewPublishe r	POST	73	91	5
6	addRecommendNewPublishe r	POST	37	83	6
7	addRecommendNewPublishe r	POST	77	89	7
	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 1 2 3 4 5	er 5 addRecommendExistPublish er 6 addRecommendExistPublish er 7 addRecommendExistPublish er 8 addRecommendExistPublish er 9 addRecommendExistPublish er 10 addRecommendExistPublish er 11 addRecommendExistPublish er 12 addRecommendExistPublish er 13 addRecommendExistPublish er 14 addRecommendExistPublish er 15 addRecommendExistPublish er 16 addRecommendExistPublish er 17 addRecommendExistPublish er 18 addRecommendExistPublish er 19 addRecommendExistPublish er 20 addRecommendExistPublish er 3 addRecommendExistPublish er 4 addRecommendNewPublishe r 5 addRecommendNewPublishe r 6 addRecommendNewPublishe r 7 addRecommendNewPublishe r 1 addRecommendNewPublishe r 1 addRecommendNewPublishe r 3 addRecommendNewPublishe r 4 addRecommendNewPublishe r 5 addRecommendNewPublishe r 6 addRecommendNewPublishe r	er 5 addRecommendExistPublish er 6 addRecommendExistPublish er 7 addRecommendExistPublish er 8 addRecommendExistPublish er 9 addRecommendExistPublish er 10 addRecommendExistPublish er 11 addRecommendExistPublish er 12 addRecommendExistPublish er 13 addRecommendExistPublish er 14 addRecommendExistPublish er 15 addRecommendExistPublish er 16 addRecommendExistPublish er 17 addRecommendExistPublish er 18 addRecommendExistPublish er 19 addRecommendExistPublish er 10 addRecommendExistPublish er 11 addRecommendExistPublish er 12 addRecommendExistPublish er 13 addRecommendExistPublish er 14 addRecommendExistPublish er 15 addRecommendExistPublish er 16 addRecommendExistPublish er 17 addRecommendExistPublish er 20 addRecommendExistPublish er 21 addRecommendNewPublishe post r 22 addRecommendNewPublishe r 3 addRecommendNewPublishe post r 4 addRecommendNewPublishe post r 5 addRecommendNewPublishe post r 6 addRecommendNewPublishe post r 7 addRecommendNewPublishe post r 8 addRecommendNewPublishe post r 8 addRecommendNewPublishe post r 9 addRecommendNewPublishe post r 9 addRecommendNewPublishe post r 10 addRecommendNewPublishe post r 11 addRecommendNewPublishe post r 12 addRecommendNewPublishe post r 13 addRecommendNewPublishe post r 14 addRecommendNewPublishe post r	er 5 addRecommendExistPublish er 6 addRecommendExistPublish er 7 addRecommendExistPublish er 8 addRecommendExistPublish er 9 addRecommendExistPublish er 10 addRecommendExistPublish er 11 addRecommendExistPublish er 12 addRecommendExistPublish er 13 addRecommendExistPublish er 14 addRecommendExistPublish er 15 addRecommendExistPublish er 16 addRecommendExistPublish er 17 addRecommendExistPublish er 18 addRecommendExistPublish er 19 addRecommendExistPublish er 10 addRecommendExistPublish er 11 addRecommendExistPublish er 12 addRecommendExistPublish er 13 addRecommendExistPublish er 14 addRecommendExistPublish er 15 addRecommendExistPublish er 16 addRecommendExistPublish er 17 addRecommendExistPublish er 18 addRecommendExistPublish er 20 addRecommendExistPublish er 3 addRecommendExistPublish er 4 addRecommendNewPublishe POST 5 addRecommendNewPublishe POST 7 addRecommendNewPublishe POST	cr

207	8	addRecommendNewPublishe	POST	35	88	6
208	9	r addRecommendNewPublishe	POST	60	174	4
209	10	addRecommendNewPublishe	POST	39	82	5
210	11	addRecommendNewPublishe	POST	39	195	5
211	12	addRecommendNewPublishe r	POST	64	86	8
212	13	addRecommendNewPublishe r	POST	36	123	5
213	14	addRecommendNewPublishe r	POST	80	135	7
214	15	addRecommendNewPublishe r	POST	48	90	9
215	16	addRecommendNewPublishe r	POST	43	86	9
216	17	addRecommendNewPublishe r	POST	115	137	9
217	18	addRecommendNewPublishe r	POST	45	82	10
218	19	addRecommendNewPublishe r	POST	47	92	9
219	20	addRecommendNewPublishe r	POST	39	86	9

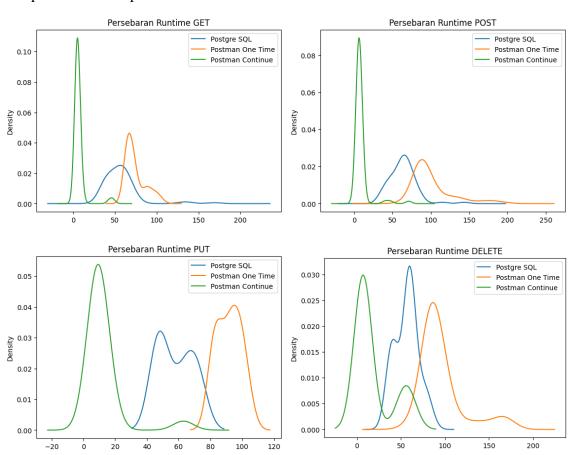
Lampiran Plot Setiap Endpoint







Lampiran Plot Setiap Methods



Lampiran Uji Paired T Test

```
T-statistic: 15.38912275068578
P-value (one-tailed): 5.725443474852156e-37
Hasil: Menolak hipotesis nol. Mean data Postman One Time lebih besar daripada mean data Postgre SQL.

+ Code + Markdown
```

T-statistic: 33.46827348738023
P-value (one-tailed): 3.7413040196169753e-88
Hasil: Menolak hipotesis nol. Mean data Postgre SQL lebih besar daripada mean data Postman Continue.

T-statistic: 46.48211205095457

P-value (one-tailed): 2.1127395633545787e-115

Hasil: Menolak hipotesis nol. Mean data Postman One Time lebih besar daripada mean data Postman Continue.

https://github.com/itproject-2k22/GRD-DB-Benchmarking-Operation