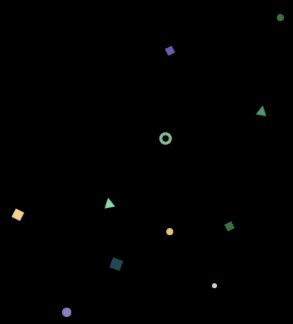


The Return of the OLAP Cube

Benn Stancil

Chief analytics officer | Mode

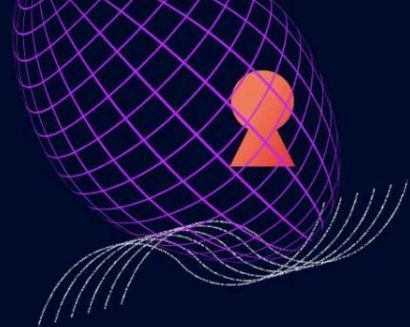


M **MODE**

OLD MAN YELLS AT CLOUD



First paragraph of text, likely a news article, containing several lines of illegible text.



The Return of the OLAP Cube

Benn Stancil, Chief Analytics Officer | Mode

ABOUT THE TALK

Fifteen years ago, OLAP cubes were a critical part of every analytics and BI stack. In a time when databases were slow and compute was expensive, cubes provided an elegant solution for standardizing multi-dimensional reporting. Over the last decade, however, they've fallen out of favor. As warehouses have gotten bigger, faster, and cheaper, cubes no seem longer necessary. Analysis and reporting is now done directly on top of raw data, no predefined or pre-aggregated cubes required.

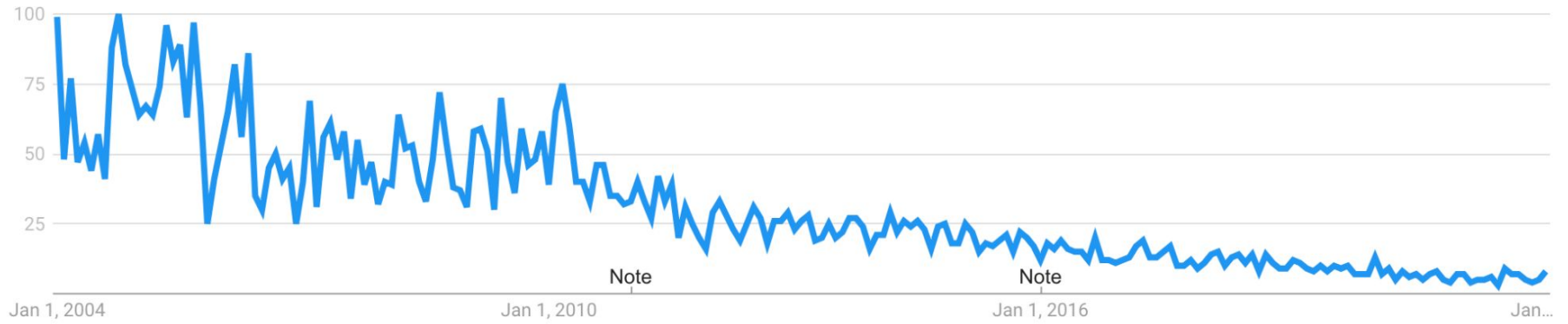
Or are they? OLAP cubes are reappearing in the modern data stack—just in a different form and under a different name. Instead of being separate data marts built for reporting and BI, cubes are now synthetic, generalized, and on-demand. In this talk, I'll walk through the history of OLAP cubes and their modern echoes. And I'll explain why this is actually a good thing—and why we should actually be excited about the return of the OLAP cube.



What's An OLAP Cube?

By Claire Carroll | August 18, 2021

● olap cube



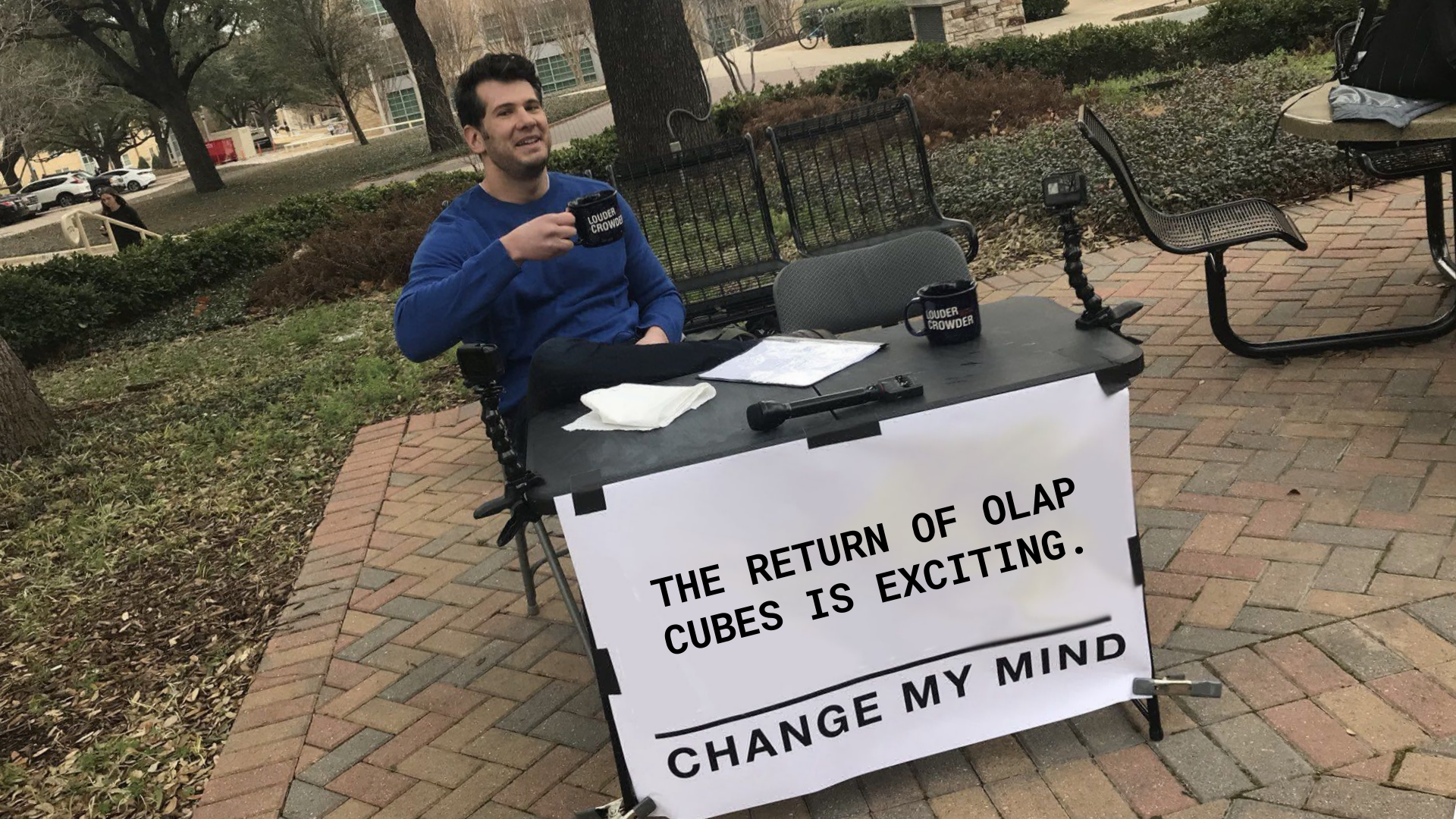
United States. 1/1/04 - 3/20/22. Web Search.



THE **WRAP**

Reviews Hail Robert Pattinson
Reboot as 'Best Bat-Movie Yet'





THE RETURN OF OLAP
CUBES IS EXCITING.

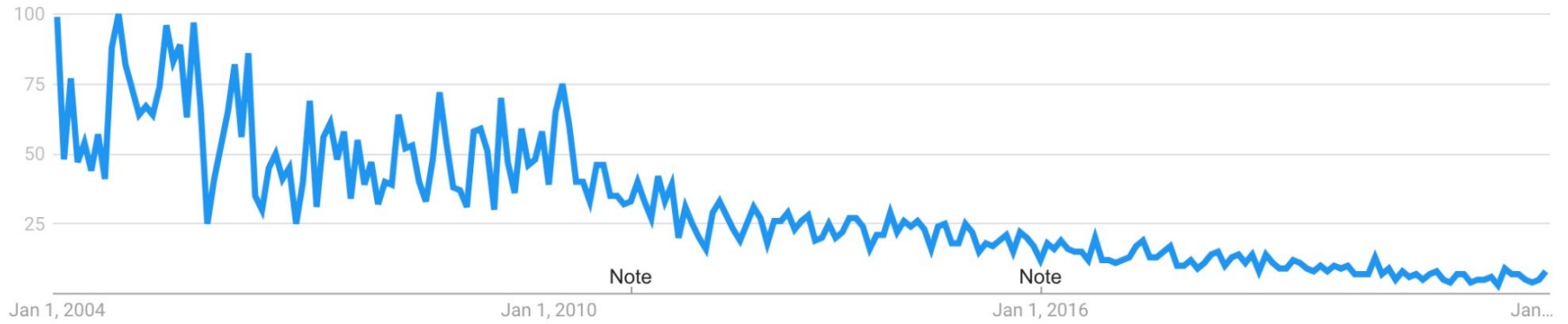
CHANGE MY MIND



What's An OLAP Cube?

By Claire Carroll | August 18, 2021

● olap cube



United States. 1/1/04 - 3/20/22. Web Search.





Tilt

***The Batman* is a Lifeless Reboot**




What's An OLAP Cube?

By Claire Carroll | August 18, 2021

general

What's An OLAP Cube?

By Claire Carroll | August 18, 2021

[Home](#) » [What's an OLAP cube?](#) 

👋 **Claire** here. I've been working with data for six years, and always in the context of a "Modern Data Stack" — the first data stack I used included Redshift, Fivetran and Looker! In contrast, many data modeling concepts were coined in an era when analysts used on-prem databases like Oracle and IBM.

As I got further into my career, I came across more terminology that didn't make sense to me, and I was

month	state	sales
January	California	\$1,217
January	Ohio	\$312
February	California	\$1,292
February	Ohio	\$323
March	California	\$1,321
March	Ohio	\$347
April	California	\$1,327
April	Ohio	\$422
May	California	\$1,411
May	Ohio	\$480
June	California	\$1,494
June	Ohio	\$528









How much money
did we make in
California?



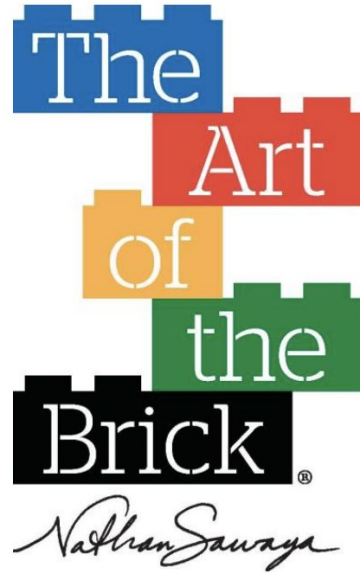
How much money
did we make in
Ohio?



How much money
did we make in
Ohio in January?



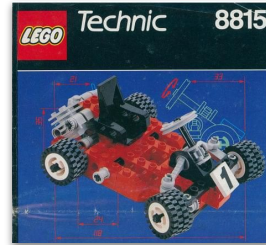
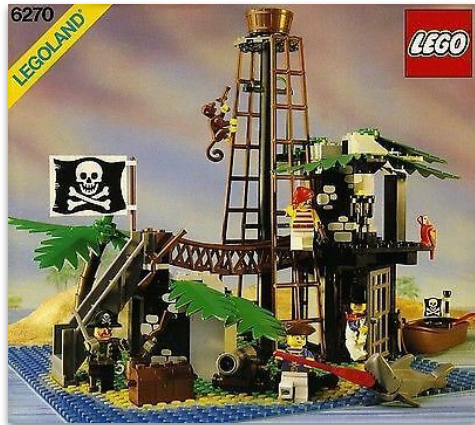
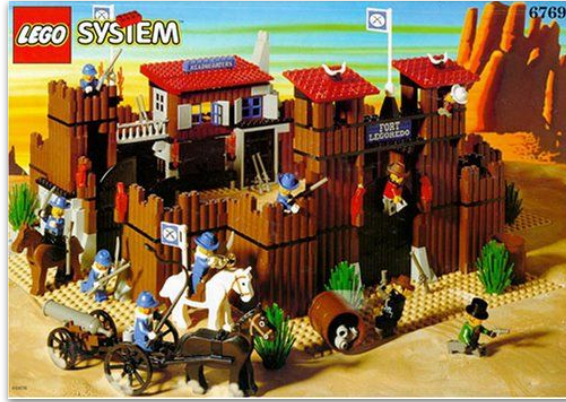
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aajs-639b656f9a82168d9b7d84d1b746cd19	2021-02-18 9:10:36		872	392769	13	Ohio	119.95	119.95	0.0000	FALSE	9.6
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LEGO®BRICKS

Quirky Facts

- The name 'LEGO' is an abbreviation of the two Danish words "leg godt", meaning "play well"
- The LEGO Group was founded in 1932 by Ole Kirk Kristiansen. The company has passed from father to son and is now owned by Kjeld Kirk Kristiansen, a grandchild of the founder.
- Recently Topgear's James May called for people to help build a LEGO house to live in, respondents lined up for 5 to 6 hours, it was a thought that took on a life of its own.





200,000,000

transactions a year

How much money
did we make in
California?

How much money
did we make in
Ohio?

How much money
did we make in
Ohio in January?





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aajs-2165b0e3bb68f5bc2aae5c2bcb70b51b	2021-02-18 9:10:24	aajs-0669ff44491a101ee3415523eec83da5	502	57164	12	California	99.95	99.95	0.0000	FALSE	10.0
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aajs-86bbc64dfd1d70e624e0243d2bfa3b	2021-02-18 9:10:34		267	425278	14	Ohio	79.95	79.95	0.0000	FALSE	6.4
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aajs-af053b939751e4eb2985fcf1252db581	2021-02-18 9:10:35		560	425278	4	California	89.95	89.95	0.0000	FALSE	9.0
52678c2c-2cce-4371-b0b4-9faf182b8453	2021-02-18 9:10:36		968	514241	25	Ohio	129.95	129.95	0.0000	FALSE	10.4
aajs-639b656f9a82168d9b7d84d1b746cd19	2021-02-18 9:10:36		872	392769	13	Ohio	119.95	119.95	0.0000	FALSE	9.6
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aajs-8b1fadcc2a71862e3c64e7f8fc8b7755	2021-02-18 9:10:38	193	500752	6	California	129.95	129.95	0.0000	TRUE	13.0	
aajs-4287510cad24f6e272bea680dc137f1b	2021-02-18 9:10:38	969	386389	7	California	129.95	129.95	0.0000	FALSE	13.0	
aajs-01d6c1aa726cf0112174e71780ba7fe	2021-02-18 9:10:38	880	392769	7	California	89.95	86.11	0.0426	FALSE	8.6	
aajs-926e90d59fcc0cf740c550756d60ac56	2021-02-18 9:10:40	789	242128	16	California	119.95	119.95	0.0000	FALSE	12.0	
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aajs-c2f8f3e5c1f9352fb29f53753a337b25	2021-02-18 9:10:46	584	587648	18	California	79.95	79.95	0.0000	FALSE	8.0	
aajs-c44ae0ce4e8563577d1dd178c585f2fb	2021-02-18 9:10:47	542	445673	2	California	19.95	19.95	0.0000	FALSE	2.0	
aajs-2acbe3c872626f39d1c000a55a27bdd5	2021-02-18 9:10:48	443	483320	20	California	39.95	39.95	0.0000	FALSE	4.0	
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June	Ohio	\$528

dimensions

month	state	sales
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dimensions

measures

month	state	sales
January	California	\$1,217
January	Ohio	\$312
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March	Ohio	\$347
April	California	\$1,327
April	Ohio	\$422
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May	Ohio	\$480
June	California	\$1,494
June	Ohio	\$528

state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945



month	state	sales
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April	Ohio	\$422
May	California	\$1,411
May	Ohio	\$480
June	California	\$1,494
June	Ohio	\$528

state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945

state	SUM of sales
California	\$7,515
Ohio	\$3,403
Grand Total	\$10,918

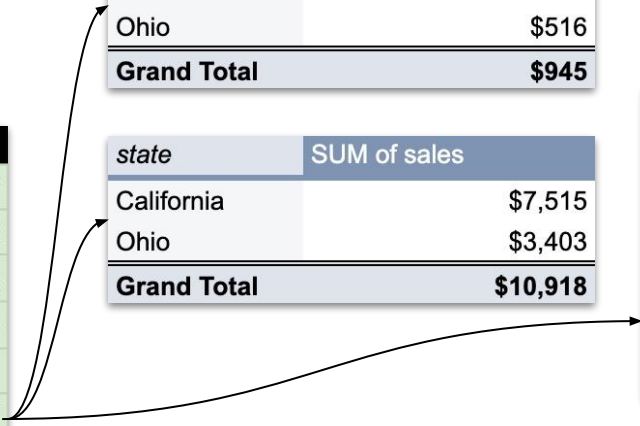


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May	Ohio	\$480
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June	Ohio	\$528

state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945

state	SUM of sales
California	\$7,515
Ohio	\$3,403
Grand Total	\$10,918

month	SUM of sales
January	\$1,416
February	\$1,546
March	\$1,595
April	\$1,702
May	\$1,780
June	\$1,857
Grand Total	\$9,895



month	state	sales
January	California	\$1,217
January	Ohio	\$312
February	California	\$1,292
February	Ohio	\$323
March	California	\$1,321
March	Ohio	\$347
April	California	\$1,327
April	Ohio	\$422
May	California	\$1,411
May	Ohio	\$480
June	California	\$1,494
June	Ohio	\$528

state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945

state	SUM of sales
California	\$7,515
Ohio	\$3,403
Grand Total	\$10,918

month	SUM of sales
January	\$1,416
February	\$1,546
March	\$1,595
April	\$1,702
May	\$1,780
June	\$1,857
Grand Total	\$9,895

SUM of sales	state		
month	California	Ohio	Grand Total
January	\$1,181	\$433	\$1,614
February	\$1,243	\$462	\$1,705
March	\$1,309	\$486	\$1,795
April	\$1,327	\$520	\$1,846
May	\$1,342	\$560	\$1,902
June	\$1,403	\$590	\$1,993
Grand Total	\$7,805	\$3,050	\$10,855

Raw data

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ep-00000449147104414122e0c030493	2021-02-18 9:10:25	174	104195	17	California	99.99	99.99	0.0000	FALSE	10.0
ep-43e028ba7704e13d493c17a7a7d02c	2021-02-18 9:10:25	889	423278	7	California	69.99	69.99	0.0000	FALSE	7.0
ep-0944ea171220a186a656237a702a6	2021-02-18 9:10:25	969	423278	10	California	79.99	12.77	0.0046	FALSE	1.2
ep-8418ba33ba34640156070233a8a8323	2021-02-18 9:10:25	615	104196	12	California	99.99	85.97	0.1021	FALSE	3.3
ep-90b000a023203a000000000000719a10009	2021-02-18 9:10:26	770	401481	6	California	99.99	89.99	0.0000	FALSE	7.0
ep-00000420578878464003001a0718	2021-02-18 9:10:27	176	401481	20	California	99.99	99.99	0.0000	FALSE	4.0
ep-412ea070020500000000000000000000	2021-02-18 9:10:27	024	441861	4	Ohio	29.99	29.99	0.0000	TRUE	2.4
ep-90c000a0000000000000000000000000	2021-02-18 9:10:28	073	327265	8	Ohio	109.99	109.99	0.0000	FALSE	8.8
ep-00000000000000000000000000000000	2021-02-18 9:10:28	188	327265	29	Ohio	49.99	49.99	0.0000	FALSE	4.0
ep-07400000000000000000000000000000	2021-02-18 9:10:29	206	441861	6	California	99.99	99.99	0.0000	FALSE	10.0
ep-57017e16b9-4945-4945-4945-4945494949494949	2021-02-18 9:10:30	080	391142	20	California	129.99	129.99	0.0000	FALSE	13.0
ep-40b00000000000000000000000000000	2021-02-18 9:10:34	389	052112	19	Ohio	69.99	69.99	0.0000	FALSE	6.4
ep-88000000000000000000000000000000	2021-02-18 9:10:34	287	432378	14	Ohio	79.99	79.99	0.0000	FALSE	6.4
ep-00712ea0000000000000000000000000	2021-02-18 9:10:34	355	393912	29	California	129.99	129.99	0.0000	FALSE	10.0
ep-40c02000000000000000000000000000	2021-02-18 9:10:35	960	432378	4	California	89.99	89.99	0.0000	FALSE	9.0
ep-00700000000000000000000000000000	2021-02-18 9:10:36	988	014241	29	Ohio	129.99	129.99	0.0000	FALSE	10.4
ep-40c02000000000000000000000000000	2021-02-18 9:10:36	872	390769	12	Ohio	119.99	119.99	0.0000	FALSE	9.8
ep-00000000000000000000000000000000	2021-02-18 9:10:36	436	900762	3	Ohio	109.99	109.99	0.0000	FALSE	8.8
ep-40c02000000000000000000000000000	2021-02-18 9:10:37	413	900762	16	Ohio	39.99	39.99	0.0000	FALSE	3.1
ep-40f1000a10410a0a0a10710a0a100000	2021-02-18 9:10:37	910	398349	6	Ohio	99.99	99.99	0.0000	FALSE	4.8
ep-40c02000000000000000000000000000	2021-02-18 9:10:37	166	900762	16	California	109.99	109.99	0.0000	TRUE	11.0
ep-80100000000000000000000000000000	2021-02-18 9:10:38	193	600782	6	California	129.99	129.99	0.0000	TRUE	13.0
ep-40c02000000000000000000000000000	2021-02-18 9:10:38	969	399389	7	California	129.99	129.99	0.0000	FALSE	10.0
ep-01000000000000000000000000000000	2021-02-18 9:10:38	880	390769	7	California	99.99	99.99	0.0048	FALSE	8.8

Raw data

OLAP cube

purchase_id	purchase_id	date	state	store_id	store_name	item_name	purchase_price	discount	is_return	tax
ep-210200a300f0523ee5c3e2d700516	2021-02-18 9 10 24	502	07164	12	California	99.99	99.99	0.0000	FALSE	10.0
ep-000004e9147104411023e030493	2021-02-18 9 10 25	174	104195	12	California	99.99	99.99	0.0000	FALSE	10.0
ep-43e200a7704f734f93c17a7a7020c	2021-02-18 9 10 25	889	432378	7	California	69.99	69.99	0.0000	FALSE	7.0
ep-094e4a17123201846656237a7020c	2021-02-18 9 10 25	969	432378	10	California	79.99	12.77	0.0000	FALSE	12.0
ep-84180a330a3404019070320a8b3023	2021-02-18 9 10 25	615	104196	12	California	99.99	35.97	0.1021	FALSE	3.5
ep-900000a320320000000000710a70026	2021-02-18 9 10 26	770	404351	6	California	69.99	69.99	0.0000	FALSE	7.0
ep-000000a320320000000000710a70026	2021-02-18 9 10 27	176	404351	20	California	99.99	39.95	0.0000	FALSE	4.0
ep-410e0730203200000000000000000000	2021-02-18 9 10 27	624	441851	4	Ohio	29.99	29.99	0.0000	TRUE	2.4
ep-900000a3203200000000000000000000	2021-02-18 9 10 28	973	327365	9	Ohio	109.99	109.99	0.0000	FALSE	8.8
ep-000000a3203200000000000000000000	2021-02-18 9 10 28	188	327365	29	Ohio	49.99	49.99	0.0000	FALSE	4.0
ep-17140000000000000000000000000000	2021-02-18 9 10 29	206	441861	9	California	99.99	99.99	0.0000	FALSE	10.0
ep-57070000000000000000000000000000	2021-02-18 9 10 30	980	391142	20	California	129.99	129.99	0.0000	FALSE	13.0
ep-10000000000000000000000000000000	2021-02-18 9 10 34	389	103212	19	Ohio	69.99	69.99	0.0000	FALSE	5.4
ep-880000a300f1070a040245020a2d	2021-02-18 9 10 34	287	432378	14	Ohio	79.99	79.99	0.0000	FALSE	6.4
ep-000000a3203200000000000000000000	2021-02-18 9 10 34	999	393912	29	California	129.99	129.99	0.0000	FALSE	13.0
ep-40000000000000000000000000000000	2021-02-18 9 10 35	960	432378	4	California	69.99	69.99	0.0000	FALSE	9.0
ep-00000000000000000000000000000000	2021-02-18 9 10 36	988	154241	29	Ohio	129.99	129.99	0.0000	FALSE	10.4
ep-40000000000000000000000000000000	2021-02-18 9 10 36	872	390769	13	Ohio	119.99	119.99	0.0000	FALSE	9.8
ep-00000000000000000000000000000000	2021-02-18 9 10 36	436	900762	3	Ohio	109.99	109.99	0.0000	FALSE	8.8
ep-00000000000000000000000000000000	2021-02-18 9 10 37	413	900762	16	Ohio	39.99	39.99	0.0000	FALSE	3.1
ep-00000000000000000000000000000000	2021-02-18 9 10 37	910	398349	6	Ohio	99.99	99.99	0.0000	FALSE	4.8
ep-00000000000000000000000000000000	2021-02-18 9 10 37	166	900762	16	California	109.99	109.99	0.0000	TRUE	11.0
ep-801900a314170a0a0a1781400a190000	2021-02-18 9 10 38	193	600762	6	California	129.99	129.99	0.0000	TRUE	13.0
ep-00000000000000000000000000000000	2021-02-18 9 10 38	969	399389	7	California	129.99	129.99	0.0000	FALSE	13.0
ep-01000000000000000000000000000000	2021-02-18 9 10 38	880	390769	7	California	99.99	66.11	0.0048	FALSE	8.8

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

Pre-aggregate data an OLAP cube

Raw data

OLAP cube

Reporting

purchase_id	purchase_id	date	state	store_id	store_id	store_name	last_price	purchase_price	discount	is_return	tax
ap-21020-18-9-10-24	102	2021-02-18 9:10:24	CA	57164	12	California	99.99	99.99	0.0000	FALSE	10.0
ap-00000-18-9-10-25	174	2021-02-18 9:10:25	CA	104195	12	California	99.99	99.99	0.0000	FALSE	10.0
ap-43020-18-9-10-25	889	2021-02-18 9:10:25	CA	432378	7	California	69.99	69.99	0.0000	FALSE	7.0
ap-09000-17-10-20-18-9-10-25	969	2021-02-18 9:10:25	CA	432378	10	California	79.99	72.77	0.9046	FALSE	12.0
ap-84-18-9-10-25	615	2021-02-18 9:10:25	CA	104196	12	California	99.99	85.97	0.1021	FALSE	3.0
ap-00000-18-9-10-25	770	2021-02-18 9:10:25	CA	461451	6	California	69.99	69.99	0.0000	FALSE	7.0
ap-00000-18-9-10-27	176	2021-02-18 9:10:27	CA	461451	20	California	99.99	99.99	0.0000	FALSE	4.0
ap-4-18-9-10-27	624	2021-02-18 9:10:27	OH	441851	4	Ohio	29.99	29.99	0.0000	TRUE	2.0
ap-00000-18-9-10-28	973	2021-02-18 9:10:28	OH	327365	9	Ohio	109.99	109.99	0.0000	FALSE	8.0
ap-00000-18-9-10-28	188	2021-02-18 9:10:28	OH	327365	29	Ohio	49.99	49.99	0.0000	FALSE	4.0
ap-00000-18-9-10-29	206	2021-02-18 9:10:29	CA	441851	9	California	99.99	99.99	0.0000	FALSE	10.0
ap-00000-18-9-10-30	980	2021-02-18 9:10:30	CA	391142	20	California	129.99	129.99	0.0000	FALSE	13.0
ap-00000-18-9-10-34	389	2021-02-18 9:10:34	OH	552312	19	Ohio	69.99	69.99	0.0000	FALSE	5.0
ap-00000-18-9-10-34	287	2021-02-18 9:10:34	OH	432378	14	Ohio	79.99	79.99	0.0000	FALSE	6.0
ap-00000-18-9-10-34	999	2021-02-18 9:10:34	CA	393912	29	California	129.99	129.99	0.0000	FALSE	13.0
ap-00000-18-9-10-35	960	2021-02-18 9:10:35	CA	432378	4	California	89.99	89.99	0.0000	FALSE	9.0
ap-00000-18-9-10-35	988	2021-02-18 9:10:35	OH	514241	29	Ohio	129.99	129.99	0.0000	FALSE	10.0
ap-00000-18-9-10-36	872	2021-02-18 9:10:36	OH	392769	13	Ohio	119.99	119.99	0.0000	FALSE	8.0
ap-00000-18-9-10-36	436	2021-02-18 9:10:36	OH	900762	3	Ohio	109.99	109.99	0.0000	FALSE	8.0
ap-00000-18-9-10-37	413	2021-02-18 9:10:37	OH	900762	16	Ohio	39.99	39.99	0.0000	FALSE	3.0
ap-00000-18-9-10-37	919	2021-02-18 9:10:37	OH	398349	6	Ohio	99.99	99.99	0.0000	FALSE	4.0
ap-00000-18-9-10-37	166	2021-02-18 9:10:37	CA	900762	16	California	109.99	109.99	0.0000	TRUE	11.0
ap-00000-18-9-10-38	193	2021-02-18 9:10:38	CA	900762	6	California	129.99	129.99	0.0000	TRUE	13.0
ap-00000-18-9-10-38	999	2021-02-18 9:10:38	CA	398389	7	California	129.99	129.99	0.0000	FALSE	13.0
ap-00000-18-9-10-38	980	2021-02-18 9:10:38	CA	392769	7	California	99.99	96.11	0.0448	FALSE	8.0



month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



month	SUM of sales
January	\$1,416
February	\$1,546
March	\$1,595
April	\$1,702
May	\$1,780
June	\$1,857
Grand Total	\$9,895



The cube does the computation

Raw data

OLAP cube

Reporting

purchase_id	purchase_id	sku	state	state	sales_state	unit_price	purchase_price	discount	is_return	tax
ip-21f550a328f05f23aee5c3d7070516	2021-02-18 9 10 24	502	07164	12	California	99.99	99.99	0.0000	FALSE	10.0
ip-069984e91e17704415122e635849	2021-02-18 9 10 25	174	104195	11	California	99.99	99.99	0.0000	FALSE	10.0
ip-43e208a7704f15d93c17a7a7020c	2021-02-18 9 10 25	889	425278	7	California	69.99	69.99	0.0000	FALSE	7.0
ip-59f4e1a7172326186656237a720ae	2021-02-18 9 10 25	969	425278	10	California	79.99	72.77	0.0904	FALSE	12.0
ip-8418ba330a4040156270320a8b3263	2021-02-18 9 10 25	615	104196	12	California	99.99	85.97	0.1021	FALSE	3.0
ip-9b0165a270236260e00e05717617026	2021-02-18 9 10 26	770	461451	6	California	69.99	69.99	0.0000	FALSE	7.0
ip-0c026a32c7878164a033051a0718	2021-02-18 9 10 27	176	461451	20	California	99.99	99.99	0.0000	FALSE	4.0
ip-412eaf32f025d5e09595c9a719a92	2021-02-18 9 10 27	624	441851	4	Ohio	29.99	29.99	0.0000	TRUE	2.0
ip-19c4a94949e9e9e9e9e9e9e9e9e9e9e9	2021-02-18 9 10 28	973	327365	9	Ohio	109.99	109.99	0.0000	FALSE	8.0
ip-03e07f9890a901a07100719231909f	2021-02-18 9 10 29	188	327365	29	Ohio	49.99	49.99	0.0000	FALSE	4.0
ip-174c01601021a021a021a021a021a021	2021-02-18 9 10 29	206	441851	9	California	99.99	99.99	0.0000	FALSE	10.0
ip-571c7e1a9b1-3045-4042-4043-4043-4043	2021-02-18 9 10 30	980	391142	20	California	129.99	129.99	0.0000	FALSE	13.0
ip-43b3701011a011a011a011a011a011a01	2021-02-18 9 10 34	389	102112	19	Ohio	69.99	69.99	0.0000	FALSE	5.0
ip-8b004848f1575d40e245282nd2	2021-02-18 9 10 34	287	425278	14	Ohio	79.99	79.99	0.0000	FALSE	6.0
ip-4d7112a4020202020202020202020202	2021-02-18 9 10 34	999	393912	29	California	129.99	129.99	0.0000	FALSE	10.0
ip-40320997914e420997912281661	2021-02-18 9 10 35	960	425278	4	California	89.99	89.99	0.0000	FALSE	9.0
ip-281762c120e4371e044-04018226405	2021-02-18 9 10 36	989	154241	29	Ohio	129.99	129.99	0.0000	FALSE	10.0
ip-4304099991940409999194119409999	2021-02-18 9 10 36	872	392769	13	Ohio	119.99	119.99	0.0000	FALSE	8.0
ip-4a0950a075009100a09100a09100a09100	2021-02-18 9 10 36	436	900762	3	Ohio	109.99	109.99	0.0000	FALSE	6.0
ip-4a0950a075009100a09100a09100a09100	2021-02-18 9 10 37	413	900762	16	Ohio	39.99	39.99	0.0000	FALSE	3.0
ip-4d9199a154179a0a0a17914a0a199255	2021-02-18 9 10 37	919	398349	6	Ohio	99.99	99.99	0.0000	FALSE	4.0
ip-4d9199a154179a0a0a17914a0a199255	2021-02-18 9 10 37	166	900762	16	California	109.99	109.99	0.0000	TRUE	11.0
ip-8b19a0c2a719b2a0a0a719b2a0a0a719b2	2021-02-18 9 10 38	193	600762	6	California	129.99	129.99	0.0000	TRUE	13.0
ip-4271700a0c2a719b2a0a0a719b2a0a0a719b2	2021-02-18 9 10 38	969	399399	7	California	129.99	129.99	0.0000	FALSE	10.0
ip-5165c1a0f5016511716411700a7a	2021-02-18 9 10 38	890	392769	9	California	99.99	86.11	0.0448	FALSE	8.0



month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945



People can ask lots of questions quickly

month	state	sales
January	California	\$1,217
January	Ohio	\$312
February	California	\$1,292
February	Ohio	\$323
March	California	\$1,321
March	Ohio	\$347
April	California	\$1,327
April	Ohio	\$422
May	California	\$1,411
May	Ohio	\$480
June	California	\$1,494
June	Ohio	\$528

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

month	state	store	sales	items_sold
January	California	1	\$1,205	24
February	California	1	\$1,346	11
March	California	1	\$1,253	18
April	California	1	\$1,184	28
May	California	1	\$1,337	17
June	California	1	\$1,245	11
January	California	2	\$1,426	26
February	California	2	\$1,275	26
March	California	2	\$1,036	30
April	California	2	\$1,357	22
May	California	2	\$1,246	17
June	California	2	\$1,074	23
January	California	3	\$1,070	12
February	California	3	\$1,480	29
March	California	3	\$1,374	20
April	California	3	\$1,105	26
May	California	3	\$1,425	18
June	California	3	\$1,205	25
January	Ohio	52	\$390	8
February	Ohio	52	\$461	3
March	Ohio	52	\$428	7
April	Ohio	52	\$420	13
May	Ohio	52	\$425	14
June	Ohio	52	\$435	8
January	Ohio	84	\$381	3
February	Ohio	84	\$487	5
March	Ohio	84	\$421	5
April	Ohio	84	\$528	12

In 1999...

In 1999...

4,597

sets

In 1999...



4,597

sets

x

50

states

In 1999...

4,597

sets

x

50

states

x

52

weeks

In 1999...

11,952,200

combinations





People can answer questions quickly



People can answer questions quickly



Metrics are computed consistently



People can answer questions quickly



Metrics are computed consistently



Everything has to be pre-computed



People can answer questions quickly



Metrics are computed consistently



Everything has to be pre-computed



OLAP cubes are unintuitive to use

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



How many bricks did we sell?!?



What is our revenue?!?



What is our revenue...
by week?!?



What is our revenue...
by week...
by set theme?!?



What is our revenue...
by week...
by set theme...
in Europe?!?



Get me a
metric!!

An iceberg floating in the ocean. The tip of the iceberg is above the water line, and the much larger base is submerged. The sky is blue with light clouds, and the water is a deep blue. The iceberg is white and blue, with some shadows. The text labels are overlaid on the image in semi-transparent boxes.

Revenue

**Salesforce
opportunity**

Stripe logs

**Date sales are
recognized**

Tax adjustment

Return policy

**CSV from Janice
in Accounting**

Get me a list of stores!



Get me a list of stores!

With details on their
location and hours!



Get me a list of stores!

With details on their
location and hours!

And data about sales
and operating costs!



Get me
a list of
entities!!



month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
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March	Ohio	\$347	6
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May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

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 - Overview
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 - Page 1
- Opportunity Analysis
 - Stages
 - Pipeline by Sales Rep
 - Top and Bottom Accounts
 - Accounts Info
- Sales Rep Performance
 - Rankings and KPIs
- Product Performance
 - Revenue/Profitability Trends
 - Pipeline by Product Category

DATASETS

All

- Dummyoffice
 - In memory
 - Category
 - Customer
 - Customer City
 - Customer Latitude
 - Customer Longitude
 - Customer State
 - Customer Zipcode
 - Day
 - Day (Month of Year)
 - Day (Month)
 - Day (Year)
 - Item
 - Metrics
 - Subcategory
 - Year
 - % Change Units Sold
 - % Units Sold by Category
 - Avg (Last Year Margin)
 - Avg (Profit Margin)
 - Avg (Promo Rate)
 - Avg Cost Per Unit
 - Avg Price Per Unit
 - Cost Per Unit
 - Last Year Margin
 - Last Year's Cost
 - Last Year's Profit
 - Last Year's Profit Margin
 - Last Year's Revenue
 - Last Year's Units Sold
 - Order Count
 - Price Per Unit
 - Profit
 - Profit Growth

EDITOR

What is the % Total O...

Vertical

- % Total Opport...

Horizontal

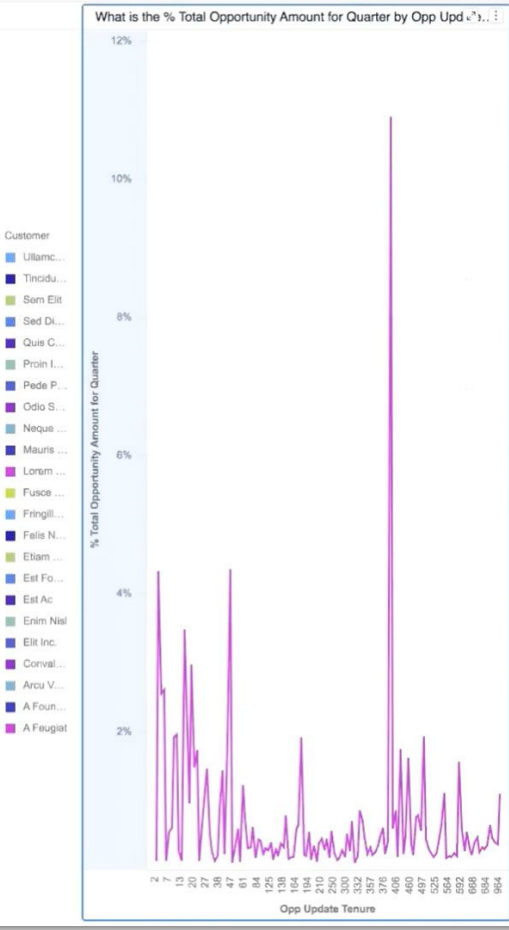
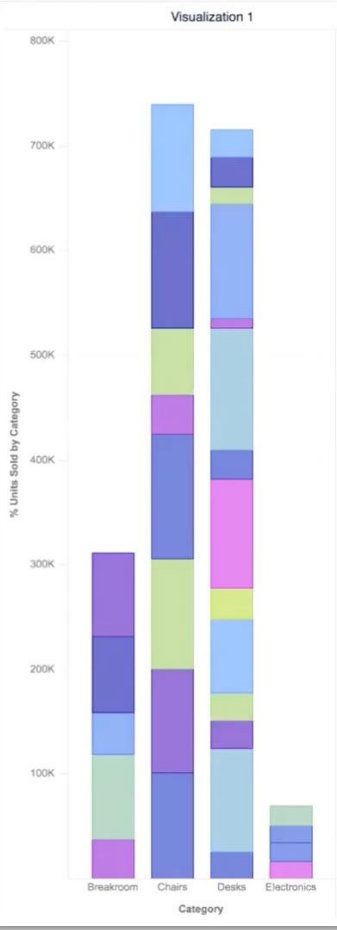
- Opp Update Te...

Color By

Break By

Size By

Tooltip



GALLERY

Built-in

- 8123
- Chart icons: bar, line, pie, map, etc.

Custom

- Chart icons: bar, line, pie, map, etc.

CONTENTS

- 4 Chapters
10 Pages
- ▼ **Summary**
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DATASETS

All

- ▼ DUmmyoffice
 - In memory
 - Category
 - Customer
 - Customer City
 - Customer Latitude
 - Customer Longitude
 - Customer State
 - Customer Zipcode
 - Day
 - Day (Month of Year)
 - Day (Month)
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 - Avg (Promo Rate)
 - Avg Cost Per Unit
 - Avg Price Per Unit
 - Cost Per Unit
 - Last Year Margin
 - Last Year's Cost
 - Last Year's Profit
 - Last Year's Profit Margin
 - Last Year's Revenue
 - Last Year's Units Sold
 - Order Count
 - Price Per Unit
 - Profit
 - Profit Growth

EDITOR

What is the % Total O...

Vertical

- % Total Opport...

Horizontal

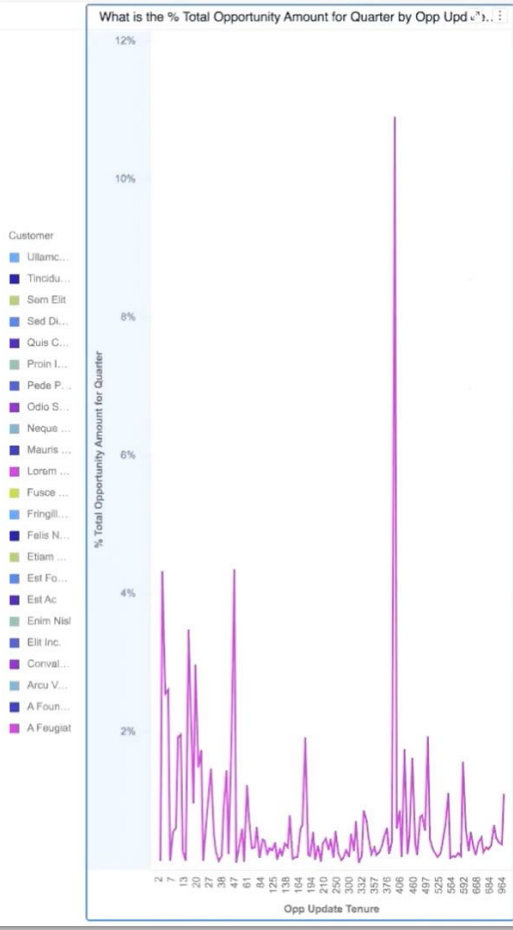
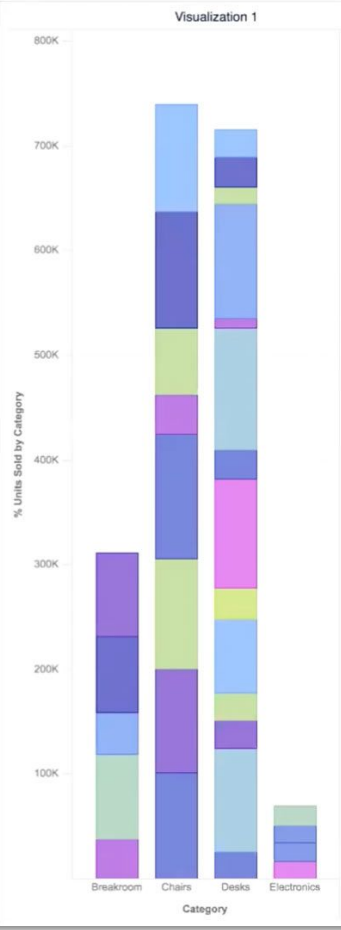
- Opp Update Te...

Color By

Break By

Size By

Tooltip



GALLERY

Built-in

- 8123
- Chart icons: bar, line, pie, area, etc.

Custom

- Chart icons: bar, line, pie, area, etc.

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 - Rankings and KPIs
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 - Revenue/Profitability Trends
 - Pipeline by Product Category

DATASETS

All

- Dummyoffice (In memory)
 - Category
 - Customer**
 - Customer City
 - Customer Latitude
 - Customer Longitude
 - Customer State
 - Customer Zipcode
 - Day**
 - Day (Month of Year)
 - Day (Month)
 - Day (Year)
 - Item
 - Metrics
 - Subcategory
 - Year
 - % Change Units Sold
 - % Units Sold by Category
 - Avg (Last Year Margin)
 - Avg (Profit Margin)
 - Avg (Promo Rate)
 - Avg Cost Per Unit
 - Avg Price Per Unit
 - Cost Per Unit
 - Last Year Margin
 - Last Year's Cost
 - Last Year's Profit
 - Last Year's Profit Margin
 - Last Year's Revenue
 - Last Year's Units Sold
 - Order Count
 - Price Per Unit
 - Profit
 - Profit Growth

EDITOR

What is the % Total O...

Vertical

- % Total Opport...

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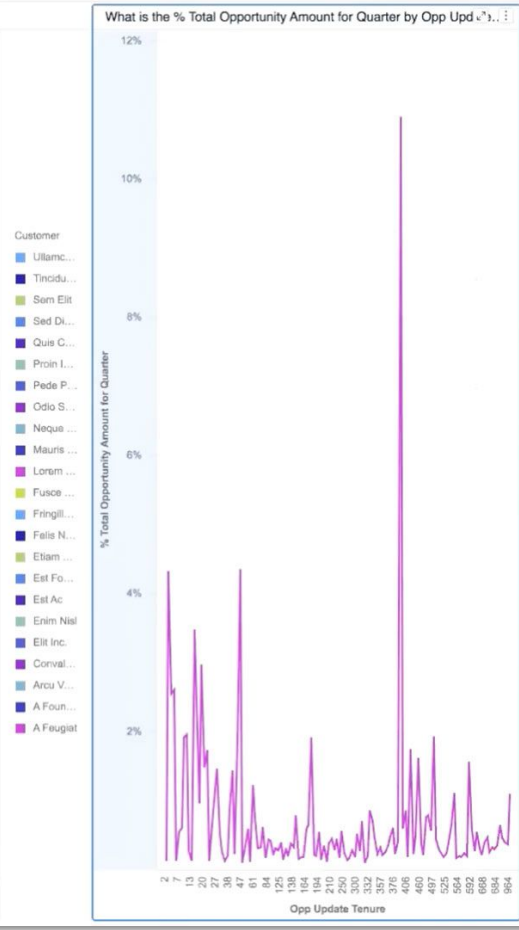
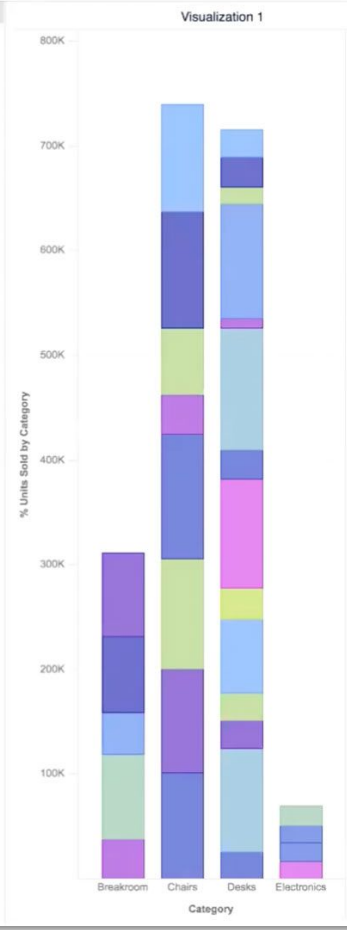
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Color By

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Tooltip



GALLERY

Built-in

- 9123
- Various chart and table icons

Custom

- Various chart and table icons

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DATASETS

All

- ▼ DUMMYoffice
 - In memory
 - ◆ Category
 - ◆ Customer
 - ◆ Customer City
 - ◆ Customer Latitude
 - ◆ Customer Longitude
 - ◆ Customer State
 - ◆ Customer Zipcode
 - ◆ Day
 - ◆ Day (Month of Year)
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 - ◆ Avg (Promo Rate)
 - ◆ Avg Cost Per Unit
 - ◆ Avg Price Per Unit
 - ◆ Cost Per Unit
 - ◆ Last Year Margin
 - ◆ Last Year's Cost
 - ◆ Last Year's Profit
 - ◆ Last Year's Profit Margin
 - ◆ Last Year's Revenue
 - ◆ Last Year's Units Sold
 - ◆ Order Count
 - ◆ Price Per Unit
 - ◆ Profit
 - ◆ Profit Growth

EDITOR

What is the % Total O...

Vertical

- fx % Total Opport...

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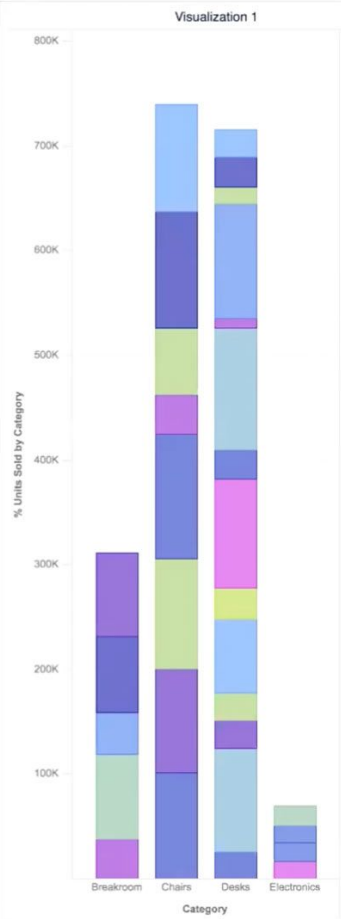
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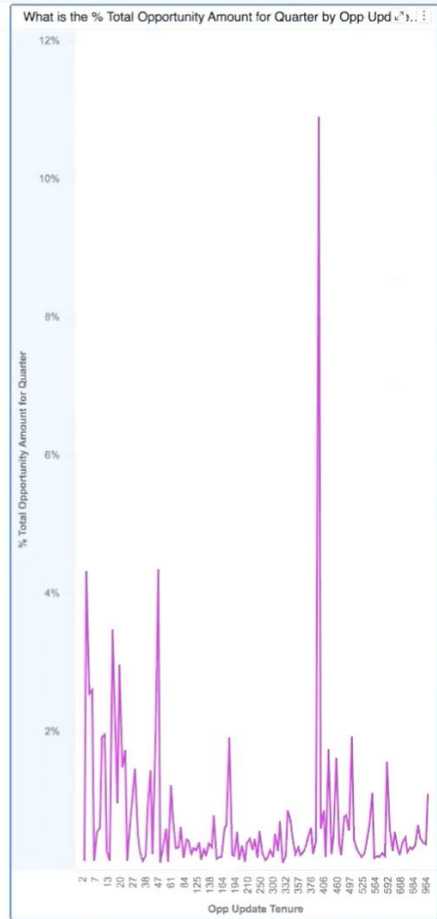
Size By

Tooltip



Customer

- Ullamc...
- Tincidu...
- Sem Elit
- Quis C...
- Proin I...
- Pede P...
- Odio S...
- Neque ...
- Mauris ...
- Lorem ...
- Fusce ...
- Fringill...
- Felis N...
- Etiam ...
- Est Fo...
- Est Ac
- Enim Nisl
- Elit Inc.
- Conval...
- Arcu V...
- A Foun...
- A Feugiat



GALLERY

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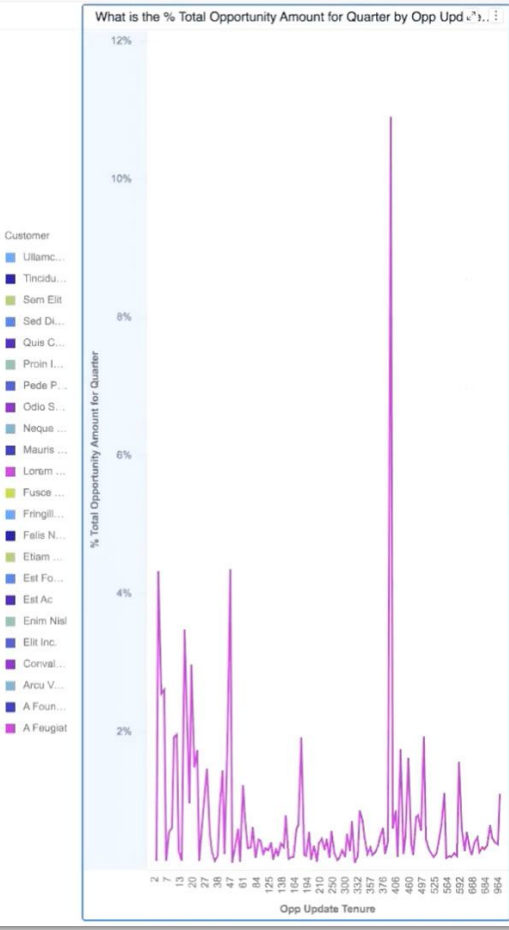
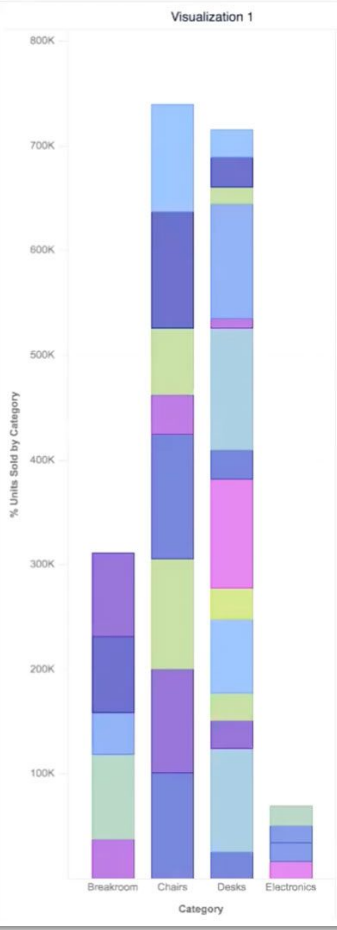
- Opp Update Te...

Color By

Break By

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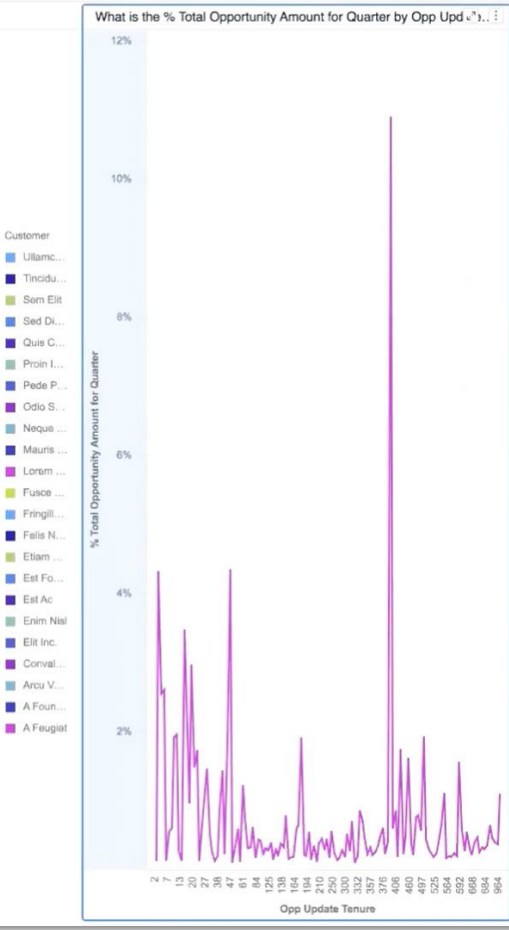
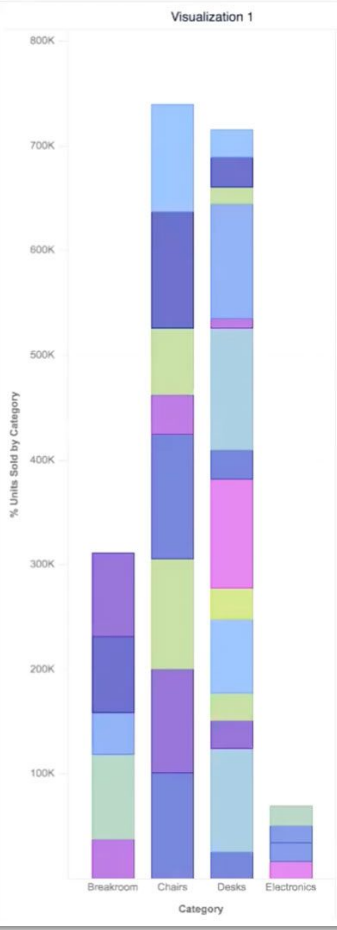
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Color By

Break By

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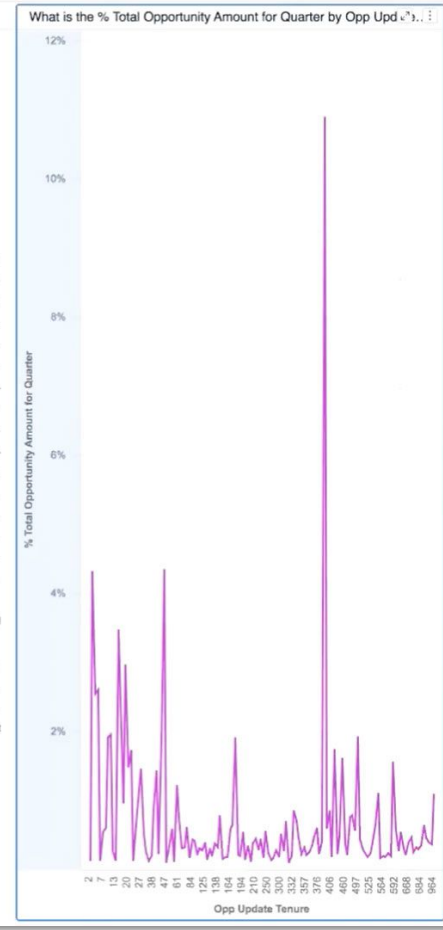
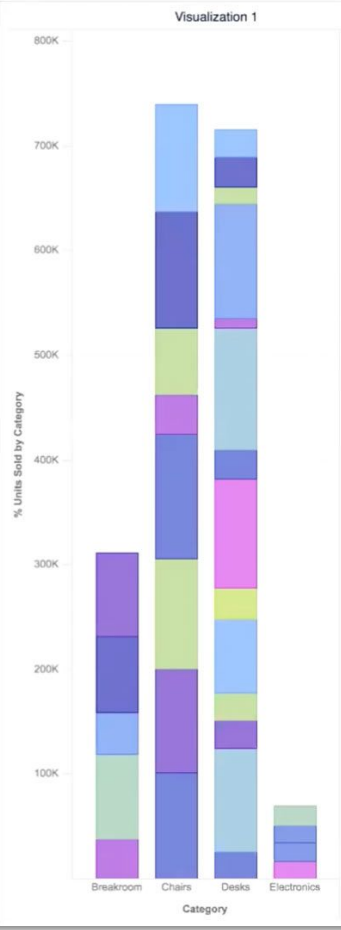
- Opp Update Te...

Color By

Break By

Size By

Tooltip



GALLERY

Built-in

- 8123
- Chart icons

Custom

- Chart icons

Raw data

purchase_id	purchase_id	sku	state	state	store_id	store_name	last_price	purchase_price	discount	is_return	tax
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ip06994e491e1710441122e43583493	2021-02-18 9 10 25	174	104195	12	California	99.99	99.99	0.0000	FALSE	10.0	
ip43e202ba7704f154f93c17a7a7020c	2021-02-18 9 10 25	889	423278	7	California	69.99	69.99	0.0000	FALSE	7.0	
ip43994a1712261846656237a702a6	2021-02-18 9 10 25	909	423278	10	California	79.99	72.77	0.0946	FALSE	12.0	
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ip49b0166a12023618000000007176170269	2021-02-18 9 10 26	770	404351	6	California	69.99	69.99	0.0000	FALSE	7.0	
ip40026a32c78874640033001a0718	2021-02-18 9 10 27	176	404351	20	California	99.99	99.99	0.0000	FALSE	4.0	
ip4132eaf3025025025025025025025025	2021-02-18 9 10 27	024	441851	4	Ohio	29.99	29.99	0.0000	TRUE	2.4	
ip430c4a94180e0e0e0e0e0e0e0e0e0e0e	2021-02-18 9 10 28	973	327365	9	Ohio	109.99	109.99	0.0000	FALSE	8.8	
ip430e07f80e0e0e0e0e0e0e0e0e0e0e0e	2021-02-18 9 10 29	188	327365	29	Ohio	49.99	49.99	0.0000	FALSE	4.0	
ip4714c4a91001e0e0e0e0e0e0e0e0e0e0e	2021-02-18 9 10 29	206	441851	9	California	99.99	99.99	0.0000	FALSE	10.0	
ip5701e7e1a9b1-3045-4042-0a093194945a	2021-02-18 9 10 30	980	391142	20	California	129.99	129.99	0.0000	FALSE	13.0	
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ip4071012a0000000000000000000000000001	2021-02-18 9 10 34	999	393912	29	California	129.99	129.99	0.0000	FALSE	13.0	
ip403200007944e439900712281661	2021-02-18 9 10 35	900	423278	4	California	89.99	89.99	0.0000	FALSE	9.0	
ip28792c120e4371e044-0a0182036405	2021-02-18 9 10 36	988	154241	29	Ohio	129.99	129.99	0.0000	FALSE	10.4	
ip4300000000000000000000000000000000000000	2021-02-18 9 10 36	872	392769	13	Ohio	119.99	119.99	0.0000	FALSE	9.8	
ip4000000000000000000000000000000000000000	2021-02-18 9 10 36	436	900712	3	Ohio	109.99	109.99	0.0000	FALSE	8.8	
ip4000000000000000000000000000000000000000	2021-02-18 9 10 37	413	900712	16	Ohio	39.99	39.99	0.0000	FALSE	3.1	
ip40190a104170a0a0a178140a119835	2021-02-18 9 10 37	910	398349	6	Ohio	99.99	99.99	0.0000	FALSE	4.8	
ip4000000000000000000000000000000000000000	2021-02-18 9 10 37	166	900712	10	California	109.99	109.99	0.0000	TRUE	11.0	
ip40190a104170a0a0a178140a119835	2021-02-18 9 10 38	193	600712	6	California	129.99	129.99	0.0000	TRUE	13.0	
ip4027190a104170a0a0a178140a119835	2021-02-18 9 10 38	909	398349	7	California	129.99	129.99	0.0000	FALSE	13.0	
ip40190a104170a0a0a178140a119835	2021-02-18 9 10 38	980	392769	7	California	99.99	99.99	0.0048	FALSE	8.8	

OLAP cube

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

Reporting

state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945



OLAP cubes are hard to understand



Amazon Redshift



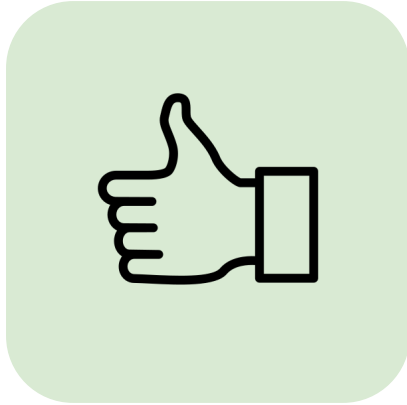
Google
BigQuery



Today...

11,952,200

combinations



Today...

200,000,000

transactions



Raw data

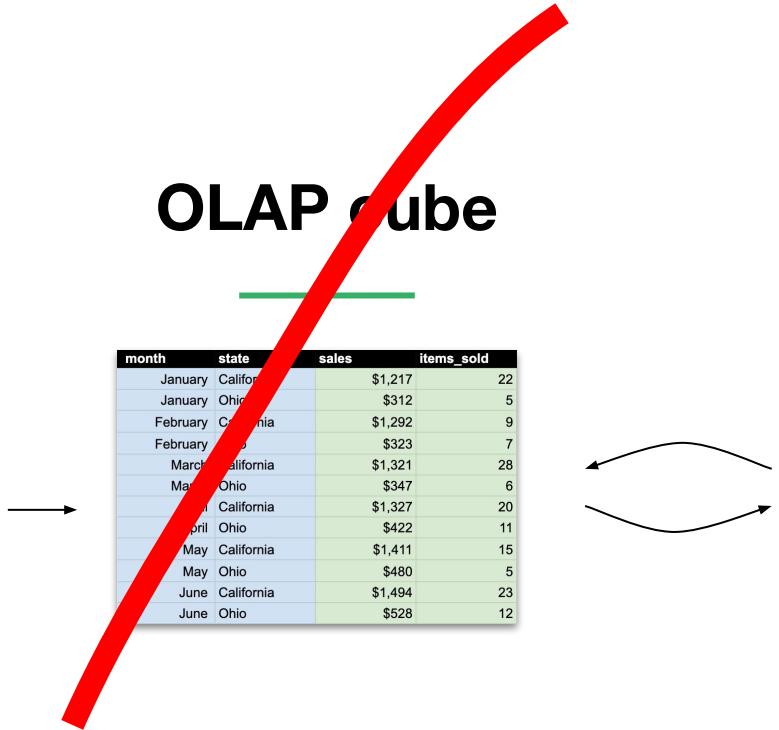
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ep06964a91e1721e441522e6358493	2021-02-18 9 10 25	174	104195	11	California	99.99	99.99	0.0000	FALSE	10.0
ep43e28a8a7704f15d9f9c17a7a902ac	2021-02-18 9 10 25	889	423278	7	California	69.99	69.99	0.0000	FALSE	7.0
ep1994ea17122618a6656217a7c2a6e	2021-02-18 9 10 25	909	423278	10	California	79.99	72.77	0.0864	FALSE	12.0
ep8418ba330a404019c072032a8b3263	2021-02-18 9 10 25	615	104196	12	California	39.99	35.97	0.1021	FALSE	3.0
ep9b0166a120236a00e0e0978176a10a9	2021-02-18 9 10 26	770	461461	6	California	69.99	69.99	0.0000	FALSE	7.0
ep0038a9c2c57887846a033051a0f18	2021-02-18 9 10 27	176	461461	20	California	39.99	39.99	0.0000	FALSE	4.0
ep4132ea73025d5e0a959c5a9f19a9c7	2021-02-18 9 10 27	624	441861	4	Ohio	29.99	29.99	0.0000	TRUE	2.0
ep19c4a94818e9e0e0e0e0e0e0e0e0e0e0	2021-02-18 9 10 28	973	327365	9	Ohio	109.99	109.99	0.0000	FALSE	8.0
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ep174c01601e0e0e0e0e0e0e0e0e0e0e0e	2021-02-18 9 10 29	206	441861	9	California	99.99	99.99	0.0000	FALSE	10.0
ep57d7e1a9b1-3915-4042-40a93194914a	2021-02-18 9 10 30	980	391142	20	California	129.99	129.99	0.0000	FALSE	13.0
ep1a070101e11a0711a0c0a0a0a0a0a0a0	2021-02-18 9 10 34	389	502312	19	Ohio	69.99	69.99	0.0000	FALSE	5.0
ep880a4a8a0f1a70a0a0a0a0a0a0a0a0a0	2021-02-18 9 10 34	287	423278	14	Ohio	79.99	79.99	0.0000	FALSE	6.0
ep4d7112a4a0a0a0a0a0a0a0a0a0a0a0a0	2021-02-18 9 10 34	995	393912	29	California	129.99	129.99	0.0000	FALSE	10.0
ep4e32a099791a4e32a099791a4e32a09979	2021-02-18 9 10 35	960	423278	4	California	89.99	89.99	0.0000	FALSE	9.0
ep2716c2a120e4371e04a0a0a0a0a0a0a0	2021-02-18 9 10 36	988	514241	25	Ohio	129.99	129.99	0.0000	FALSE	10.0
ep430a0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9 10 36	872	392769	13	Ohio	119.99	119.99	0.0000	FALSE	8.0
ep4a0e0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9 10 36	436	900762	3	Ohio	109.99	109.99	0.0000	FALSE	8.0
ep4a0e0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9 10 37	413	900762	16	Ohio	39.99	39.99	0.0000	FALSE	3.0
ep4d919a0a15417a0a0a0a0a0a0a0a0a0a	2021-02-18 9 10 37	910	398349	6	Ohio	99.99	99.99	0.0000	FALSE	4.0
ep4d919a0a15417a0a0a0a0a0a0a0a0a0a	2021-02-18 9 10 37	169	900762	10	California	109.99	109.99	0.0000	TRUE	11.0
ep8a19a0a0a0a0a0a0a0a0a0a0a0a0a0a0	2021-02-18 9 10 38	193	600762	6	California	129.99	129.99	0.0000	TRUE	13.0
ep42719a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9 10 38	969	399389	7	California	129.99	129.99	0.0000	FALSE	10.0
ep5165c1a0f25c1e174611709a7a7a	2021-02-18 9 10 38	980	392769	7	California	99.99	99.99	0.0000	FALSE	8.0

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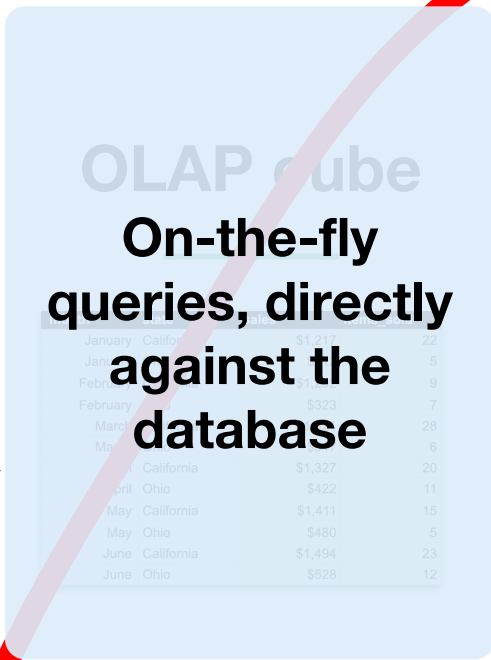
Reporting

state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945



Raw data

purchase_id	purchase_id	date	state	store_id	store_name	total_price	purchase_price_discount	is_return	tax	
ip-21f520a3a205f023ae5c3de370515		2021-02-18 9:10:26	502	57164	12 California	99.99	99.99	0.0000	FALSE	10.0
ip-065964e91e171e441523e635849		2021-02-18 9:10:25	174	104195	12 California	99.99	99.99	0.0000	FALSE	10.0
ip-43e2828a7758f15d93c17a7a920e		2021-02-18 9:10:25	989	423278	7 California	69.99	69.99	0.0000	FALSE	7.0
ip-59f4eae1712318a5656527a720ae		2021-02-18 9:10:25	969	423278	10 California	79.99	72.77	0.0866	FALSE	12.0
ip-8418ba338a34848156270330a83023		2021-02-18 9:10:25	615	104196	12 California	99.99	85.87	0.1021	FALSE	3.0
ip-9b0185a270236a3e66e098719a10205		2021-02-18 9:10:26	770	461461	6 California	99.99	89.99	0.0000	FALSE	7.0
ip-00209a3c25c7881f464d033051aaf18		2021-02-18 9:10:27	176	461461	20 California	99.99	99.99	0.0000	FALSE	4.0
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ip-93c4e94878e9e9e9e9e9e9e9e9e9e9e9		2021-02-18 9:10:28	973	327365	9 Ohio	109.99	109.99	0.0000	FALSE	8.0
ip-03e9f7869a9a9a9a9a9a9a9a9a9a9a9a		2021-02-18 9:10:29	188	327365	29 Ohio	49.99	49.99	0.0000	FALSE	4.0
ip-f74c9f4916e9e9e9e9e9e9e9e9e9e9e9		2021-02-18 9:10:29	206	441851	9 California	99.99	99.99	0.0000	FALSE	10.0
ip57f127e1a9b1-8916-8916-8916-8916198184		2021-02-18 9:10:30	980	391142	20 California	129.99	129.99	0.0000	FALSE	13.0
ip-43b10701211a911f1a2c1a2c1a2c1a2c1a2c		2021-02-18 9:10:34	389	102312	19 Ohio	69.99	69.99	0.0000	FALSE	5.4
ip-8806a48a8f187a5d4a2452a28a2d		2021-02-18 9:10:34	287	423278	14 Ohio	79.99	79.99	0.0000	FALSE	6.4
ip-4d7112aa1e2014738c10351035103510351		2021-02-18 9:10:34	999	393912	29 California	129.99	129.99	0.0000	FALSE	13.0
ip-4e32389397144e1c999597123281661		2021-02-18 9:10:36	980	423278	4 California	89.99	89.99	0.0000	FALSE	9.0
ip281762c120ee43711e64-04e18918236460		2021-02-18 9:10:36	988	154241	29 Ohio	129.99	129.99	0.0000	FALSE	10.4
ip-4e32389397144e1c999597123281661		2021-02-18 9:10:36	872	392769	12 Ohio	119.99	119.99	0.0000	FALSE	9.6
ip-9a9f85a077026f9102a3a3a3a3a3a3a3a3a3		2021-02-18 9:10:36	436	900762	3 Ohio	109.99	109.99	0.0000	FALSE	8.4
ip-48a48e28e28e28e28e28e28e28e28e28e28e		2021-02-18 9:10:37	413	900762	16 Ohio	39.99	39.99	0.0000	FALSE	3.1
ip-4d9198a154178a6a6a178148a19835		2021-02-18 9:10:37	910	398349	6 Ohio	99.99	99.99	0.0000	FALSE	4.8
ip-48f48f48f48f48f48f48f48f48f48f48f48f		2021-02-18 9:10:37	166	900762	16 California	109.99	109.99	0.0000	TRUE	11.0
ip-8c19a3ca27192b33d48198a681759		2021-02-18 9:10:38	193	900762	6 California	129.99	129.99	0.0000	TRUE	13.0
ip-4271790a3d87120a69103011710		2021-02-18 9:10:38	989	398389	7 California	129.99	129.99	0.0000	FALSE	13.0
ip-5165c1aaf726151214211709a7a7a		2021-02-18 9:10:38	989	392769	7 California	99.99	86.11	0.0448	FALSE	8.8



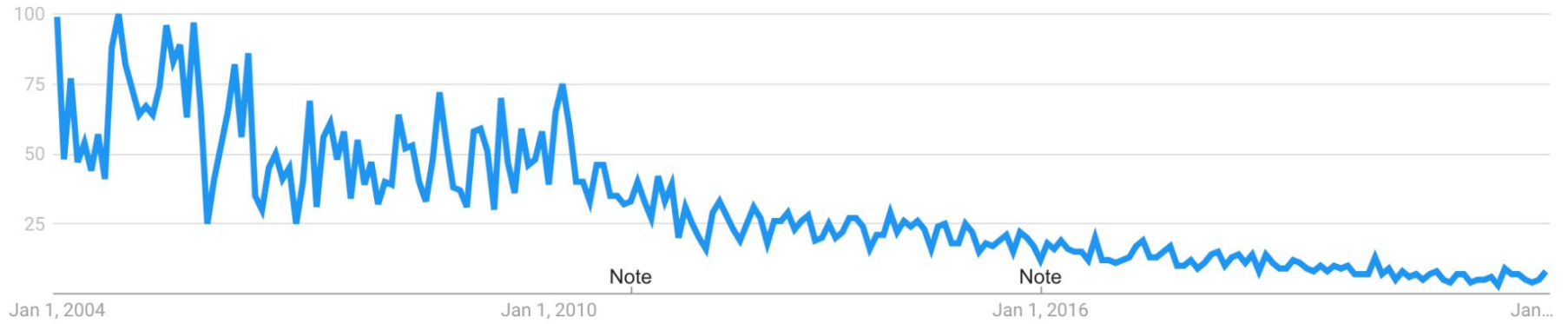
Reporting

state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945

**More like
NOLAP cube, amirite?**



● olap cube



United States. 1/1/04 - 3/20/22. Web Search.



looker

The logo for 'looker' features the word 'looker' in a dark grey, sans-serif font. The two 'o's in 'loo' are replaced by a stylized molecular structure consisting of three purple circles of varying sizes connected by thin white lines. The largest circle is at the bottom, with a medium-sized circle above it to the left, and a smaller circle above that to the right. A thin white line connects the top of the medium circle to the top of the small circle, and another line connects the bottom of the medium circle to the top of the large circle.

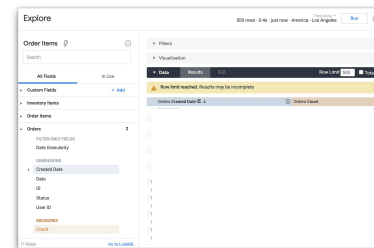
Raw data

order_id	customer_id	order_date	total	items	status	category	amount	quantity	price_per_unit	weight
1	1	2016-09-19 10:24	702	17196	C	Colonia	80.00	0.000	700.00	1.00
2	1	2016-09-19 10:25	274	3426	C	Colonia	80.00	0.000	700.00	1.00
3	1	2016-09-19 10:25	889	45219	C	Colonia	80.00	0.000	700.00	1.00
4	1	2016-09-19 10:25	610	3018	C	Colonia	80.00	0.000	700.00	1.00
5	1	2016-09-19 10:25	81	1016	C	Colonia	80.00	0.000	700.00	1.00
6	1	2016-09-19 10:25	170	45361	C	Colonia	80.00	0.000	700.00	1.00
7	1	2016-09-19 10:27	178	44161	C	Colonia	80.00	0.000	700.00	1.00
8	1	2016-09-19 10:27	624	44161	C	Colonia	20.00	0.000	700.00	1.00
9	1	2016-09-19 10:28	873	37168	C	Colonia	80.00	0.000	700.00	1.00
10	1	2016-09-19 10:29	208	44161	C	Colonia	80.00	0.000	700.00	1.00
11	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
12	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00
13	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
14	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00
15	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
16	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00
17	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
18	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00
19	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
20	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00
21	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
22	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00
23	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
24	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00
25	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
26	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00
27	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
28	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00
29	1	2016-09-19 10:29	305	44161	C	Colonia	80.00	0.000	700.00	1.00
30	1	2016-09-19 10:29	889	44161	C	Colonia	80.00	0.000	700.00	1.00

Data model

```
#####
# FILE: orders.view.sql
# Define the dimensions and measures for the ORDERS view
#
view: orders {
#####
SELECT
  orders.`status` AS `orders.status`,
  `products`.`brand` AS `products.brand`,
  `products`.`category` AS `products.category`
FROM
  `demo_db`.`order_items` AS `order_items`
  LEFT JOIN `demo_db`.`orders` AS `orders` ON `order_items`.`order_id` = `orders`
  `id`
  LEFT JOIN `demo_db`.`inventory_items` AS `inventory_items` ON `order_items`
  `inventory_item_id` = `inventory_items`.`id`
  LEFT JOIN `demo_db`.`products` AS `products` ON `inventory_items`.`product_id` =
  `products`.`id`
GROUP BY
  1,
  2,
  3
#####
set: drill_set {
  fields: [id, created_time, customers.name, amount]
}
```

Reporting



The model transforms requests into SQL queries

Raw data

customer_id	product_id	time	price	unit	customer	product	quantity	order_status	product_status	category	unit_cost	unit_price
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:24	50	0.5000	F Customer	88.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:25	200	5.0000	F Customer	90.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:26	100	10.0000	F Customer	85.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:27	200	5.0000	F Customer	88.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:28	100	10.0000	F Customer	92.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:29	100	10.0000	F Customer	95.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:30	100	10.0000	F Customer	88.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:31	200	5.0000	F Customer	90.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:32	200	5.0000	F Customer	88.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:33	100	10.0000	F Customer	92.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:34	200	5.0000	F Customer	88.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:35	100	10.0000	F Customer	95.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:36	100	10.0000	F Customer	90.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:37	200	5.0000	F Customer	88.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:38	100	10.0000	F Customer	92.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:39	200	5.0000	F Customer	90.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:40	100	10.0000	F Customer	88.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:41	100	10.0000	F Customer	95.00	0.0000	PAID	100			
00000000000000000000000000000000000000	00000000000000000000000000000000	2017-08-18 15:42	200	5.0000	F Customer	88.00	0.0000	PAID	100			

Data model

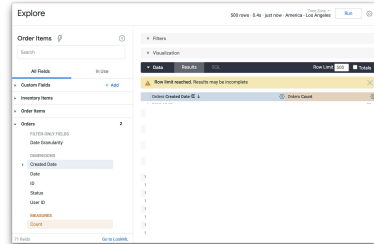
```

#####
# FILE: orders.view.sql
#
# Define the dimensions and measures for the ORDERS view
#
view: orders {
  .....
}

SELECT
  orders.'status' AS 'orders.status',
  products.'brand' AS 'products.brand',
  products.'category' AS 'products.category'
FROM
  'demo_db'.orders_items AS 'order_items'
  LEFT JOIN 'demo_db'.orders AS 'orders' ON 'order_items'.order_id = 'orders'.id
  LEFT JOIN 'demo_db'.inventory_items AS 'inventory_items' ON 'order_items'.inventory_item_id = 'inventory_items'.id
  LEFT JOIN 'demo_db'.products AS 'products' ON 'inventory_items'.product_id = 'products'.id
GROUP BY
  1,
  2,
  3
#####
set: $amount {;
};
set: drill_set {
  field: [id, created_time, customers.name, amount]
};

```

Reporting



The query runs against raw data

Raw data

customer_id	product_id	time	time_id	time_cat	time_name	amount	price	amount	price	category	status
1	1	2017-08-19 12:24	752	17	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:25	754	16:50	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:26	756	16:40	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:27	758	16:30	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:28	760	16:20	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:29	762	16:10	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:30	764	16:00	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:31	766	15:50	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:32	768	15:40	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:33	770	15:30	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:34	772	15:20	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:35	774	15:10	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:36	776	15:00	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:37	778	14:50	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:38	780	14:40	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:39	782	14:30	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:40	784	14:20	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:41	786	14:10	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:42	788	14:00	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:43	790	13:50	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:44	792	13:40	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:45	794	13:30	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:46	796	13:20	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:47	798	13:10	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:48	800	13:00	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:49	802	12:50	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:50	804	12:40	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:51	806	12:30	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:52	808	12:20	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:53	810	12:10	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:54	812	12:00	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:55	814	11:50	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:56	816	11:40	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:57	818	11:30	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:58	820	11:20	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 12:59	822	11:10	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED
1	1	2017-08-19 13:00	824	11:00	17:00	89.00	89.00	0.000	748.00	17	CONFIRMED

Data model

```
#####  
# FILE: orders.view.sql  
#####  
# Define the dimensions and measures for the ORDERS view #  
#####  
view: orders |  
#####  
  
SELECT  
  orders.'status' AS 'orders.status',  
  orders.'brand' AS 'products.brand',  
  products.'category' AS 'products.category'  
FROM  
  'demo_db'.order_items AS 'order_items'  
  LEFT JOIN 'demo_db'.orders AS 'orders' ON 'order_items'.order_id = 'orders'.id  
  LEFT JOIN 'demo_db'.inventory_items AS 'inventory_items' ON 'order_items'.id = 'inventory_items'.id  
  LEFT JOIN 'demo_db'.products AS 'products' ON 'inventory_items'.product_id = 'products'.id  
  
GROUP BY  
  1,  
  2,  
  3  
  
#####  
set: drill_set |  
  fields: [id, created_time, customers.name, amount]  
  }
```

Reporting

Order Items	Date	Status	User ID
1	2017-08-20	CONFIRMED	1
2	2017-08-20	CONFIRMED	1
3	2017-08-21	CONFIRMED	1
4	2017-08-21	CONFIRMED	1
5	2017-08-21	CONFIRMED	1
6	2017-08-21	CONFIRMED	1
7	2017-08-21	CONFIRMED	1
8	2017-08-21	CONFIRMED	1
9	2017-08-21	CONFIRMED	1
10	2017-08-21	CONFIRMED	1
11	2017-08-21	CONFIRMED	1
12	2017-08-21	CONFIRMED	1
13	2017-08-21	CONFIRMED	1
14	2017-08-21	CONFIRMED	1
15	2017-08-21	CONFIRMED	1
16	2017-08-21	CONFIRMED	1
17	2017-08-21	CONFIRMED	1

And results get returned

Raw data

order_id	customer_id	order_date	order_status	order_items	products	categories	amounts
1	1	2012-09-19 12:24	572	17556	17	Coffee	89.56
2	1	2012-09-19 12:25	714	94560	17	Coffee	89.56
3	1	2012-09-19 12:25	889	452179	7	Coffee	89.56
4	1	2012-09-19 12:25	889	452179	11	Coffee	89.56

Data model

```
# FILE: orders.view.sql
# Define the dimensions and measures for the ORDERS view #
view: orders {
  SELECT
  orders.`status` AS `orders.status`,
  products.`brand` AS `products.brand`,
  products.`category` AS `products.category`
FROM
  `demo_db`.`order_items` AS `order_items`
  LEFT JOIN `demo_db`.`orders` AS `orders` ON `order_items`.`order_id` = `orders`.`id`
  LEFT JOIN `demo_db`.`inventory_items` AS `inventory_items` ON `order_items`.`inventory_item_id` = `inventory_items`.`id`
  LEFT JOIN `demo_db`.`products` AS `products` ON `inventory_items`.`product_id` = `products`.`id`
GROUP BY
  1,
  2,
  3
}
set: drill_set {
  fields: [id, created_time, customers.name, amount]
}
```

Reporting

Order Items	Date	Status	User ID
1	2012-09-19	5	1
2	2012-09-19	7	1
3	2012-09-19	5	1
4	2012-09-19	5	1
5	2012-09-19	5	1
6	2012-09-19	5	1
7	2012-09-19	5	1
8	2012-09-19	5	1
9	2012-09-19	5	1
10	2012-09-19	5	1
11	2012-09-19	5	1
12	2012-09-19	5	1
13	2012-09-19	5	1
14	2012-09-19	5	1
15	2012-09-19	5	1
16	2012-09-19	5	1
17	2012-09-19	5	1

Raw data

OLAP cube?

Reporting

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

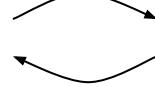


month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



```
#####
# FILE: orders_view.html
# Define the dimensions and measures for the ORDERS view #
#####
view: orders {
  .....
}

SELECT
  'orders','status' AS 'orders.status',
  'products','brand' AS 'products.brand',
  'products','category' AS 'products.category'
FROM
  'demo_db','order_items' AS 'order_items'
LEFT JOIN 'demo_db','orders' ON 'order_items'.order_id = 'orders'
  '.id'
LEFT JOIN 'demo_db','inventory_items' AS 'inventory_items' ON 'order_items'
  '.inventory_item_id' = 'inventory_items'.id
LEFT JOIN 'demo_db','products' AS 'products' ON 'inventory_items'.product_id =
  'products'.id

GROUP BY
  1,
  2,
  3

select sum
sql: $[amount] ;;

set: @all_set
fields: [id, created_time, customers.name, amount]
```



The screenshot shows a reporting tool interface with the following components:

- Filters:** A section for defining filters, currently empty.
- Order Items Table:** A table with columns for Date, Amount, and Customers. It shows a list of data points with dates ranging from 2023-01-20 to 2023-01-26.
- Order Items Table:** A table with columns for Date, Amount, and Customers. It shows a list of data points with dates ranging from 2023-01-20 to 2023-01-26.
- Order Items Table:** A table with columns for Date, Amount, and Customers. It shows a list of data points with dates ranging from 2023-01-20 to 2023-01-26.



+ a b | e a u[®]

Employees+ (Employees DB) (2)

Connection


Live Extract


Filters


0 | Add




Join ✕


Inner


Left


Right


Full Outer

Data Source		Salaries
Employee ID	=	Employee ID (Salaries)

Add new join clause

Show aliases Show hidden fields 31 → rows

#	Employees	Employees	Employees	Employees	Employees	Salaries	Salaries	Salaries	
	Employee ID	Birth Date	Last Name	First Name	Gender	Hire Date	Employee ID (Sala...	Salary	From Date
	1467	4/1/1983	Loui	Bondur	Female	4/1/2007	1467	6,231	4/1/2005
	1492	2/12/1980	Mary	Patterson	Female	2/12/2003	1492	6,177	2/12/2004
	1015	1/24/1987	Yoshimi	Kato	Female	1/24/2010	<i>null</i>	<i>null</i>	<i>null</i>
	1275	1/16/1990	Cindy	Smith	Female	1/16/2015	<i>null</i>	<i>null</i>	<i>null</i>
	1401	1/15/1982	Larry	Bott	Male	1/15/2005	<i>null</i>	<i>null</i>	<i>null</i>
	1237	3/29/1985	Foon Yue	Tseng	Male	3/29/2010	<i>null</i>	<i>null</i>	<i>null</i>
	1071	5/29/1986	William	Patterson	Male	5/29/2010	<i>null</i>	<i>null</i>	<i>null</i>
	1032	3/2/1981	Leslie	Thompson	Female	3/2/2004	<i>null</i>	<i>null</i>	<i>null</i>

Data | Analytics <

Orders+ (Sample - EU Sup...)

Dimensions

- Orders
- Returns
- Country, State, City
- Product Hierarchy
- Measure Names

Measures

- Discount
- Profit
- Quantity
- Sales
- Unit Price
- Latitude (generated)
- Longitude (generated)
- Number of Records
- Measure Values

Pages

Order Date

Filters

Order Date

Marks

Automatic

Color Size Label

Detail Tooltip Shape

SUM(Profit)

Product ID

Columns Segment SUM(Profit)

Rows SUM(Sales)



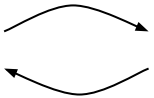
Raw data

OLAP cube?

Reporting

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

month	state	sales	items_sold
January	California	\$1,217	22
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February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
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February	Ohio	\$323	7
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March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

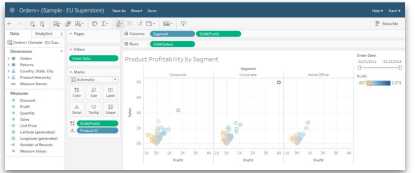
Employees+ (Employees DB) (2)

Connection: Live Extract Filters: Add

Employees

Employee ID Birth Date Last Name First Name Gender Hire Date Employee ID (Date) Salary From Date

1467	4/1/1983	Lual	Banjour	Female	4/1/2007	1467	4/1/2008
1016	1/24/1987	Vigorens	Kato	Female	1/24/2003	1492	6/17/2004
1276	1/16/1990	Cindy	Smith	Female	1/16/2010	null	null
1461	1/15/1982	Larry	Batt	Male	1/15/2005	null	null
1237	3/29/1986	Peon Yue	Tsang	Male	3/29/2010	null	null
1074	6/29/1986	William	Patterson	Male	6/29/2010	null	null
1032	3/2/1982	Leticia	Thompson	Female	3/2/2004	null	null



M **MODE**



Sales - Account Metrics ▶ Account Breakdown ☆

Report ▾ Embed Share Schedule View

Query 1

SQL



▶ Run

Limit 100

Format SQL

View History...

```
1 SELECT us.id AS user_id,
      CASE WHEN p.created_at IS NOT NULL THEN 'complete'
      ELSE 'incomplete' END AS profile_status,
      us.created_at AS started_at,
      p.created_at AS completed_at
FROM {{ @user_accounts AS us }}
LEFT JOIN user_profiles p
  ON p.user_id = user.id
```

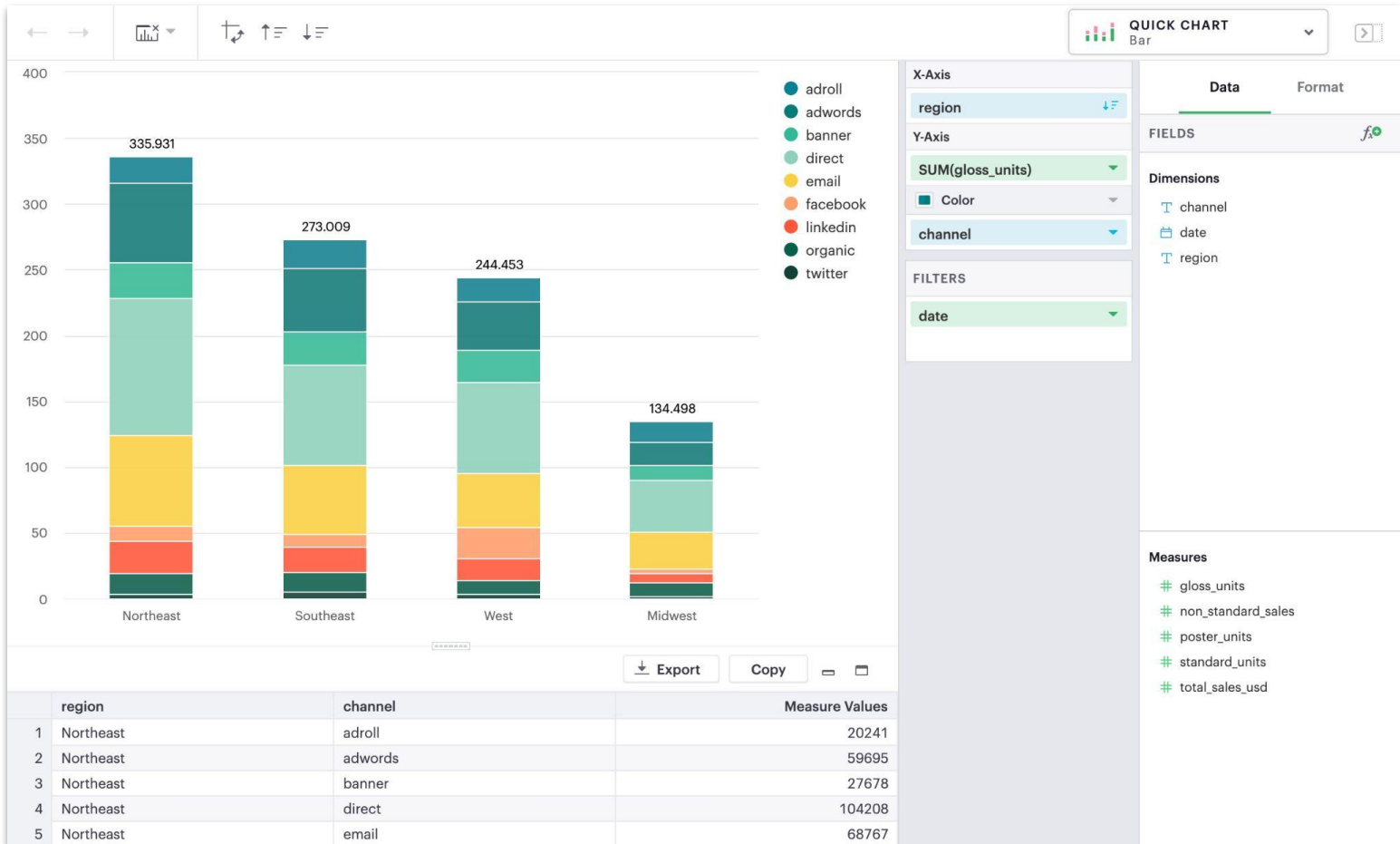
✓ 1,298,420 rows | 9GB returned in 45 seconds



Copy

Add chart





Raw data

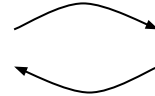
id	month	state	sales	items_sold
1	January	California	\$1,217	22
2	January	Ohio	\$312	5
3	February	California	\$1,292	9
4	February	Ohio	\$323	7
5	March	California	\$1,321	28
6	March	Ohio	\$347	6
7	April	California	\$1,327	20
8	April	Ohio	\$422	11
9	May	California	\$1,411	15
10	May	Ohio	\$480	5
11	June	California	\$1,494	23
12	June	Ohio	\$528	12

OLAP cube?

month	state	sales	items_sold
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May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

Reporting

state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945

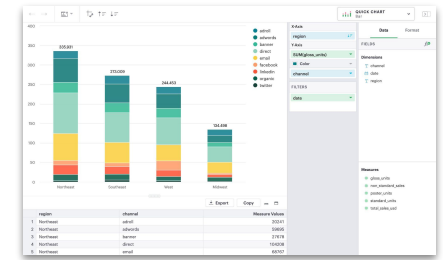
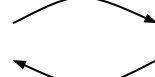


id	month	state	sales	items_sold
1	January	California	\$1,217	22
2	January	Ohio	\$312	5
3	February	California	\$1,292	9
4	February	Ohio	\$323	7
5	March	California	\$1,321	28
6	March	Ohio	\$347	6
7	April	California	\$1,327	20
8	April	Ohio	\$422	11
9	May	California	\$1,411	15
10	May	Ohio	\$480	5
11	June	California	\$1,494	23
12	June	Ohio	\$528	12

```

Query1 | SQL
-- Run | Limit 100 | Refresh Size: Year | History:
1 SELECT user_id AS user_id,
CASE WHEN p_created_at IS NOT NULL THEN 'complete'
ELSE 'incomplete' END AS profile_status,
u_created_at AS started_at,
p_created_at AS completed_at
FROM (( users_profiles ps
ON p.user_id = user_id)

```



 **transform**

`name: organizations`

`description:` This datasource is sourced from the `demo.orgs` table. Each row in this table represents an organization. Each user is associated with an organization. A user can be active with paid or unpaid, has a billing and a usage country, has a role, and each organization can be work, social, or education.

`owners:`

- `support@transformdata.io`

`sql_table: demo.orgs`

`identifiers:`

- `name: org`
 - `type: primary`
 - `expr: org_id`

```
import pandas
from transform import mql

metrics: List[mql.Metric] = mql.list_metrics()

df: pandas.DataFrame = mql.create_query(
    metrics=["rainfall"],
    dimensions=["ds", "country"]
)
```

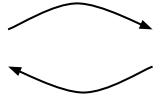

Raw data

OLAP cube?

Reporting

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
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May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



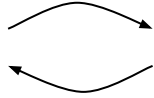
state	AVERAGE of sales
California	\$1,373
Ohio	\$516
Grand Total	\$945

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
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April	Ohio	\$422	11
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May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

```

name: organizations
description: This datasource is sourced from the demo.orgs table. Each row in this table represents an organization. Each user is associated with an organization and can be active with paid or unpaid, has a billing and a usage country, and each organization can be work, social, or education.
owners:
  - support@transformdata.io
sql_table: demo.orgs

identifiers:
  - name: org_id
    type: primary
    expr: org_id
    
```

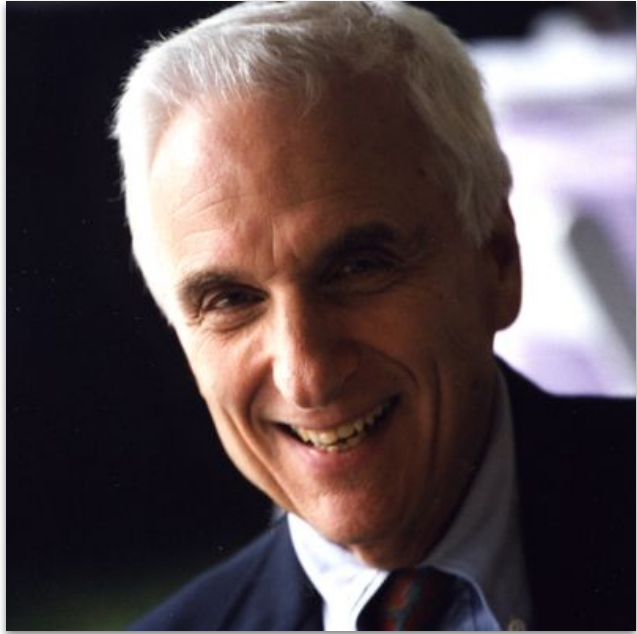


```

import pandas
from transform import mql

metrics: List[mql.Metric] = mql.list_metrics()

df: pandas.DataFrame = mql.create_query(
    metrics=["rainfall", "country"]
)
    
```



**You ship your
org chart.**

month	state	sales
January	California	\$1,217
January	Ohio	\$312
February	California	\$1,292
February	Ohio	\$323
March	California	\$1,321
March	Ohio	\$347
April	California	\$1,327
April	Ohio	\$422
May	California	\$1,411
May	Ohio	\$480
June	California	\$1,494
June	Ohio	\$528

dimensions

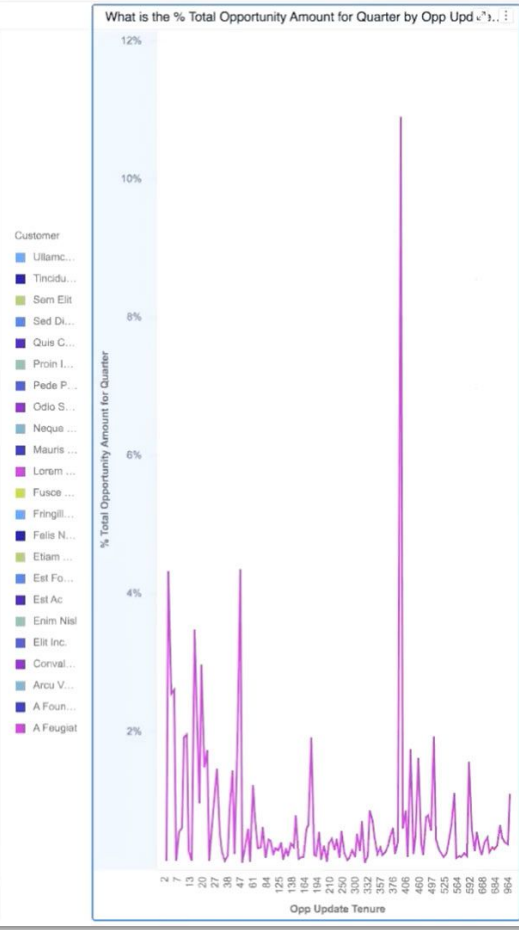
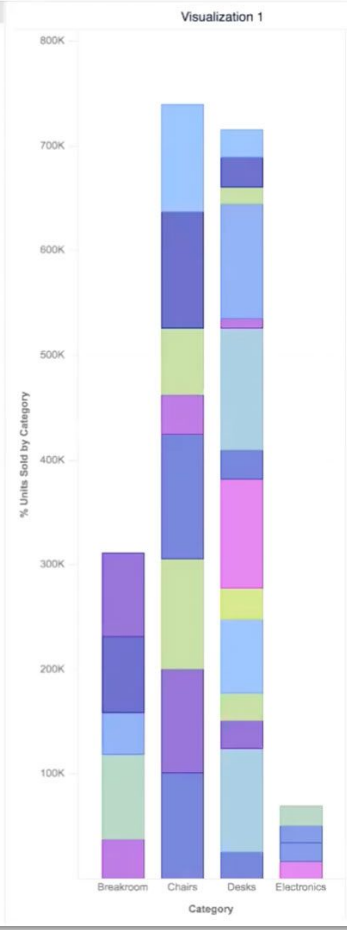
measures

CONTENTS

- 4 Chapters
10 Pages
- Summary**
 - Overview
 - Regional Overview
 - Page 1
- Opportunity Analysis**
 - Stages
 - Pipeline by Sales Rep
 - Top and Bottom Accounts
 - Accounts Info
- Sales Rep Performance**
 - Rankings and KPIs
- Product Performance**
 - Revenue/Profitability Trends
 - Pipeline by Product Category

DATASETS

- Dummyoffice** (In memory)
 - Category
 - Customer
 - Customer City
 - Customer Latitude
 - Customer Longitude
 - Customer State
 - Customer Zipcode
 - Day
 - Day (Month of Year)
 - Day (Month)
 - Day (Year)
 - Item
 - Metrics
 - Subcategory
 - Year
 - % Change Units Sold
 - % Units Sold by Category
 - Avg (Last Year Margin)
 - Avg (Profit Margin)
 - Avg (Promo Rate)
 - Avg Cost Per Unit
 - Avg Price Per Unit
 - Cost Per Unit
 - Last Year Margin
 - Last Year's Cost
 - Last Year's Profit
 - Last Year's Profit Margin
 - Last Year's Revenue
 - Last Year's Units Sold
 - Order Count
 - Price Per Unit
 - Profit



GALLERY

Built-in

- 8123
- Chart icons: bar, line, pie, map, funnel, etc.

Custom

- Chart icons: bar, line, pie, map, funnel, etc.

Explore

500 rows · 0.4s · just now · America - Los Angeles

Time Zone

Run



Order Items



Search

All Fields

In Use

Custom Fields

+ Add

Inventory Items

Order Items

Orders

2

FILTER-ONLY FIELDS

Date Granularity

DIMENSIONS

Created Date

Date

ID

Status

User ID

MEASURES

Count

Filters

Visualization

Data

Results

SQL

Row Limit

500

Totals

Row limit reached. Results may be incomplete

	Orders Created Date	Orders Count
1	2019-12-21	39
2	2019-12-20	51
3	2019-12-19	38
4	2019-12-18	49
5	2019-12-17	45
6	2019-12-16	39
7	2019-12-15	32
8	2019-12-14	38
9	2019-12-13	36
10	2019-12-12	50
11	2019-12-11	45
12	2019-12-10	48
13	2019-12-09	47
14	2019-12-08	48
15	2019-12-07	47
16	2019-12-06	45
17	2019-12-05	52

Data Analytics < Pages

Columns: Segment, SUM(Profit)
Rows: SUM(Sales)

Filters: Order Date

Marks: Automatic

Color, Size, Label, Detail, Tooltip, Shape

SUM(Profit), Product ID

Dimensions

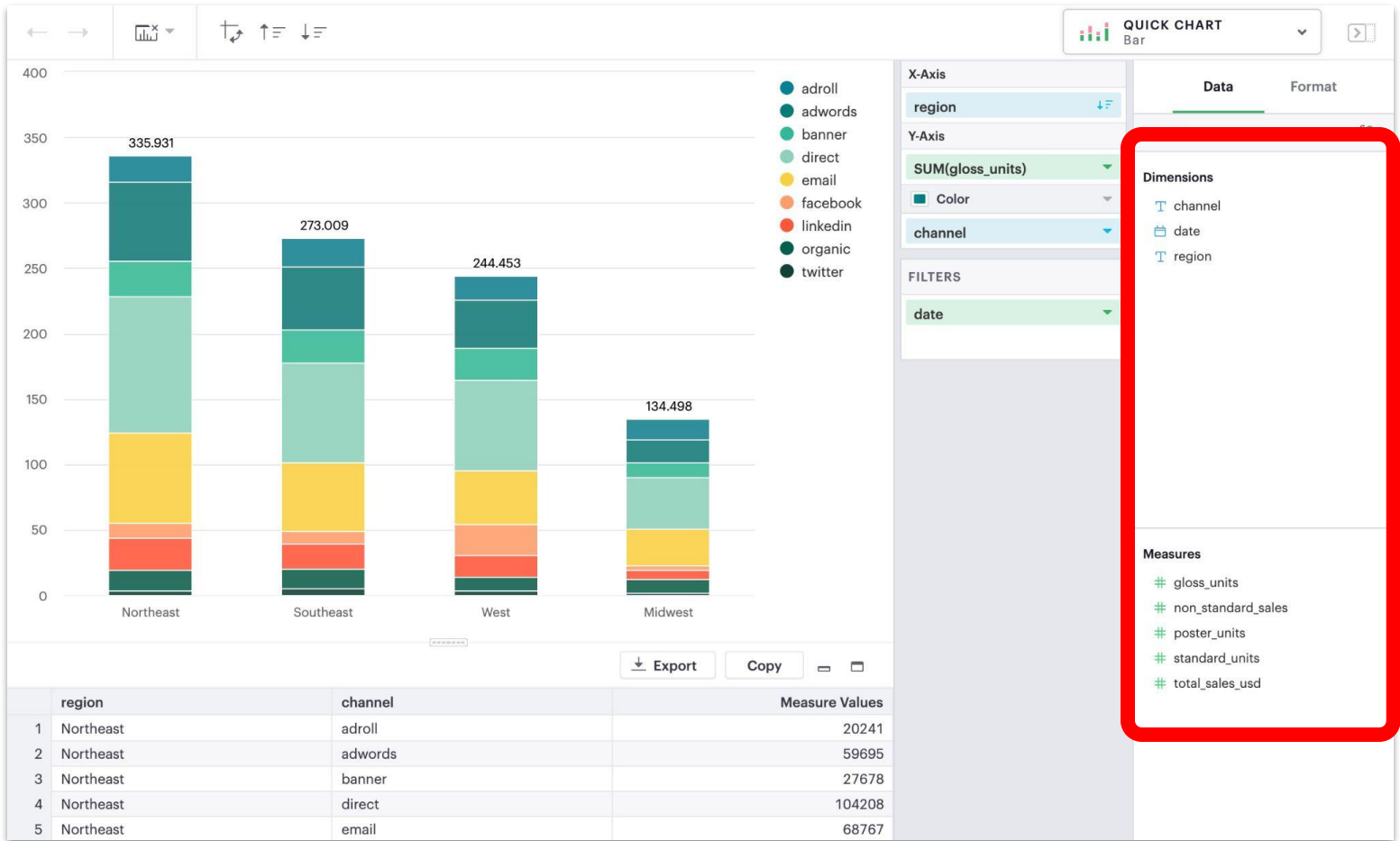
- Orders
- Returns
- Country, State, City
- Product Hierarchy
- Measure Names

Measures

- Discount
- Profit
- Quantity
- Sales
- Unit Price
- Latitude (generated)
- Longitude (generated)
- Number of Records
- Measure Values

Product Profitability by Segment

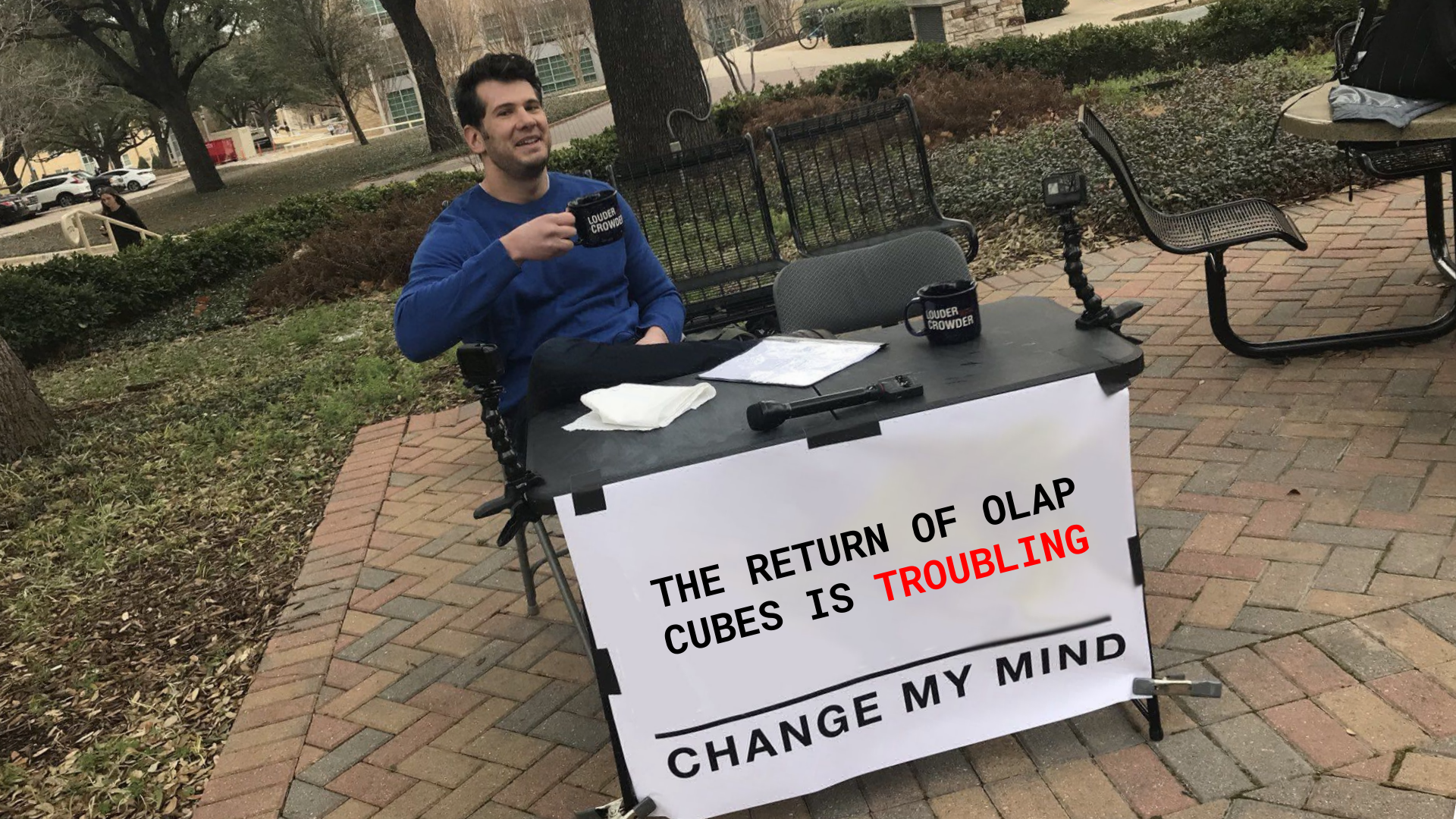




```
import pandas
from transform import mql
```

```
metrics: List[mql.Metric] = mql.list_metrics()
```

```
df: pandas.DataFrame = mql.create_query(
    metrics=["rainfall"],
    dimensions=["ds", "country"]
)
```

THE RETURN OF OLAP
CUBES IS TROUBLING

CHANGE MY MIND

Raw data

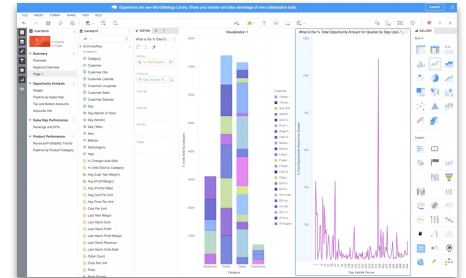
OLAP cube

Reporting

purchase_id	purchase_id	date	state	store_id	store_name	sales	items_sold	purchase_price	discount	is_return	tax
ip-21f550a39250f523ae6532e6703516	2021-02-18 9 10 24	502	57164	12	California	99.95	99.95	0.0000	FALSE	10.0	
ip-06958491471074041123e6358463	2021-02-18 9 10 25	174	104195	12	California	99.95	99.95	0.0000	FALSE	10.0	
ip-43e2828a77046734f93c17a7a7020c	2021-02-18 9 10 25	889	423278	7	California	69.95	69.95	0.0000	FALSE	7.0	
ip-99f4eaa1712326186656527a7320ae	2021-02-18 9 10 25	969	423278	10	California	79.95	12.77	0.9846	FALSE	1.2	
ip-8418ba339a480156073329a8932a3	2021-02-18 9 10 25	615	104196	12	California	99.95	35.87	0.1021	FALSE	3.5	
ip-9b0165a1702326186656527a7320ae	2021-02-18 9 10 25	770	461451	6	California	69.95	69.95	0.0000	FALSE	7.0	
ip-02028a32c789746a8032071a0718	2021-02-18 9 10 27	176	461451	20	California	99.95	99.95	0.0000	FALSE	10.0	
ip-412ae732f02326186656527a7320ae	2021-02-18 9 10 27	624	441851	4	Ohio	29.95	29.95	0.0000	TRUE	2.4	
ip-9c0ca9491902326186656527a7320ae	2021-02-18 9 10 28	973	327565	9	Ohio	109.95	109.95	0.0000	FALSE	8.8	
ip-50e07f9892a9012007192321909f	2021-02-18 9 10 29	188	327565	29	Ohio	49.95	49.95	0.0000	FALSE	4.0	
ip-7f4c0169102326186656527a7320ae	2021-02-18 9 10 29	206	441851	9	California	99.95	99.95	0.0000	FALSE	10.0	
ip-57b7e7e16b9-4945-4945-4945-49454a	2021-02-18 9 10 30	980	391142	20	California	129.95	129.95	0.0000	FALSE	13.0	
ip-43b07a0169102326186656527a7320ae	2021-02-18 9 10 34	389	102112	19	Ohio	69.95	69.95	0.0000	FALSE	5.4	
ip-480648a98f424042424242424242	2021-02-18 9 10 34	287	423278	14	Ohio	79.95	79.95	0.0000	FALSE	6.4	
ip-4d7123a4e02326186656527a7320ae	2021-02-18 9 10 34	999	109112	29	California	129.95	129.95	0.0000	FALSE	13.0	
ip-4e6230997f444230997f444230997f	2021-02-18 9 10 35	960	423278	4	California	89.95	89.95	0.0000	FALSE	9.0	
ip-7076c220e4371684-49421823a605	2021-02-18 9 10 36	989	154241	25	Ohio	129.95	129.95	0.0000	FALSE	10.4	
ip-4304230997f444230997f444230997f	2021-02-18 9 10 36	872	392769	13	Ohio	119.95	119.95	0.0000	FALSE	9.6	
ip-4a92050a770209102326186656527a7320ae	2021-02-18 9 10 36	436	900732	3	Ohio	109.95	109.95	0.0000	FALSE	8.8	
ip-44a404230997f444230997f444230997f	2021-02-18 9 10 37	413	900732	16	Ohio	39.95	39.95	0.0000	FALSE	3.1	
ip-4d9196a154178a4a17814a17814a17814a	2021-02-18 9 10 37	910	398349	6	Ohio	99.95	99.95	0.0000	FALSE	4.8	
ip-484404230997f444230997f444230997f	2021-02-18 9 10 37	166	900732	16	California	109.95	109.95	0.0000	TRUE	11.0	
ip-8b178a02a71782b3b3d4b17814a17814a	2021-02-18 9 10 38	193	900732	9	California	129.95	129.95	0.0000	TRUE	13.0	
ip-427178a02a71782b3b3d4b17814a17814a	2021-02-18 9 10 38	999	398349	7	California	129.95	129.95	0.0000	FALSE	13.0	
ip-5167e1a404230997f444230997f444230997f	2021-02-18 9 10 38	890	392769	7	California	99.95	99.95	0.0048	FALSE	8.8	



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June	Ohio	\$528	12



Raw data

purchase_id	purchase_id	sku	state	store_id	store_name	last_price	purchase_price	discount	is_return	tax
ip-21f520a32a6f0523ae523ca7370516	2021-02-18 10:24	502	57164	12	California	99.99	99.99	0.0000	FALSE	10.0
ip-068984e91e3710441523e635849	2021-02-18 10:25	174	104195	12	California	99.99	99.99	0.0000	FALSE	10.0
ip-43c2c28a7704f34f9317a7a7a02ac	2021-02-18 10:25	889	432378	7	California	69.99	69.99	0.0000	FALSE	7.0
ip-59f4eaa17122816a6565237a732a6	2021-02-18 10:25	969	432378	10	California	79.99	72.77	0.0884	FALSE	12.0
ip-8418ba338a34840156270232a883263	2021-02-18 10:25	615	104196	12	California	99.99	85.97	0.1021	FALSE	3.0
ip-9b0165a27023626e00e097176170295	2021-02-18 10:26	770	461451	6	California	69.99	69.99	0.0000	FALSE	7.0
ip-02026a326578878164a033071a0718	2021-02-18 10:27	176	461451	20	California	99.99	99.99	0.0000	FALSE	4.0
ip-412ea7327023626e00e097176170295	2021-02-18 10:27	624	441851	4	Ohio	29.99	29.99	0.0000	TRUE	2.0
ip-93c94a9494949494949494949494	2021-02-18 10:28	973	327865	9	Ohio	109.99	109.99	0.0000	FALSE	8.0
ip-03e07f8989a9a9a9a9a9a9a9a9a9	2021-02-18 10:29	188	327865	29	Ohio	49.99	49.99	0.0000	FALSE	4.0
ip-174c19c016c016c016c016c016c0	2021-02-18 10:29	206	441851	9	California	99.99	99.99	0.0000	FALSE	10.0
ip-571c7e1a9b1-4915-4915-4915-49154a	2021-02-18 10:30	980	391142	20	California	129.99	129.99	0.0000	FALSE	13.0
ip-1a3b3b3b3b3b3b3b3b3b3b3b3b3b	2021-02-18 10:34	389	102312	19	Ohio	69.99	69.99	0.0000	FALSE	6.0
ip-880a648a8f1474a4a4a4a4a4a4a4a4	2021-02-18 10:34	267	432378	14	Ohio	79.99	79.99	0.0000	FALSE	6.0
ip-4d71717171717171717171717171	2021-02-18 10:34	999	393912	29	California	129.99	129.99	0.0000	FALSE	10.0
ip-46c32699979146c32699979146c326	2021-02-18 10:35	960	432378	4	California	89.99	89.99	0.0000	FALSE	9.0
ip-1297162c129e4371e64-0491823a460	2021-02-18 10:36	988	154241	29	Ohio	129.99	129.99	0.0000	FALSE	10.0
ip-46c32699979146c32699979146c326	2021-02-18 10:36	872	392769	13	Ohio	119.99	119.99	0.0000	FALSE	8.0
ip-4a9e950a750a910a910a910a910a91	2021-02-18 10:36	436	900712	3	Ohio	109.99	109.99	0.0000	FALSE	8.0
ip-4a9e950a750a910a910a910a910a91	2021-02-18 10:37	413	900712	16	Ohio	39.99	39.99	0.0000	FALSE	3.1
ip-4d91591a154178a6a6a6a6a6a6a6a6	2021-02-18 10:37	910	398349	6	Ohio	99.99	99.99	0.0000	FALSE	4.0
ip-4d91591a154178a6a6a6a6a6a6a6a6	2021-02-18 10:37	166	900712	16	California	109.99	109.99	0.0000	TRUE	11.0
ip-8c1f8a3ca27182b3b3b3b3b3b3b3b3	2021-02-18 10:38	193	600782	6	California	129.99	129.99	0.0000	TRUE	13.0
ip-4d217910a327182b3b3b3b3b3b3b3b	2021-02-18 10:38	969	398349	7	California	129.99	129.99	0.0000	FALSE	10.0
ip-21f520a32a6f0523ae523ca7370516	2021-02-18 10:38	980	392769	7	California	99.99	96.11	0.0448	FALSE	8.0



OLAP cube

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

Reporting



Raw data

purchase_id	purchase_id	sku	state	store_id	store_name	last_price	purchase_price	discount	is_return	tax
ip-21f550a32a05f0232ee523c0a703516	2021-02-18 9 10 24	502	07164	12	California	99.99	99.99	0.0000	FALSE	10.0
ip-069584e914710441522e035b3463	2021-02-18 9 10 25	174	104195	12	California	99.99	99.99	0.0000	FALSE	10.0
ip-43c202ba7704f15d93c17a7a7d02c	2021-02-18 9 10 25	889	423278	7	California	69.99	69.99	0.0000	FALSE	7.0
ip-59f4eac171220a56a5652a710720ae	2021-02-18 9 10 25	909	423278	10	California	79.99	72.77	0.0946	FALSE	12.0
ip-8418ba330a340401560720320a8b323	2021-02-18 9 10 25	615	104196	12	California	99.99	85.97	0.1021	FALSE	3.0
ip-9b0160a270230a000e0907176170205	2021-02-18 9 10 26	770	461451	6	California	69.99	69.99	0.0000	FALSE	7.0
ip-02026a32c37881746a03001a071a018	2021-02-18 9 10 27	176	461451	20	California	99.99	99.99	0.0000	FALSE	4.0
ip-412eaf1023f5d5e0a959e5c0a719a92	2021-02-18 9 10 27	624	441851	4	Ohio	29.99	29.99	0.0000	TRUE	2.0
ip-93c0a49478e0e0e0e0e0e0e0e0e0e0e	2021-02-18 9 10 28	973	327365	9	Ohio	109.99	109.99	0.0000	FALSE	8.0
ip-03e07f800a0a0a0a0a0a0a0a0a0a0a0	2021-02-18 9 10 29	188	327365	29	Ohio	49.99	49.99	0.0000	FALSE	4.0
ip-714c0a01001a0a0a0a0a0a0a0a0a0a0	2021-02-18 9 10 29	206	441851	9	California	99.99	99.99	0.0000	FALSE	10.0
ip-571e7e1a0b1-8045-404c-2a09319494a	2021-02-18 9 10 30	980	391142	20	California	129.99	129.99	0.0000	FALSE	13.0
ip-43b010a0171a0171a0171a0171a0171	2021-02-18 9 10 34	389	102312	19	Ohio	69.99	69.99	0.0000	FALSE	6.0
ip-880a648a0f147a0a0a0a0a0a0a0a0a0	2021-02-18 9 10 34	287	423278	14	Ohio	79.99	79.99	0.0000	FALSE	6.0
ip-4d7112a4a00000143001001001001001	2021-02-18 9 10 34	909	393912	29	California	129.99	129.99	0.0000	FALSE	10.0
ip-46320a0097914a0a00990712200001	2021-02-18 9 10 35	900	423278	4	California	89.99	89.99	0.0000	FALSE	9.0
ip-27162c120e43711e04-0018020a00	2021-02-18 9 10 36	989	154241	25	Ohio	129.99	129.99	0.0000	FALSE	10.0
ip-46320a0097914a0a00990712200001	2021-02-18 9 10 36	872	392769	13	Ohio	119.99	119.99	0.0000	FALSE	8.0
ip-4a0000070001001001001001001001	2021-02-18 9 10 36	436	900712	3	Ohio	109.99	109.99	0.0000	FALSE	8.0
ip-4a0000070001001001001001001001	2021-02-18 9 10 37	413	900712	16	Ohio	39.99	39.99	0.0000	FALSE	3.1
ip-4d9190a1104170a0a0a178140a119935	2021-02-18 9 10 37	910	398349	6	Ohio	99.99	99.99	0.0000	FALSE	4.0
ip-4d9190a1104170a0a0a178140a119935	2021-02-18 9 10 37	166	900712	16	California	109.99	109.99	0.0000	TRUE	11.0
ip-8c19a0a2371902303d0a190a007795	2021-02-18 9 10 38	193	600712	6	California	129.99	129.99	0.0000	TRUE	13.0
ip-4d21790a0007100000000000000000	2021-02-18 9 10 38	900	398349	7	California	129.99	129.99	0.0000	FALSE	10.0
ip-516c1a0f201651714611700a70a	2021-02-18 9 10 38	880	392769	7	California	99.99	96.11	0.0448	FALSE	8.0



OLAP cube

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



Reporting



Get me
a list of
entities!!





Get me a
metric!!

Raw data

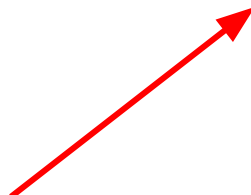
OLAP cube

Datasets for exploration

purchase_id	purchase_id	date	state	store_id	store_name	sales_person	purchase_price	discount	is_return	tax
ep-210500a3260f0523ae5c32c0700516	2021-02-18 9 10 24	502	07164	12	California	99.99	99.99	0.0000	FALSE	10.0
ep-0059584914710441122e0350493	2021-02-18 9 10 25	174	104195	12	California	99.99	99.99	0.0000	FALSE	10.0
ep-43c2826a7704f34f9317a7a7d02c	2021-02-18 9 10 25	989	432378	7	California	69.99	69.99	0.0000	FALSE	7.0
ep-59f4e4a171220a3660456237a720a6	2021-02-18 9 10 25	969	432378	10	California	79.99	72.77	0.0904	FALSE	12.0
ep-8418ba338a34601560720320a83023	2021-02-18 9 10 25	615	104196	12	California	99.99	85.87	0.1021	FALSE	3.0
ep-9b0f05a0720320a83023e0e0717617026	2021-02-18 9 10 26	770	461461	6	California	69.99	69.99	0.0000	FALSE	7.0
ep-0026a326c78871646d03d01a0718	2021-02-18 9 10 27	176	461461	20	California	99.99	99.99	0.0000	FALSE	4.0
ep-412eaf1027052d5e049592c0a716a92	2021-02-18 9 10 27	624	441861	4	Ohio	29.99	29.99	0.0000	TRUE	2.0
ep-19c0a49a789e0e043e0e043e0e043e0e04	2021-02-18 9 10 28	973	327365	9	Ohio	109.99	109.99	0.0000	FALSE	8.0
ep-03e0f7890a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9 10 28	188	327365	29	Ohio	49.99	49.99	0.0000	FALSE	4.0
ep-1714c0a49a789e0e043e0e043e0e043e0e04	2021-02-18 9 10 29	206	441861	9	California	99.99	99.99	0.0000	FALSE	10.0
ep-57812e1a9b-2816-4816-40c2-0a093158f54a	2021-02-18 9 10 30	980	391142	20	California	129.99	129.99	0.0000	FALSE	13.0
ep-1a010970171a07110a20a0a0a0a0a0a0a0	2021-02-18 9 10 34	389	032112	19	Ohio	69.99	69.99	0.0000	FALSE	5.0
ep-880a648a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9 10 34	287	432378	14	Ohio	79.99	79.99	0.0000	FALSE	6.0
ep-0a7121a0a0a0a0a0a0a0a0a0a0a0a0a0a0	2021-02-18 9 10 34	999	999712	29	California	129.99	129.99	0.0000	FALSE	10.0
ep-46c32609971446c9999712226161	2021-02-18 9 10 35	960	432378	4	California	89.99	89.99	0.0000	FALSE	9.0
ep-7612c120e4371164a-0a019923a040	2021-02-18 9 10 36	988	154241	29	Ohio	129.99	129.99	0.0000	FALSE	10.0
ep-46c32609971446c9999712226161	2021-02-18 9 10 36	872	392769	13	Ohio	119.99	119.99	0.0000	FALSE	8.0
ep-0a0f05a0720320a83023e0e0717617026	2021-02-18 9 10 36	436	900712	3	Ohio	109.99	109.99	0.0000	FALSE	8.0
ep-46c32609971446c9999712226161	2021-02-18 9 10 37	413	900712	16	Ohio	39.99	39.99	0.0000	FALSE	3.0
ep-40f199a114178a0a0a1781140a119935	2021-02-18 9 10 37	910	398349	6	Ohio	99.99	99.99	0.0000	FALSE	4.0
ep-46c32609971446c9999712226161	2021-02-18 9 10 37	166	900712	16	California	109.99	109.99	0.0000	TRUE	11.0
ep-8b19a0c2a7180a304a0a0a0a0a0a0a0a0a	2021-02-18 9 10 38	193	600712	6	California	129.99	129.99	0.0000	TRUE	13.0
ep-46c32609971446c9999712226161	2021-02-18 9 10 38	969	398349	7	California	129.99	129.99	0.0000	FALSE	10.0
ep-5165c1a0f25c16117461170a0a7a	2021-02-18 9 10 38	980	392769	7	California	99.99	96.11	0.0404	FALSE	8.0



month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	7
February	Ohio	\$323	9
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



Raw data

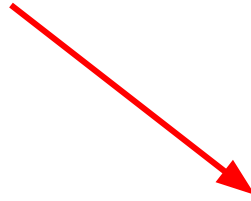
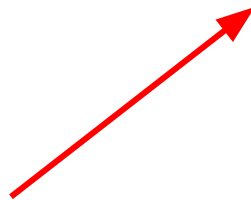
OLAP cube

Datasets for exploration

purchase_id	purchase_id	date	qty	state	store_id	store_name	sales_price	purchase_price	discount	is_return	tax
ip-21650a32a05f0232a65c32e0730519	2021-02-18 9 10 24	502	57164	12	California	99.95	99.95	0.0000	FALSE	10.0	
ip-06958449143710441122e0353649	2021-02-18 9 10 25	174	104195	11	California	99.95	99.95	0.0000	FALSE	10.0	
ip-43c2826a7704f34f93c17a7a7d02c	2021-02-18 9 10 25	889	423278	1	California	69.95	69.95	0.0000	FALSE	7.0	
ip-59f44a171220a3664565217a720a7	2021-02-18 9 10 25	969	423278	10	California	79.95	12.77	0.0846	FALSE	1.2	
ip-8418ba338a348401560720320a8323	2021-02-18 9 10 25	615	104196	12	California	99.95	35.87	0.1021	FALSE	3.3	
ip-9b0f05a0720320a8320e097176a7026	2021-02-18 9 10 26	770	461451	6	California	69.95	69.95	0.0000	FALSE	7.0	
ip-0c026a32c78871646d03d01a0718	2021-02-18 9 10 27	176	461451	20	California	99.95	99.95	0.0000	FALSE	4.0	
ip-412eaf320320e0959595c0a719a92	2021-02-18 9 10 27	624	441851	4	Ohio	29.95	29.95	0.0000	TRUE	2.4	
ip-19c0c4a9189e0e0959595c0a719a92	2021-02-18 9 10 28	973	327265	9	Ohio	109.95	109.95	0.0000	FALSE	8.8	
ip-03e07f9809a091a007f92321909f	2021-02-18 9 10 29	188	327265	29	Ohio	49.95	49.95	0.0000	FALSE	4.0	
ip-174c0c4a9189e0e0959595c0a719a92	2021-02-18 9 10 29	206	441851	9	California	99.95	99.95	0.0000	FALSE	10.0	
ip-5787e7e18b1-3845-484c-40a9319494a	2021-02-18 9 10 30	980	391142	20	California	129.95	129.95	0.0000	FALSE	13.0	
ip-1a030701071a071a030701071a0307	2021-02-18 9 10 34	389	523212	19	Ohio	69.95	69.95	0.0000	FALSE	5.4	
ip-8b0c4a9189e0e0959595c0a719a92	2021-02-18 9 10 34	287	432378	14	Ohio	79.95	79.95	0.0000	FALSE	6.4	
ip-8d712e0a320320e0959595c0a719a92	2021-02-18 9 10 34	995	393512	29	California	129.95	129.95	0.0000	FALSE	13.0	
ip-46c320e09718440959595c0a719a92	2021-02-18 9 10 35	960	432378	4	California	69.95	69.95	0.0000	FALSE	9.0	
ip-7676c320e09718440959595c0a719a92	2021-02-18 9 10 36	988	514241	25	Ohio	129.95	129.95	0.0000	FALSE	10.4	
ip-46c320e09718440959595c0a719a92	2021-02-18 9 10 36	872	392769	13	Ohio	119.95	119.95	0.0000	FALSE	9.8	
ip-aa95959595959595959595959595	2021-02-18 9 10 36	436	900712	3	Ohio	109.95	109.95	0.0000	FALSE	8.8	
ip-46c320e09718440959595c0a719a92	2021-02-18 9 10 37	413	900712	16	Ohio	39.95	39.95	0.0000	FALSE	3.1	
ip-40f196a114178a6a0a17814a0a19856	2021-02-18 9 10 37	910	398349	6	Ohio	99.95	99.95	0.0000	FALSE	4.8	
ip-46c320e09718440959595c0a719a92	2021-02-18 9 10 37	166	900712	16	California	109.95	109.95	0.0000	TRUE	11.0	
ip-8b19a0c2a719b2a3d4a39f8a687759	2021-02-18 9 10 38	193	600782	6	California	129.95	129.95	0.0000	TRUE	13.0	
ip-427179a0c2a719b2a3d4a39f8a687759	2021-02-18 9 10 38	969	398349	7	California	129.95	129.95	0.0000	FALSE	13.0	
ip-5165c1a0f261051714611709a7a	2021-02-18 9 10 38	890	392769	7	California	99.95	66.11	0.0448	FALSE	8.6	



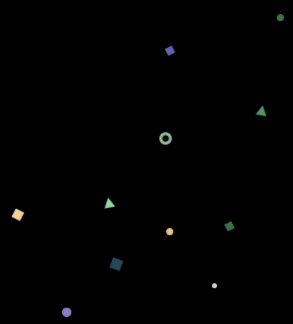
month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	7
February	Ohio	\$323	9
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12



Metrics for reporting



Backup





Welcome
Lane Open

U-Scan Genesis

Cash In

Change Out

25
COVER
OF
Hardb
Best

MAGIC
BONE

Are you
Winning all
of
ts?

\$1



Corona[®] Extra



data pulls

miles away from ordinary

OLD MAN YELLS AT CLOUD



First paragraph of text, likely a news report or commentary related to the headline. The text is partially obscured by a yellow shape on the right side of the page.

benn.substack.com



Self-serve is a feeling

Lots of houses can be made a home.

Jul 9, 2021 11 ...



Why is self-serve still a problem?

We're not going to solve it until we define it.

Apr 8, 2021 11 8 ...



The self-serve shibboleth

We all like to talk about it. But how do we fix it?

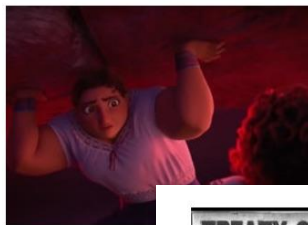
Jun 1, 2021 5 1 ...



Data is for dashboards

Animating an abstract world is hard, valuable, and worthy of celebration

Dec 3, 2021 4 2 ...



Service pressure

Data teams aren't service organizations, but we can learn a lot from those that are.

Jan 28 10 3 ...



BI is dead

How an integration between Looker and Tableau

Exploration



Exploration



Reporting







1859

1909

Today



Get me a list of stores!



Get me a list of stores!

With details on their
location and hours!



Get me a list of stores!

With details on their
location and hours!

And data about sales
and operating costs!



Entity

Get me a list of stores!

With details on their
location and hours!

And data about sales
and operating costs!



Entity

Get me a list of stores!

Dimensions

With details on their location and hours!

And data about sales and operating costs!



Entity

Get me a list of stores!

Dimensions

With details on their location and hours!

Metrics

And data about sales and operating costs!



Entity

Get me a list of stores!

Dimensions

With details on their location and hours!

Metrics

And data about sales and operating costs!

Entity	Dimensions	Metrics
--------	------------	---------



Get me a
dataset!!



Exploration



Reporting

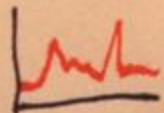




Open bugs

Todo

Doing Done





How many bricks did we sell?!?



What is our revenue?!?



What is our revenue...
by week?!?



What is our revenue...
by week...
by set theme?!?



What is our revenue...
by week...
by set theme...
in Europe?!?



What is our revenue...

Metric

by week...

by set theme...

in Europe?!?



What is our revenue...

Metric

by week...

Time grain

by set theme...

in Europe?!?



What is our revenue...

Metric

by week...

Time grain

by set theme...

Groupings

in Europe?!?



What is our revenue...

Metric

by week...

Time grain

by set theme...

Groupings

in Europe?!?

Filters



What is our revenue...

Metric

by week...

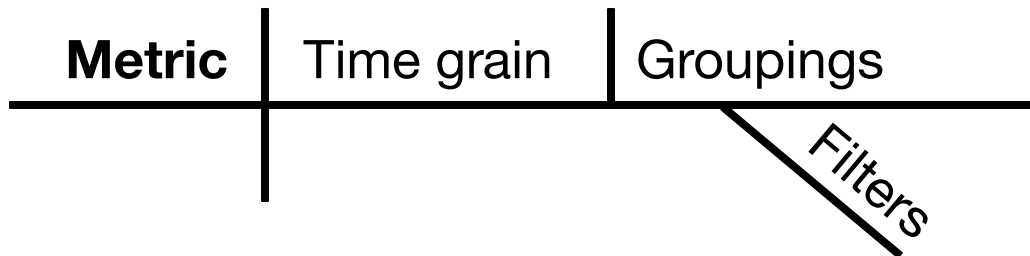
Time grain

by set theme...

Groupings

in Europe?!?

Filters



Revenue

Stripe logs

Salesforce
opportunity

Tax adjustment

Date sales are
recognized

CSV from Janice
in Accounting

Return policy



Get me a
metric!!



Welcome
Lane Open

U-Scan Genesis

Cash In

Change Out

25
COVER
OF
Hardb
Best

MAGIC
BONE

Are you
Winning all
of
ts?

\$1

Neither? Both?

Exploration

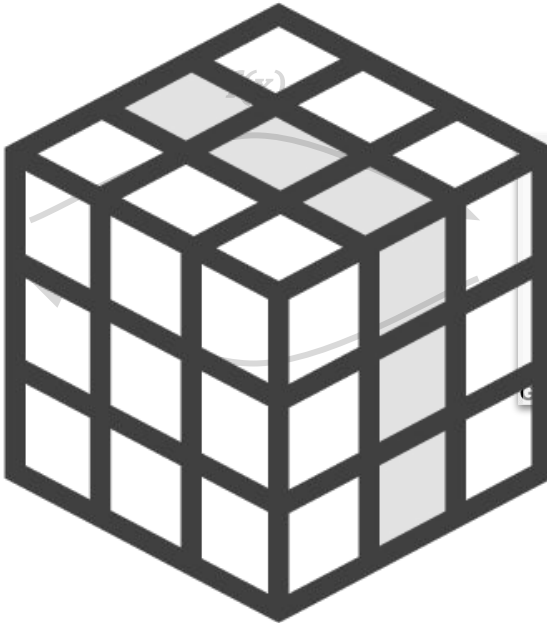
Reporting

purchase_id	purchase_dt	city	item_id	state_id	store_name	list_price	purchase_price_discount	is_warehouse	tax	
purchase_1	2012-01-18 9:10:24	002	67164	12	California	99.99	99.99	0.0000	FALSE	10.0
purchase_2	2012-01-18 9:10:25	174	104195	12	California	99.99	99.99	0.0000	FALSE	10.0
purchase_3	2012-01-18 9:10:25	889	420278	7	California	69.99	69.99	0.0000	FALSE	1.0
purchase_4	2012-01-18 9:10:25	869	420278	16	California	79.99	72.77	0.0984	FALSE	2.0
purchase_5	2012-01-18 9:10:25	615	104195	12	California	99.99	35.67	0.1021	FALSE	3.0
purchase_6	2012-01-18 9:10:26	770	403451	6	California	69.99	69.99	0.0000	FALSE	7.0
purchase_7	2012-01-18 9:10:27	176	403451	22	California	39.99	39.99	0.0000	FALSE	4.0
purchase_8	2012-01-18 9:10:27	924	441951	4	Ohio	29.99	29.99	0.0000	TRUE	2.0
purchase_9	2012-01-18 9:10:28	972	327465	3	Ohio	109.99	109.99	0.0000	FALSE	6.0
purchase_10	2012-01-18 9:10:28	188	327465	20	Ohio	49.99	49.99	0.0000	FALSE	4.0
purchase_11	2012-01-18 9:10:29	207	441951	3	California	99.99	99.99	0.0000	FALSE	10.0
purchase_12	2012-01-18 9:10:30	980	351142	20	California	129.99	129.99	0.0000	FALSE	13.0
purchase_13	2012-01-18 9:10:34	289	559312	19	Ohio	89.99	89.99	0.0000	FALSE	5.0
purchase_14	2012-01-18 9:10:34	267	420278	14	Ohio	79.99	79.99	0.0000	FALSE	6.0
purchase_15	2012-01-18 9:10:34	555	559312	20	California	129.99	129.99	0.0000	FALSE	13.0
purchase_16	2012-01-18 9:10:36	990	420278	4	California	89.99	89.99	0.0000	FALSE	9.0
purchase_17	2012-01-18 9:10:36	969	914241	20	Ohio	129.99	129.99	0.0000	FALSE	10.0
purchase_18	2012-01-18 9:10:36	872	302189	13	Ohio	119.99	119.99	0.0000	FALSE	9.0
purchase_19	2012-01-18 9:10:36	439	900732	2	Ohio	109.99	109.99	0.0000	FALSE	8.0
purchase_20	2012-01-18 9:10:37	613	900732	14	Ohio	39.99	39.99	0.0000	FALSE	3.0
purchase_21	2012-01-18 9:10:37	910	389349	6	Ohio	99.99	99.99	0.0000	FALSE	4.0
purchase_22	2012-01-18 9:10:37	168	900732	19	California	109.99	109.99	0.0000	TRUE	10.0
purchase_23	2012-01-18 9:10:38	193	900732	6	California	129.99	129.99	0.0000	TRUE	13.0
purchase_24	2012-01-18 9:10:38	969	389349	7	California	129.99	129.99	0.0000	FALSE	13.0
purchase_25	2012-01-18 9:10:38	990	392249	2	California	99.99	96.71	0.0424	FALSE	4.0

Month	SUM of sales
January	\$1,416
February	\$1,546
March	\$1,595
April	\$1,702
May	\$1,780
June	\$1,857
Grand Total	\$9,895

Datasets

Metrics



OLAP Cube

month	state	sales
January	California	\$1,217
January	Ohio	\$312
February	California	\$1,292
February	Ohio	\$323
March	California	\$1,321
March	Ohio	\$347
April	California	\$1,327
April	Ohio	\$422
May	California	\$1,411
May	Ohio	\$480
June	California	\$1,494
June	Ohio	\$528

month	state	sales	items_sold
January	California	\$1,217	22
January	Ohio	\$312	5
February	California	\$1,292	9
February	Ohio	\$323	7
March	California	\$1,321	28
March	Ohio	\$347	6
April	California	\$1,327	20
April	Ohio	\$422	11
May	California	\$1,411	15
May	Ohio	\$480	5
June	California	\$1,494	23
June	Ohio	\$528	12

month	state	store	sales	items_sold
January	California	1	\$1,205	24
February	California	1	\$1,346	11
March	California	1	\$1,253	18
April	California	1	\$1,184	28
May	California	1	\$1,337	17
June	California	1	\$1,245	11
January	California	2	\$1,426	26
February	California	2	\$1,275	26
March	California	2	\$1,036	30
April	California	2	\$1,357	22
May	California	2	\$1,246	17
June	California	2	\$1,074	23
January	California	3	\$1,070	12
February	California	3	\$1,480	29
March	California	3	\$1,374	20
April	California	3	\$1,105	26
May	California	3	\$1,425	18
June	California	3	\$1,205	25
January	Ohio	52	\$390	8
February	Ohio	52	\$461	3
March	Ohio	52	\$428	7
April	Ohio	52	\$420	13
May	Ohio	52	\$425	14
June	Ohio	52	\$435	8
January	Ohio	84	\$381	3
February	Ohio	84	\$487	5
March	Ohio	84	\$421	5
April	Ohio	84	\$528	12





Simple OLAP

What is this?

**It's transactions,
but not really**

**And it's metrics,
but sorta weirdly
decomposed,
where you still
have to add it up**

**And that makes
them kinda hard
to use, because it
doesn't fit the
vocabulary**



1859

1909

Today





Open bugs

Todo

Doing Done



Handwritten notes on a yellow sticky note under the 'Todo' column.

Handwritten notes on a pink sticky note under the 'Doing' column.

Handwritten notes on a yellow sticky note under the 'Done' column.

Exploration

purchase_id	purchase_dt	city	item_id	item_nm	item_cat	purchase_price	purchase_price_discount	is_return	tax
pp21650a33a85f522aaw5c3e27037616	2021-02-18 9:10:24	002	57184	17 California	99.99	99.99	0.0000	FALSE	13.0
pp20584a91419121a119123a0a383	2021-02-18 9:10:25	174	104195	17 California	99.99	99.99	0.0000	FALSE	13.0
pp49628ba770461348f9517a7a6020a	2021-02-18 9:10:25	889	425278	7 California	69.99	69.99	0.0000	FALSE	7.0
pp4984a4e71222a165f655271a7a020a	2021-02-18 9:10:25	969	425278	16 California	79.99	72.77	0.0988	FALSE	7.0
pp4448ba330a4a04015672235a080203	2021-02-18 9:10:25	615	104195	12 California	59.99	35.57	0.1021	FALSE	3.0
pp48685aa29a13a30a8e087576a176a76	2021-02-18 9:10:26	770	403451	8 California	69.99	69.99	0.0000	FALSE	7.0
pp4022a81a4a0397846a0201871a6118	2021-02-18 9:10:27	176	403451	22 California	39.99	39.99	0.0000	FALSE	4.0
pp412a4a128f958a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:27	624	441851	4 Ohio	29.99	29.99	0.0000	TRUE	2.4
pp419c1a4a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:28	873	327385	8 Ohio	109.99	109.99	0.0000	FALSE	8.0
pp40a0f76580a0a070a07f832311a0a0f	2021-02-18 9:10:28	188	327385	20 Ohio	49.99	49.99	0.0000	FALSE	4.0
pp419c1a4a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:29	205	441851	8 California	69.99	69.99	0.0000	FALSE	13.0
157a7a7a4a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:30	980	351142	20 California	129.99	129.99	0.0000	FALSE	13.0
pp4058f0c11a111a111a111a111a111a11	2021-02-18 9:10:34	292	355112	19 Ohio	69.99	65.92	0.0238	FALSE	5.4
pp486a4a4a0f1d7a4a4a4a4a4a4a4a4a4a	2021-02-18 9:10:34	267	425278	14 Ohio	79.99	79.99	0.0000	FALSE	6.4
pp487a135a4a2a2a2a2a2a2a2a2a2a2a2a	2021-02-18 9:10:34	555	555112	20 California	129.99	129.99	0.0000	FALSE	13.0
pp4872a0a0a01a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:35	900	425278	4 California	89.99	89.99	0.0000	FALSE	9.0
1207762a-2a0a-4277-1a8a-0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:36	969	314241	20 Ohio	129.99	129.99	0.0000	FALSE	10.4
pp420a0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:36	872	302189	13 Ohio	119.99	119.99	0.0000	FALSE	9.0
pp4a0a0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:36	439	900732	2 Ohio	109.99	109.99	0.0000	FALSE	8.8
pp4a0a0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:37	613	900732	16 Ohio	39.99	39.93	0.0020	FALSE	3.1
pp4a0a0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:37	910	388389	8 Ohio	59.99	59.99	0.0000	FALSE	4.8
pp4a0a0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:37	168	900732	16 California	109.99	109.99	0.0000	TRUE	11.0
pp4a0a0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:38	193	900732	8 California	129.99	129.99	0.0000	TRUE	13.0
pp4a0a0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:38	989	388389	7 California	129.99	129.99	0.0000	FALSE	13.0
pp4a0a0a0a0a0a0a0a0a0a0a0a0a0a0a0a	2021-02-18 9:10:38	990	392189	7 California	89.99	86.71	0.0424	FALSE	8.8

Datasets

Exploration

purchase_id	purchase_dt	city	item_id	item_nm	item_cat	item_price	purchase_price_discount	is_which	sum
app21659a3a388f522aee52c3e2b703576	2021-02-18 9:10:24	002	57184	17 California	99.99	99.99	0.0000	FALSE	10.0
app20284a4919726a1f10232a0e381882	2021-02-18 9:10:25	174	104195	17 California	99.99	99.99	0.0000	FALSE	10.0
app496288a770467348f95171a7a6020e	2021-02-18 9:10:25	889	425278	7 California	69.99	69.99	0.0000	FALSE	7.0
app3941a1e77222a0565652271a720e	2021-02-18 9:10:25	969	425278	16 California	79.99	77.77	0.0888	FALSE	7.0
app4448a335a4a0515672235a080023	2021-02-18 9:10:25	615	104195	12 California	39.99	36.57	0.1021	FALSE	3.0
app86f85a2a13a30a8e08776a776a7676	2021-02-18 9:10:26	770	403451	8 California	69.99	69.99	0.0000	FALSE	7.0
app20284a4919726a1f10232a0e381882	2021-02-18 9:10:27	174	403451	22 California	39.99	39.99	0.0000	FALSE	4.0
app412a4a128f958285a092a0976a76a76a76	2021-02-18 9:10:27	624	441851	4 Ohio	29.99	29.99	0.0000	TRUE	2.4
app3941a1e77222a0565652271a720e	2021-02-18 9:10:28	973	327385	5 Ohio	109.99	109.99	0.0000	FALSE	8.0
app3941a1e77222a0565652271a720e	2021-02-18 9:10:28	188	327385	20 Ohio	49.99	49.99	0.0000	FALSE	4.0
app496288a770467348f95171a7a6020e	2021-02-18 9:10:29	205	441851	5 California	69.99	69.99	0.0000	FALSE	10.0
app3941a1e77222a0565652271a720e	2021-02-18 9:10:30	980	351142	20 California	129.99	129.99	0.0000	FALSE	13.0
app496288a770467348f95171a7a6020e	2021-02-18 9:10:34	282	355112	19 Ohio	69.99	69.99	0.0000	FALSE	5.4
app86b46468f1d70a40424242d4a2d	2021-02-18 9:10:34	287	425278	14 Ohio	79.99	79.99	0.0000	FALSE	6.4
app87a135a4282a24350549f38a3a3a3a3a	2021-02-18 9:10:34	555	555112	20 California	129.99	129.99	0.0000	FALSE	13.0
app496288a770467348f95171a7a6020e	2021-02-18 9:10:35	900	425278	4 California	89.99	89.99	0.0000	FALSE	9.0
app3941a1e77222a0565652271a720e	2021-02-18 9:10:36	969	914241	20 Ohio	129.99	129.99	0.0000	FALSE	10.4
app20284a4919726a1f10232a0e381882	2021-02-18 9:10:36	872	302789	13 Ohio	119.99	119.99	0.0000	FALSE	8.0
app3941a1e77222a0565652271a720e	2021-02-18 9:10:36	439	900732	2 Ohio	109.99	109.99	0.0000	FALSE	8.8
app496288a770467348f95171a7a6020e	2021-02-18 9:10:37	613	900732	18 Ohio	39.99	39.99	0.0000	FALSE	3.1
app496288a770467348f95171a7a6020e	2021-02-18 9:10:37	910	388389	8 Ohio	59.99	59.99	0.0000	FALSE	4.8
app496288a770467348f95171a7a6020e	2021-02-18 9:10:37	168	900732	18 California	109.99	109.99	0.0000	TRUE	10.0
app496288a770467348f95171a7a6020e	2021-02-18 9:10:38	193	900732	8 California	129.99	129.99	0.0000	TRUE	13.0
app428710a4248a2722a0a0a0a113770	2021-02-18 9:10:38	989	388389	7 California	129.99	129.99	0.0000	FALSE	13.0
app496288a770467348f95171a7a6020e	2021-02-18 9:10:38	990	392789	7 California	89.99	89.99	0.0000	FALSE	8.8

Datasets

Reporting

month	SUM of sales
January	\$1,416
February	\$1,546
March	\$1,595
April	\$1,702
May	\$1,780
June	\$1,857
Grand Total	\$9,895

Metrics

Exploration

purchase_id	purchase_dt	city	item_id	item_name	item_price	purchase_price_discount	is_which	sum	
app-21659a3a38f522aee52c3e28703576	2021-02-18 9:10:24	002	57184	12 California	99.99	99.99	0.0000	FALSE	13.0
app-20208449157104119320a081892	2021-02-18 9:10:25	174	104195	17 California	99.99	99.99	0.0000	FALSE	13.0
app-856289a770467348f95171a7a6020c	2021-02-18 9:10:25	889	425278	7 California	69.99	69.99	0.0000	FALSE	7.0
app-8941a4e772220a565652271a720a6	2021-02-18 9:10:25	969	425278	16 California	79.99	77.77	0.2888	FALSE	7.0
app-6448a335a4a040156722326a082023	2021-02-18 9:10:25	615	104195	12 California	99.99	35.57	0.1021	FALSE	3.0
app-86f852a6213a308a8e8776a767676	2021-02-18 9:10:26	770	403461	8 California	69.99	69.99	0.0000	FALSE	7.0
app-0220a815a0c197846a02021874a014	2021-02-18 9:10:27	176	403461	22 California	39.99	39.99	0.0000	FALSE	4.0
app-412a4a128785828a892a892a892a892	2021-02-18 9:10:27	624	441851	4 Ohio	29.99	29.99	0.0000	TRUE	2.4
app-19c1a561688e0a0c19c1a561688e0a0c	2021-02-18 9:10:28	873	327465	8 Ohio	109.99	109.99	0.0000	FALSE	8.0
app-01a07f569898970d077832311869f	2021-02-18 9:10:28	188	327465	26 Ohio	48.99	48.99	0.0000	FALSE	4.0
app-81a5c1a561688e0a0c19c1a561688e0a0c	2021-02-18 9:10:29	205	441851	8 California	99.99	99.99	0.0000	FALSE	10.0
15787a7a7a7a7a7a7a7a7a7a7a7a7a7a	2021-02-18 9:10:30	980	351142	20 California	129.99	129.99	0.0000	FALSE	13.0
app-405070c11a7104119320a081892	2021-02-18 9:10:34	292	555112	19 Ohio	69.99	69.99	0.0000	FALSE	5.4
app-860a6468f1d70a4242424242424242	2021-02-18 9:10:34	267	425278	14 Ohio	79.99	79.99	0.0000	FALSE	6.4
app-87a156a156a156a156a156a156a156a1	2021-02-18 9:10:34	555	555112	20 California	129.99	129.99	0.0000	FALSE	13.0
app-8023a0207104a0207104a0207104a0207	2021-02-18 9:10:35	900	425278	4 California	89.99	89.99	0.0000	FALSE	9.0
1287762a-2aa-4377-4384-0ba8-0a812834831	2021-02-18 9:10:36	969	914241	20 Ohio	129.99	129.99	0.0000	FALSE	10.4
app-1202090907104a0207104a0207104a0207	2021-02-18 9:10:36	872	302789	13 Ohio	119.99	119.99	0.0000	FALSE	9.0
app-8a08a070209f02a08a070209f02a08a07	2021-02-18 9:10:36	439	900732	2 Ohio	109.99	109.99	0.0000	FALSE	8.8
app-86a8a070209f02a08a070209f02a08a07	2021-02-18 9:10:37	613	900732	14 Ohio	39.99	39.99	0.0000	FALSE	3.1
app-a48198a154780a08a154780a08a154780a08	2021-02-18 9:10:37	910	388349	8 Ohio	59.99	59.99	0.0000	FALSE	4.8
app-8941a4e772220a565652271a720a6	2021-02-18 9:10:37	168	900732	16 California	109.99	109.99	0.0000	TRUE	11.0
app-861a68a27192a0a68a27192a0a68a27192a0a68	2021-02-18 9:10:38	193	900732	8 California	129.99	129.99	0.0000	TRUE	13.0
app-428710a0248a0248a0248a0248a0248a0248	2021-02-18 9:10:39	989	388349	7 California	129.99	129.99	0.0000	FALSE	13.0
app-104195a104195a104195a104195a104195a104195	2021-02-18 9:10:39	990	392349	7 California	99.99	99.11	0.0424	FALSE	8.8

Datasets

$f(x)$



Reporting

month	SUM of sales
January	\$1,416
February	\$1,546
March	\$1,595
April	\$1,702
May	\$1,780
June	\$1,857
Grand Total	\$9,895

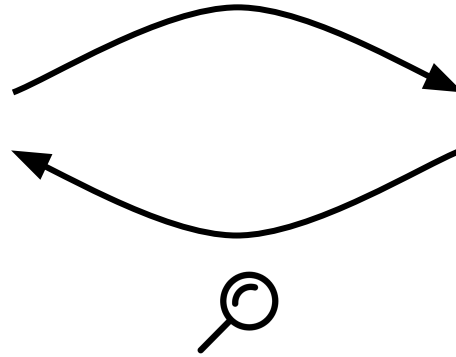
Metrics

Exploration

customer_id	purchase_id	city	item_id	class_id	store_name	list_price	purchase_price_discount	is_return	tax	
ipj21659a3a38f52c2a6c3c2c270376	2021-02-18 9 10 24	802	87184	12	California	99.99	99.99	0.0000	FALSE	13.0
ipj20284a491370a1193120a28f382	2021-02-18 9 10 25	174	104195	17	California	99.99	99.99	0.0000	FALSE	13.0
ipj49628ba770a67349f93171a7a6020c	2021-02-18 9 10 25	889	425278	7	California	69.99	69.99	0.0000	FALSE	7.0
ipj4984a4e77220a56f5652271a7c20a	2021-02-18 9 10 25	969	425278	16	California	79.99	72.77	0.0988	FALSE	7.0
ipj4448a35a4a40515672203a680203	2021-02-18 9 10 25	615	104195	12	California	99.99	35.57	0.1021	FALSE	3.0
ipj488f5a2a130a38a68f8776a77670b	2021-02-18 9 10 26	770	403451	9	California	69.99	69.99	0.0000	FALSE	7.0
ipj40228a5a4c3978a4620201874a618	2021-02-18 9 10 27	176	403451	22	California	39.99	39.99	0.0000	FALSE	4.0
ipj412aa128785a28a492a9a975a91a9a9	2021-02-18 9 10 27	624	441851	4	Ohio	29.99	29.99	0.0000	TRUE	2.4
ipj419c1a5a468a6a6a6a6a6a6a6a6a6a	2021-02-18 9 10 28	873	327485	5	Ohio	109.99	109.99	0.0000	FALSE	8.0
ipj430a7f569a9a9a9a9a9a9a9a9a9a9a	2021-02-18 9 10 28	188	327485	26	Ohio	49.99	49.99	0.0000	FALSE	4.0
ipj419c1a5a468a6a6a6a6a6a6a6a6a6a	2021-02-18 9 10 28	205	441851	5	California	99.99	99.99	0.0000	FALSE	13.0
ipj47a7a7a7a7a7a7a7a7a7a7a7a7a7a7a	2021-02-18 9 10 30	980	351142	20	California	129.99	129.99	0.0000	FALSE	13.0
ipj40570c1311a1110450450450450450	2021-02-18 9 10 34	292	555112	19	Ohio	69.99	69.99	0.0000	FALSE	5.4
ipj486a4a4a4a4a4a4a4a4a4a4a4a4a4a4a	2021-02-18 9 10 34	267	425278	14	Ohio	79.99	79.99	0.0000	FALSE	6.4
ipj487a156a42a2a2a2a2a2a2a2a2a2a2a2a	2021-02-18 9 10 34	555	555112	20	California	129.99	129.99	0.0000	FALSE	13.0
ipj4823a9a9a9a9a9a9a9a9a9a9a9a9a9a9	2021-02-18 9 10 36	900	425278	4	California	89.99	89.99	0.0000	FALSE	9.0
ipj48776a2a2a2a2a2a2a2a2a2a2a2a2a2a2a	2021-02-18 9 10 36	969	914441	20	Ohio	129.99	129.99	0.0000	FALSE	10.4
ipj4320a90a90a90a90a90a90a90a90a90a90	2021-02-18 9 10 36	872	302199	13	Ohio	119.99	119.99	0.0000	FALSE	9.0
ipj4a009a0a702a9f02a9f02a9f02a9f02a9f02	2021-02-18 9 10 36	439	900732	2	Ohio	109.99	109.99	0.0000	FALSE	8.8
ipj48a48a48a48a48a48a48a48a48a48a48a48a	2021-02-18 9 10 37	613	900732	14	Ohio	39.99	39.99	0.0000	FALSE	3.1
ipj4a4819a1a478a9a9a9a9a9a9a9a9a9a9a9a	2021-02-18 9 10 37	910	388349	8	Ohio	59.99	59.99	0.0000	FALSE	4.8
ipj48f4a4a4a4a4a4a4a4a4a4a4a4a4a4a4a4a	2021-02-18 9 10 37	168	900732	16	California	109.99	109.99	0.0000	TRUE	11.0
ipj481a6a6a6a6a6a6a6a6a6a6a6a6a6a6a6a6a	2021-02-18 9 10 38	193	900732	9	California	129.99	129.99	0.0000	TRUE	13.0
ipj428710a2a4a4a4a4a4a4a4a4a4a4a4a4a4a4a	2021-02-18 9 10 38	989	388349	7	California	129.99	129.99	0.0000	FALSE	13.0
ipj410a10a10a10a10a10a10a10a10a10a10a10a	2021-02-18 9 10 38	990	392199	7	California	89.99	86.71	0.0424	FALSE	8.8

Datasets

$f(x)$



Reporting

month	SUM of sales
January	\$1,416
February	\$1,546
March	\$1,595
April	\$1,702
May	\$1,780
June	\$1,857
Grand Total	\$9,895

Metrics

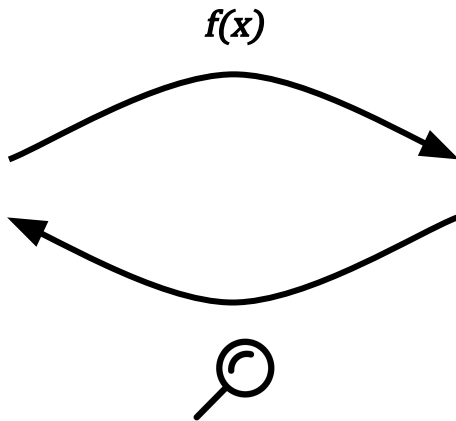


Exploration

purchase_id	purchase_dt	city	item_id	store_id	item_name	list_price	purchase_price_discount	is_which	tax	
aa-21650a3a3885f2c2a663c2c27037676	2021-02-18 9:10:24	002	87184	12	California	99.99	99.99	0.0000	FALSE	13.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:25	174	104195	17	California	99.99	99.99	0.0000	FALSE	13.0
aa-89c288a7704673495617a7a60200c	2021-02-18 9:10:25	889	425278	7	California	69.99	69.99	0.0000	FALSE	7.0
aa-084a4e477220a06565227a7020a	2021-02-18 9:10:25	969	425278	16	California	79.99	72.77	0.0888	FALSE	7.0
aa-64480a330a4a0d15672203a080023	2021-02-18 9:10:25	615	104195	12	California	99.99	35.57	0.1021	FALSE	3.0
aa-88d850a2103a38a0e88756a70a7676	2021-02-18 9:10:26	770	403461	8	California	69.99	69.99	0.0000	FALSE	7.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:27	174	492461	22	California	39.99	39.99	0.0000	FALSE	4.0
aa-412a4a1287050a082a082a082a082a	2021-02-18 9:10:27	624	441861	4	Ohio	29.99	29.99	0.0000	TRUE	2.4
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:28	873	327465	8	Ohio	109.99	109.99	0.0000	FALSE	8.0
aa-0bc07f6000007007f00231f000f	2021-02-18 9:10:28	188	327465	20	Ohio	49.99	49.99	0.0000	FALSE	4.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:29	205	441861	4	California	99.99	99.99	0.0000	FALSE	13.0
aa-0bc07f6000007007f00231f000f	2021-02-18 9:10:29	188	327465	20	California	129.99	129.99	0.0000	FALSE	13.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:30	980	351142	19	Ohio	69.99	69.99	0.0000	FALSE	5.4
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:34	267	425278	14	Ohio	79.99	79.99	0.0000	FALSE	6.4
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:34	555	555112	20	California	129.99	129.99	0.0000	FALSE	13.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:36	900	425278	4	California	89.99	89.99	0.0000	FALSE	9.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:36	969	914441	20	Ohio	129.99	129.99	0.0000	FALSE	10.4
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:36	872	302199	13	Ohio	119.99	119.99	0.0000	FALSE	8.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:36	439	900732	2	Ohio	109.99	109.99	0.0000	FALSE	8.8
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:37	613	900732	14	Ohio	39.99	39.99	0.0000	FALSE	3.1
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:37	910	388349	8	Ohio	59.99	59.99	0.0000	FALSE	4.8
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:37	168	900732	16	California	109.99	109.99	0.0000	TRUE	11.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:38	193	900732	9	California	129.99	129.99	0.0000	TRUE	13.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:39	989	388349	7	California	129.99	129.99	0.0000	FALSE	13.0
aa-00004a491d70a41f10320a08380	2021-02-18 9:10:39	990	392199	7	California	89.99	89.99	0.0000	FALSE	8.8

Datasets

Reporting



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Metrics

OLAP cube

From Wikipedia, the free encyclopedia

An **OLAP cube** is a [multi-dimensional array](#) of data.

