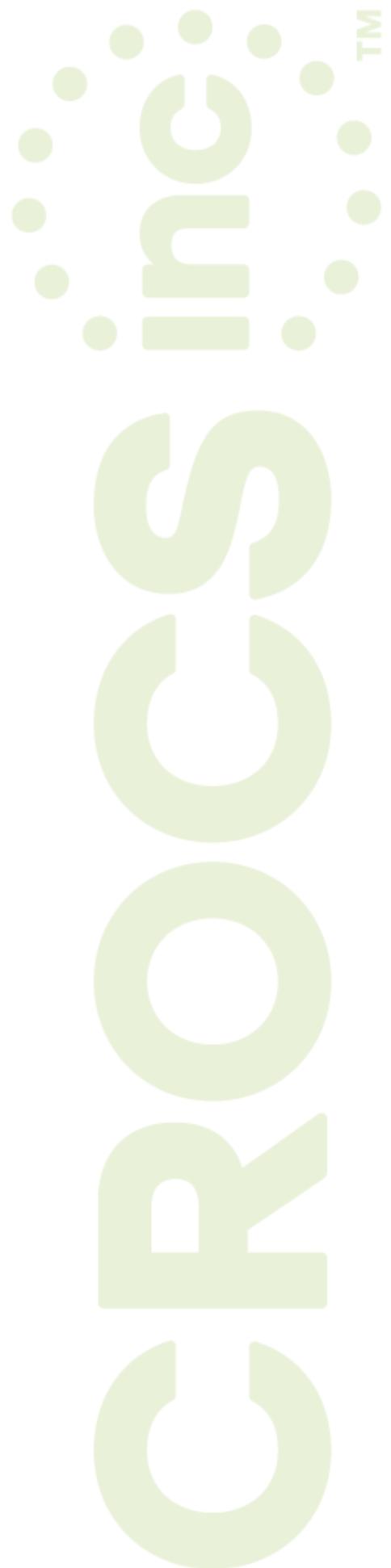




GROUP 18

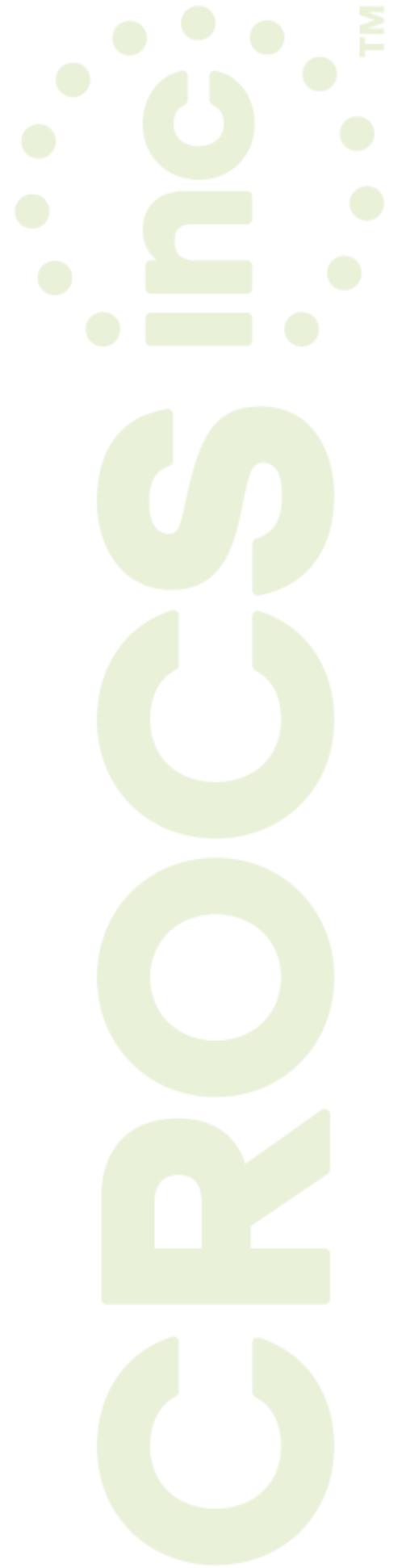
FROM SOLE TO SALE: MODELING AND ANALYZING CROCS DATA

Project by :
Sheena Solomon
Murali Prateek Manthri
Shruti Wakchoure
Pranathi Manthri



CONTENT

- INTRODUCTION
- EXECUTIVE SUMMARY
- PROJECT GOALS
- ER DIAGRAM
- RELATIONAL SCHEMA
- DATA COLLECTION
- DATABASE CREATION
- SQL QUERIES & VISUALIZATIONS
- CONCLUSION



INTRODUCTION

- Crocs, known for its iconic and comfortable footwear, has revolutionized casual footwear since its launch in 2002.
- This project dives deep into the world of Crocs, leveraging structured data to explore its business performance, customer insights, and market trends.
- A relational database was designed to model real-world scenarios, capturing Crocs' sales, products, store locations, and competitor data.
- Using SQL and Tableau, we uncovered patterns and trends highlighting the brand's growth and customer engagement.
- This work showcases how structured data can clarify complexity, offering actionable insights into a global footwear brand.



Executive Summary

We as a team spearheaded an initiative to develop an archive database system designed for long-term data preservation, security, and collaboration. Using tools like SQL MariaDB and Tableau, I analyzed archival solutions to centralize historical data while ensuring accessibility for cross-functional teams.

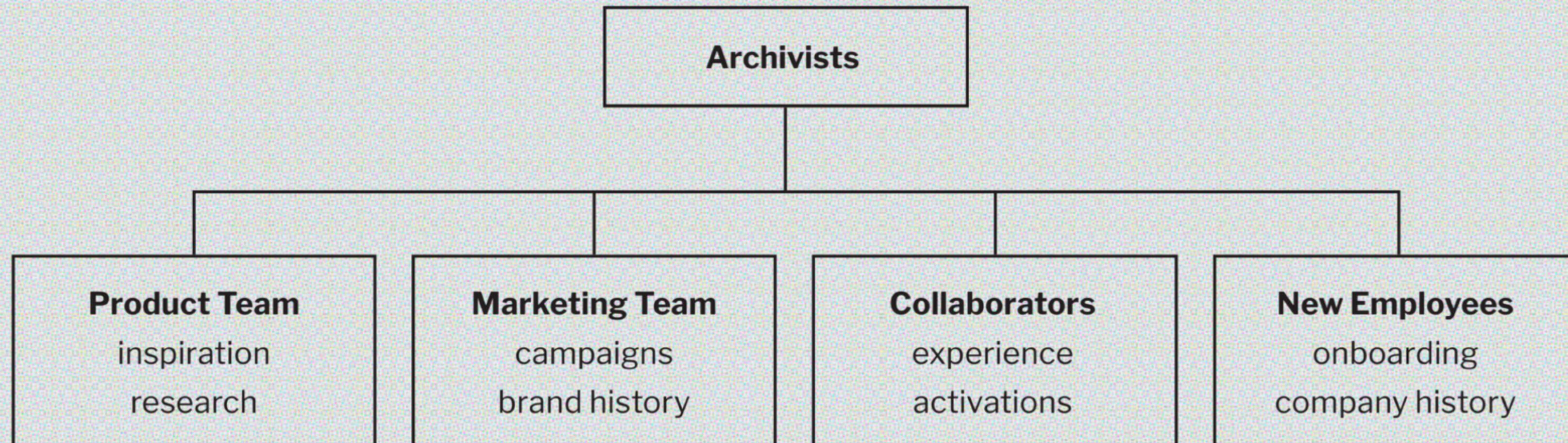
Scope:

- **Objective:** Evaluate and implement a robust archival solution that aligns with Crocs' requirements for data security, compliance, and usability.
- **Analysis:** Conducted a comprehensive assessment of SQL-based databases and visualization tools like Tableau to support both technical and non-technical stakeholders in accessing archived data seamlessly.
- **Key Deliverables:** Identified efficient data structures and streamlined workflows to preserve historical data while ensuring high performance and scalability.

Next Steps:

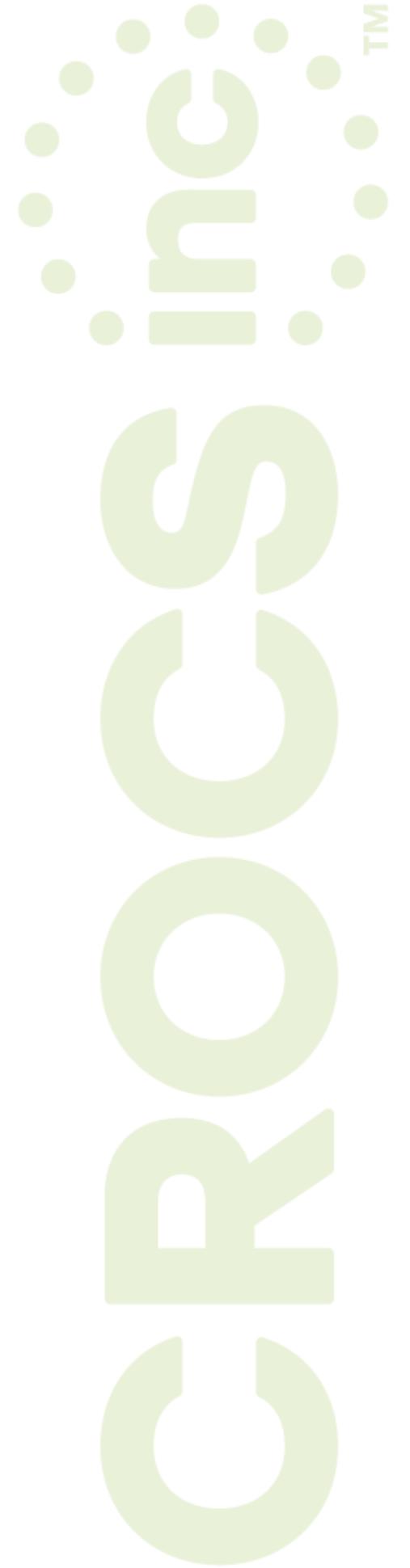
- Proposed a roadmap to launch the archival project, including initial database structures and visualization dashboards.
- Developed Python scripts to automate manual tasks, following a recommended format to improve efficiency, reduce errors, and save time.

HOW ARCHIVES EMPOWER TEAMS



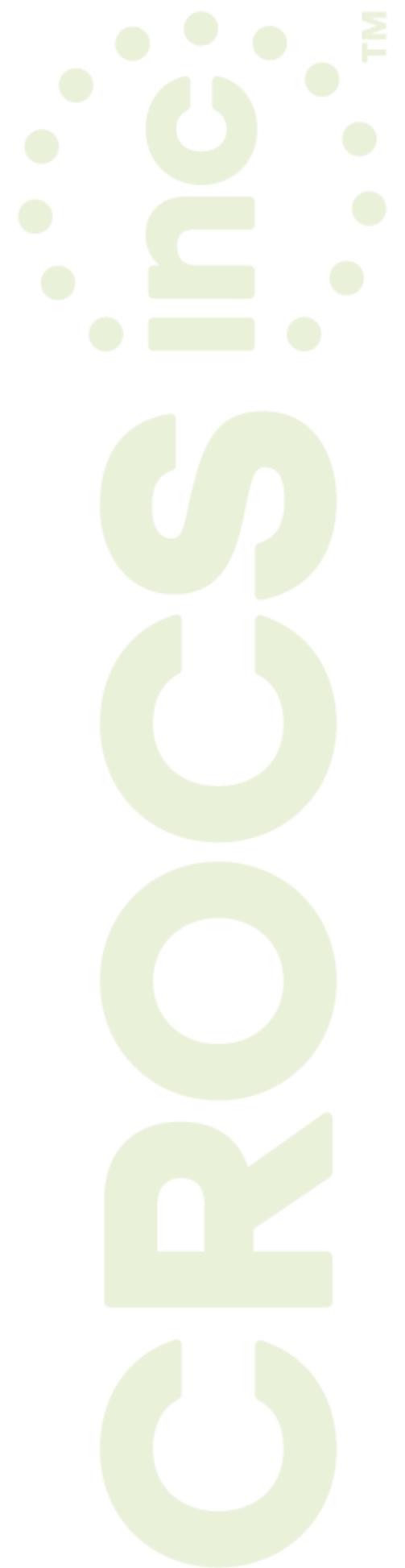
CONTENT CAPTURED

- Product Images
- Catalogs
- Microlearnings
- Retrospective Videos
- Contextual Photos
- Brand History
- Advertising Collateral
- Design Sketches
- Campaign Timelines

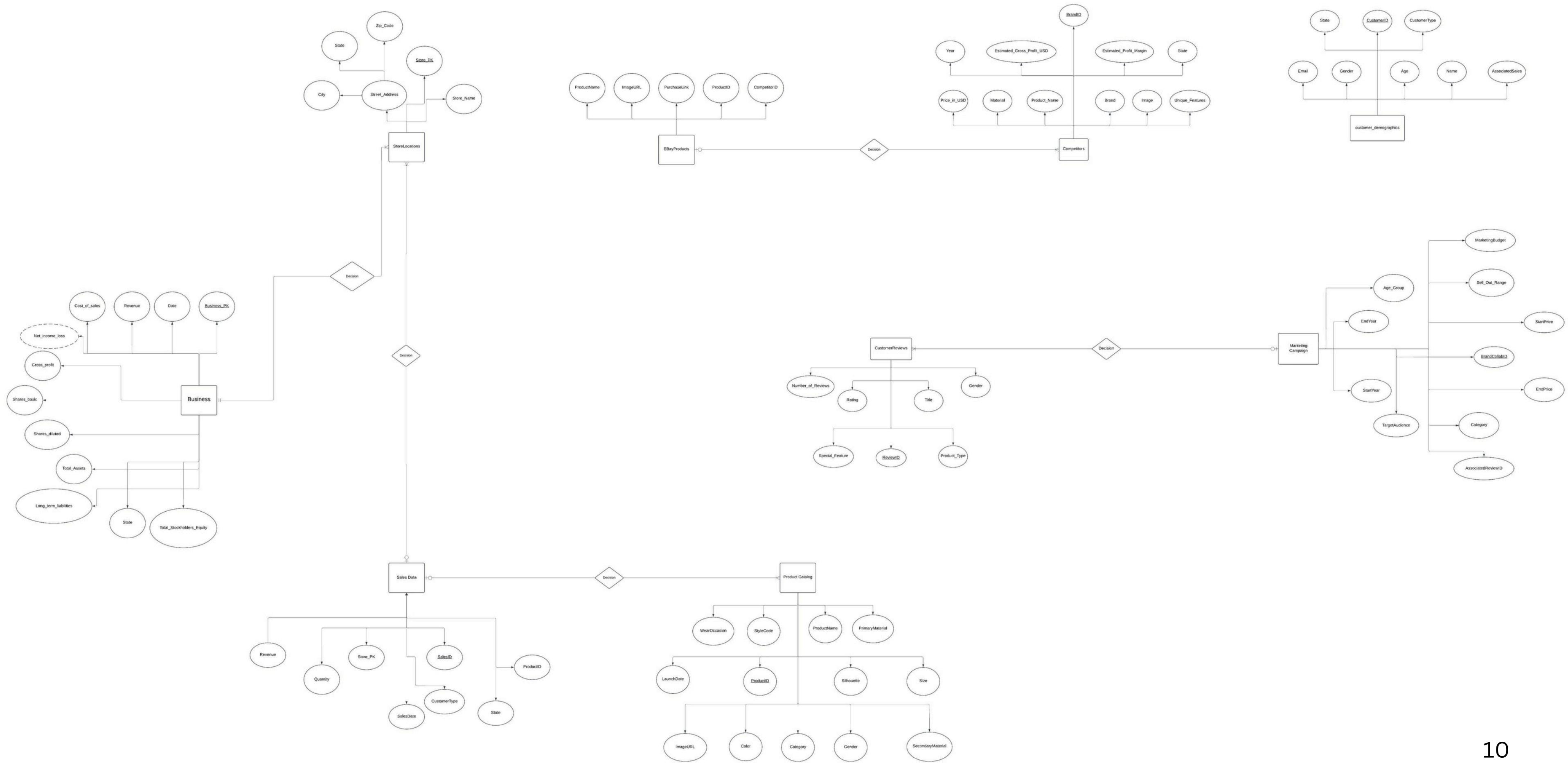


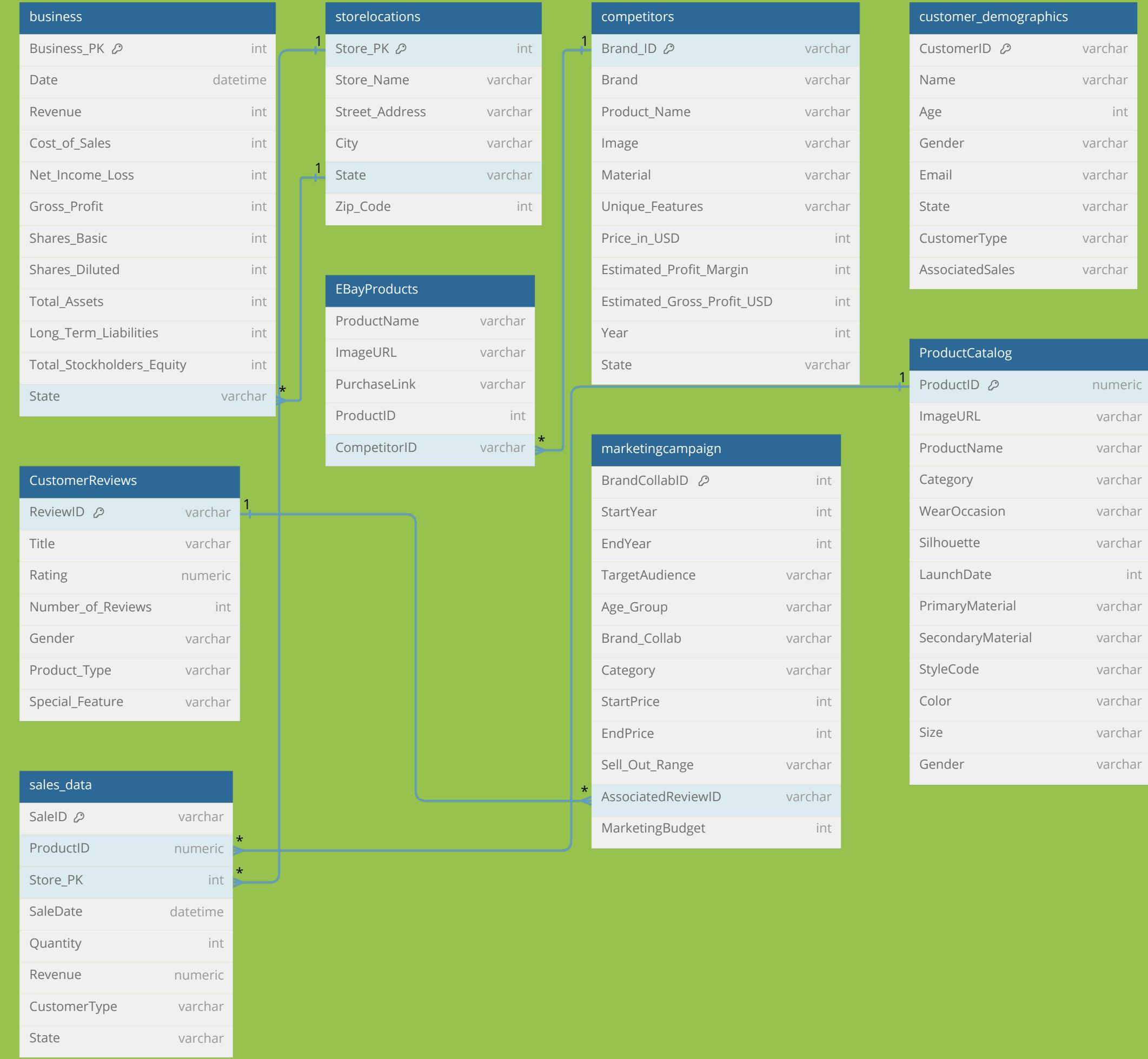
PURPOSE

- To develop a structured relational database for Crocs, enabling centralized data management and insightful analysis across business operations, sales, customers, and competitors.
- To uncover actionable insights and support data-driven decision-making, optimizing operations, enhancing customer satisfaction, and driving business growth.



ER DIAGRAM & RELATIONAL SCHEMA

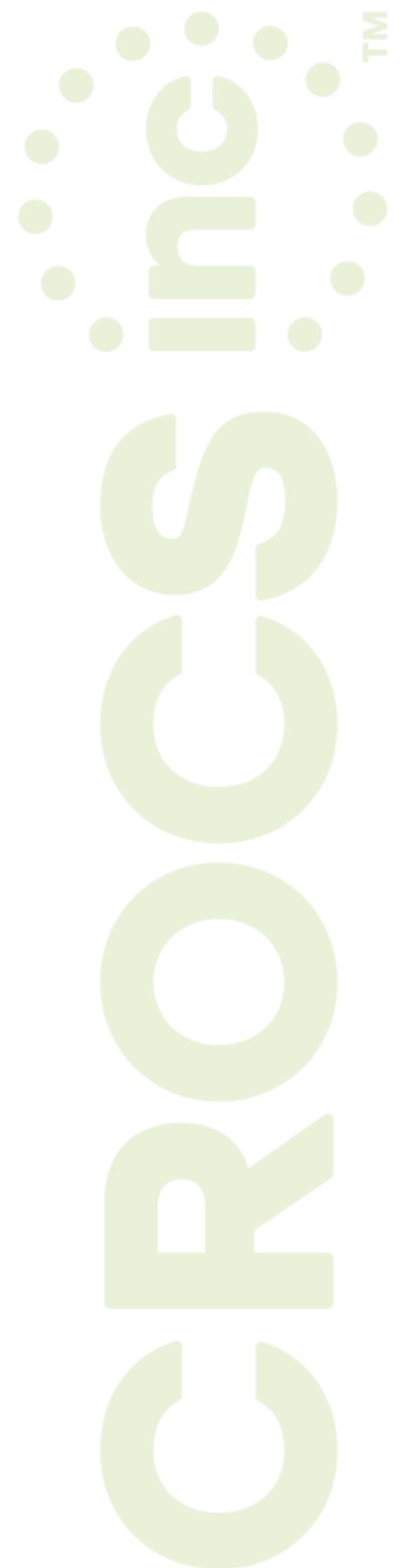






Relational Schema

- **Business** {Business_PK (PK), Date, Revenue, Cost_of_Sales, Net_Income_Loss, Gross_Profit, Shares_Basic, Shares_Diluted, Total_Assets, Long_Term_Liabilities, Total_Stockholders_Equity, State}
- **Storelocations** {Store_PK (PK), Store_Name, Street_Address, City, State, Zip_Code}
- **competitors** {Brand_ID (PK), Brand, Product_Name, Image, Material, Unique_Features, Price_in_USD, Estimated_Profit_Margin, Estimated_Gross_Profit_USD, Year, State}
- **customer_demographics** {CustomerID, Name, Age, Gender, Email, State, CustomerType, AssociatedSales}
- **CustomerReviews** {ReviewID (PK), Title, Rating, Number_of_Reviews, Gender, Product_Type, Special_Feature}
- **EBayProducts** {ProductName, ImageURL, PurchaseLink, ProductID (FK), CompetitorID (FK)}
- **Marketingcampaign** {BrandCollabID (PK), StartYear, EndYear, TargetAudience, Age_Group, Brand_Collab, Category, StartPrice, EndPrice, Sell_Out_Range, AssociatedReviewID (FK), MarketingBudget}
- **ProductCatalog** {ProductID (PK), ImageURL, ProductName, Category, WearOccasion, Silhouette, LaunchDate, PrimaryMaterial, SecondaryMaterial, StyleCode, Color, Size, Gender}
- **sales_data** {SaleID (PK), ProductID (FK), Store_PK (FK), SaleDate, Quantity, Revenue, CustomerType, State}



DATA COLLECTION

- One of our team members, working at Crocs, provided archive data stored in the ProductCatalog table.
- Customer Reviews data was web-scraped from Amazon when searching for Crocs products.
- Store locations and addresses were collected from the company's official website.
- MarketingCampaign, revenue, profit, and loss data were derived from the company's balance sheet.
- Customer Demographics and customer type data were created as fictional data for the project.

Snapshots of Raw Data

A	B	C	D	E	F	G	H
1	ReviewID	Title	Rating	Number_of_Reviews	Gender	Product_Type	Special_Feature
2	R001	Crocs Stand Modern	4.3	1237	Children	Clog	Lightweight
3	R002	Crocs Low Standard	4.5	6653	Unisex Adult	Boot	Waterproof
4	R003	Crocs Around Classic	4.3	3231	Men	Boot	Waterproof
5	R004	Crocs Offer Standard	4.6	7791	Men	Sandal	Eco-Friendly
6	R005	Crocs Something Standard	4.3	1513	Children	Clog	Lightweight
7	R006	Crocs Seem Lined	4.1	1936	Children	Sandal	Lightweight
8	R007	Crocs Leave Classic	4	3886	Women	Boot	Lightweight
9	R008	Crocs Attorney Modern	4.3	4645	Men	Sandal	Eco-Friendly
10	R009	Crocs Nor Classic	4.8	746	Women	Clog	Waterproof
11	R010	Crocs Clear Standard	4.6	6642	Women	Clog	Lightweight
12	R011	Crocs Speak Modern	3.8	4599	Men	Clog	Eco-Friendly
13	R012	Crocs By Classic	4	5688	Unisex Adult	Sandal	Eco-Friendly
14	R013	Crocs Second Standard	4.5	6906	Unisex Adult	Flat	Waterproof
15	R014	Crocs Ability Modern	4.9	8692	Women	Clog	Lightweight
16	R015	Crocs Lay Lined	4.9	3106	Unisex Adult	Flat	Waterproof
17	R016	Crocs Central Classic	3.8	7301	Unisex Adult	Flat	Eco-Friendly
18	R017	Crocs Every Classic	4.6	5583	Children	Flat	Standard
19	R018	Crocs Minute Standard	4.8	8057	Unisex Adult	Clog	Waterproof
20	R019	Crocs Husband Modern	4.8	2618	Unisex Adult	Boot	

Product Catalog

A	B	C	D	E	F	G	H	I
ProductID	ImageURL	ProductName	Category	WearOccasion	Silhouette	LaunchDate	PrimaryMaterial	SecondaryMaterial
102001	https://drv/CYPRUS	SANDALS	STYLE	SANDALS	2008	CROSLITE	Unavailable	
102002	https://drv/MALINDI	SANDALS	STYLE	FLAT	2008	CROSLITE	Unavailable	
102003	https://drv/ADARA	SANDALS	STYLE	FLOP	2008	CROSLITE	Unavailable	
102004	https://drv/WOMENS SANTA CRUZ	LIFESTYLE	STYLE	SLIP ON	2008	CROSLITE	CANVAS	
102005	https://drv/MENS SANTA CRUZ	LIFESTYLE	STYLE	SLIP ON	2008	CROSLITE	CANVAS	
102006	https://drv/YUKON	CLOG	EVERYDAY	CLOG	2008	CROSLITE	LEATHER	
102007	https://drv/ATLANTIC	LIFESTYLE	STYLE	SHOE	2008	CROSLITE	WATERPROOF	
102008	https://drv/YUCATAN	SANDALS	STYLE	SANDALS	2008	CROSLITE	Unavailable	
102009	https://drv/OTTER	KIDS	STYLE	SANDALS	2008	CROSLITE	Unavailable	
102010	https://drv/PELICAN	KIDS	STYLE	SLIP ON	2008	CROSLITE	Unavailable	
102011	https://drv/CELESTE PERFORATED LEATHER	SANDALS	STYLE	SLIP ON	2008	CROSLITE	LEATHER	
102012	https://drv/VENTURE SUEDE	LIFESTYLE	STYLE	SHOE	2008	CROSLITE	Unavailable	
102013	https://drv/CELESTE SUEDE	LIFESTYLE	STYLE	FLAT	2008	CROSLITE	SUEDE	
102014	https://drv/CELESTE CANVAS	LIFESTYLE	STYLE	FLAT	2008	CROSLITE	CANVAS	
102015	https://drv/VENTURE LEATHER	LIFESTYLE	STYLE	SHOE	2008	CROSLITE	LEATHER	
102016	https://drv/VENTURE CANVAS	LIFESTYLE	STYLE	SHOE	2008	CROSLITE	CANVAS	
102017	https://drv/SUDED ALICE	LIFESTYLE	STYLE	MARY JAI	2008	CROSLITE	SUEDE	
102018	https://drv/ALICE	LIFESTYLE	STYLE	MARY JAI	2008	CROSLITE	Unavailable	
102019	https://drv/GIRLS ALICE	LIFESTYLE	STYLE	MARY JAI	2008	CROSLITE	Unavailable	
102020	https://drv/HI CRUISER	LIFESTYLE	STYLE	SHOE	2008	CROSLITE	SUEDE	
102021	https://drv/WOMENS TROIKA	CLOG	EVERYDAY	CLOG	2008	CROSLITE	SUEDE	

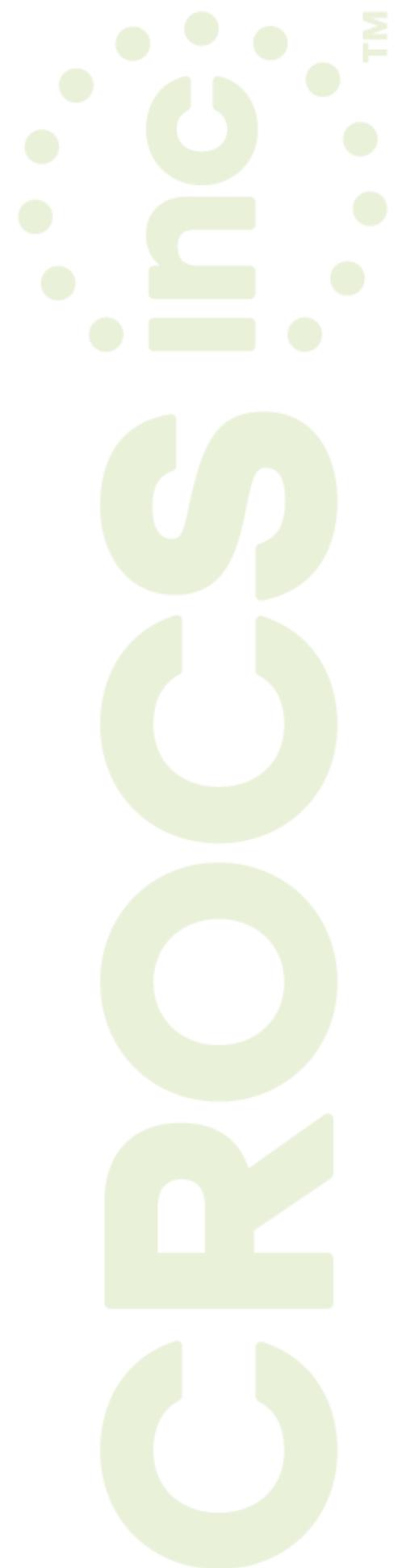
Customer Reviews

Competitors

	A	B	C	D	E	F	G	H	I	J	K
1	Brand_ID	Brand	Product_Name	Image	Material	Unique_Features	Price_in_USD	Estimated	Estimated	Year	State
2	B1	Crocs	Classic Lined Clog	https://www.crocs.com	Croslite™ with fuzzy liner	Lightweight, customizable, heel strap	60	50	35	2008	New York
3	B2	Skechers	Bobs Plush	https://www.skechers.com	microfiber with faux fur	Sustainable, memory foam	55	55	35	2010	Alabama
4	B3	Birkenstock	Boston Big Buckle Shearling	https://www.birkenstock.com	Natural suede with shearling lining	Iconic, EVA outsole, orthopedically support	170	50	100	1977	Alabama
5	B4	Clarks	Shearling Lined Mule	https://www.clarks.com	Leather with shearling lining	Stylish, durable, lightweight	55	50	60	2015	Arizona
6	B5	Teva	Ember Shearling Slipper	https://www.teva.com	Ripstop upper with shearling	Durable, outdoor, collapsible	80	50	50	2018	Arizona
7	B6	Hoka One One	Recovery Slide	https://www.hokafactory.com	EVA foam with soft lining	Cushioned, Active lifestyle	50	50	30	2019	New York
8	B7	Vans	Cozy ComfyCush Slip-On	https://www.vans.com	Canvas with plush interior	Casual, skate-inspired	70	42	40	2020	Texas
9	B8	Allbirds	Wool Lounger	https://www.allbirds.com	Merino wool with faux fur	Sustainable, washable, temperature regulation	105	52	65	2017	California
0	B9	Keen	Howser Slide	https://www.keenfootwear.com	Recycled materials with fleece	Outdoor-, sustainable, durable	100	50	60	2008	California
1	B10	Sanuk	Cozy Vibe	https://www.sanuk.com	Hemp with faux fur lining	Relaxed, eco-friendly, sustainable	65	46	40	2017	New York
2											
3											

Business

A	B	C	D	E	F	G	H	I	J
Date	Revenue	Cost_of_Sales	Net_Income_Loss	Gross_Profit	Shares_Basic	Shares_Diluted	Total_Asse	Long_Term_Liabilities	Total_Stockholders_Equity
31-12-2008	721589	486722	-185076	233966	82767540	82767540	455039	33500	287163
31-12-2009	645767	337720	-42078	300961	85112461	85112461	409738	35303	287620
31-12-2010	789695	364631	67726	423764	85482055	87595618	549481	35613	376106
31-12-2011	1000903	464493	112788	536410	88317898	89981382	695453	48370	491780
31-12-2012	1123301	515324	131343	607977	89571105	90588416	829638	54300	617400
31-12-2013	1192680	569482	10420	623198	87989	89089	875159	63487	624744
31-12-2014	1198223	603893	-4926	590345	85140	85140	806931	27849	452518
31-12-2015	1090630	579825	-83196	510805	75604	75604	608020	19294	245972
31-12-2016	1036273	536109	-16494	500164	73371	73371	566390	17966	220383
31-12-2017	1023513	506292	10238	517221	72255	72255	543695	18379	185865



CROCS DATABASE

<> ProjectC <> ProjVal x <> ProjectQu
1 CREATE DATABASE crocsdatabase;
2 USE crocsdatabase;
3

File Edit View Tools Help MSBX - Beekeeper Studio

crocsdatabase

ENTITIES 9

- > business
- > competitors
- > customerreviews
- > customer_demographics
- > ebayproducts
- > marketingcampaign
- > productcatalog
- > sales_data
- > storelocations

```
33 CREATE TABLE IF NOT EXISTS `storelocations` (
34     `Store_PK` INT PRIMARY KEY,
35     `Store_Name` VARCHAR(37) CHARACTER SET utf8,
36     `Street_Address` VARCHAR(38) CHARACTER SET utf8,
37     `City` VARCHAR(14) CHARACTER SET utf8,
38     `State` VARCHAR(14) CHARACTER SET utf8,
39     `Zip_Code` INT
40 );
41
42 INSERT INTO `storelocations` VALUES (1,'Crocs at Vacaville Outlet','101D Nut Tree Rd','Vacaville','California',
43 (2,'Crocs at Miromar','10801 Corkscrew Rd Suite 182','Estero','Florida',33928),
44 (3,'Crocs at Plaza Las Americas','525 Ave. F.D. Roosevelt Space 524','San Juan','Puerto Rico',918),
45 (4,'Crocs at Tanger Outlets Foxwoods','455 Trolley Line Blvd','Mashantucket','Connecticut',6338),
46 (5,'Crocs at Waikiki','94-790 Lumiaina Street','Waipahu','Hawaii',96797),
47 (6,'Crocs at Plaza Bonita','13030 Plaza Bonita Road Space 1134','National City','California',91950),
48 (7,'Crocs at Concord Mills','8111 Concord Mills Blvd Space 529','Concord','North Carolina',28027),
49 (8,'Crocs at Seattle Premium Outlet','10600 Quil Ceda Blvd Suite 0417','Tulalip','Washington',98271),
50 (9,'Crocs at Niagara Falls Fashion Outlet','1989 Fashion Outlets Blvd Suite 208','Niagara Falls','New York',
51 (10 'Crocs at Puerto Rico Premium Outlets','1 Prime Outlets Blvd Spc 910','Barceloneta','Puerto Rico',617),
```

Save Run

CustomerID equals Enter Value + 🔎

	CustomerID	Name	Age	Gender	Email	State	CustomerType
1	C001	Theresa Carter	41	Women	srivera@yahoo.c...	New York	New
2	C002	Mark Bates	53	Unisex Adult	ewiley@hotmail....	Texas	Regular
3	C003	Dr. Theresa Oliver...	40	Men	robertarmstrong...	Arizona	Regular
4	C004	Stephanie Walker	38	Unisex Adult	whitealyssa@bal...	Arizona	New
5	C005	Barbara Roman	29	Men	lewisrichard@gm...	Alabama	New
6	C006	Olivia Hoover	37	Women	palmerjames@g...	California	Regular
7	C007	Kelly Obrien	18	Men	ywatson@barnes...	Arizona	VIP
8	C008	Dennis Smith	27	Unisex Adult	matthew23@hot...	Alabama	VIP
9	C009	Susan Mora	51	Women	wbaker@gmail.c...	Texas	New
10	C010	Denise Nelson	25	Unisex Adult	ygarrison@yaho...	New York	Regular
11	C011	Jacob Bryant	25	Women	vincentgonzales...	California	New
12	C012	Kathy Thompson	30	Unisex Adult	edavenport@hot...	New York	Regular
13	C013	Robert Ross	21	Unisex Adult	zwolf@hotmail.c...	California	Regular
14	C014	Christina Hurst	32	Unisex Adult	charles58@hotm...	Alabama	New
15	C015	Sydney Juarez	40	Unisex Adult	rebecca47@sulli...	New York	VIP
16	C016	Travis Thompson	56	Children	karenjackson@c...	Arizona	New

ProjectC ProjVal ProjectQu marketingcampai productcatalog sales_data customer_demogra + 🔎 Upgrade

SaleID equals Enter Value + 🔎

	SaleID	Produ...	Store...	SaleDate ...	Quantity	Revenue	CustomerType	State
1	S001	102001.0	8	2024-08-19 ...	3	130.80	New	Arizona
2	S002	102002.0	8	2024-10-28 ...	4	58.24	VIP	New York
3	S003	102003.0	7	2023-06-12 ...	2	271.09	Regular	New York
4	S004	102004.0	4	2023-12-19 ...	5	161.93	New	Alabama
5	S005	102005.0	1	2023-10-17 ...	6	845.20	VIP	Alabama
6	S006	102006.0	7	2024-09-14 ...	7	171.89	New	Texas
7	S007	102007.0	1	2024-03-10 ...	1	944.06	New	California
8	S008	102008.0	4	2024-05-09 ...	6	538.37	New	Texas
9	S009	102009.0	8	2023-01-22 ...	8	914.42	VIP	Arizona
10	S010	102010.0	1	2024-10-28 ...	3	1381.84	Regular	New York
11	S011	102011.0	5	2023-09-20 ...	4	879.31	VIP	California
12	S012	102012.0	7	2023-08-05 ...	3	214.00	New	California
13	S013	102013.0	1	2024-09-06 ...	7	170.95	Regular	Arizona
14	S014	102014.0	4	2024-01-02 ...	1	297.58	New	New York
15	S015	102015.0	5	2023-11-10 ...	1	145.04	Regular	Texas
16	S016	102016.0	9	2024-03-21 ...	6	972.19	New	Alabama

crocsdatabase 🔍 +

Filter

ENTITIES 9

- business
- competitors
- customerreviews
- customer_demographics
- ebayproducts
- marketingcampaign
- productcatalog
- sales_data
- storelocations

SQL QUERIES

&

VISUALIZATIONS

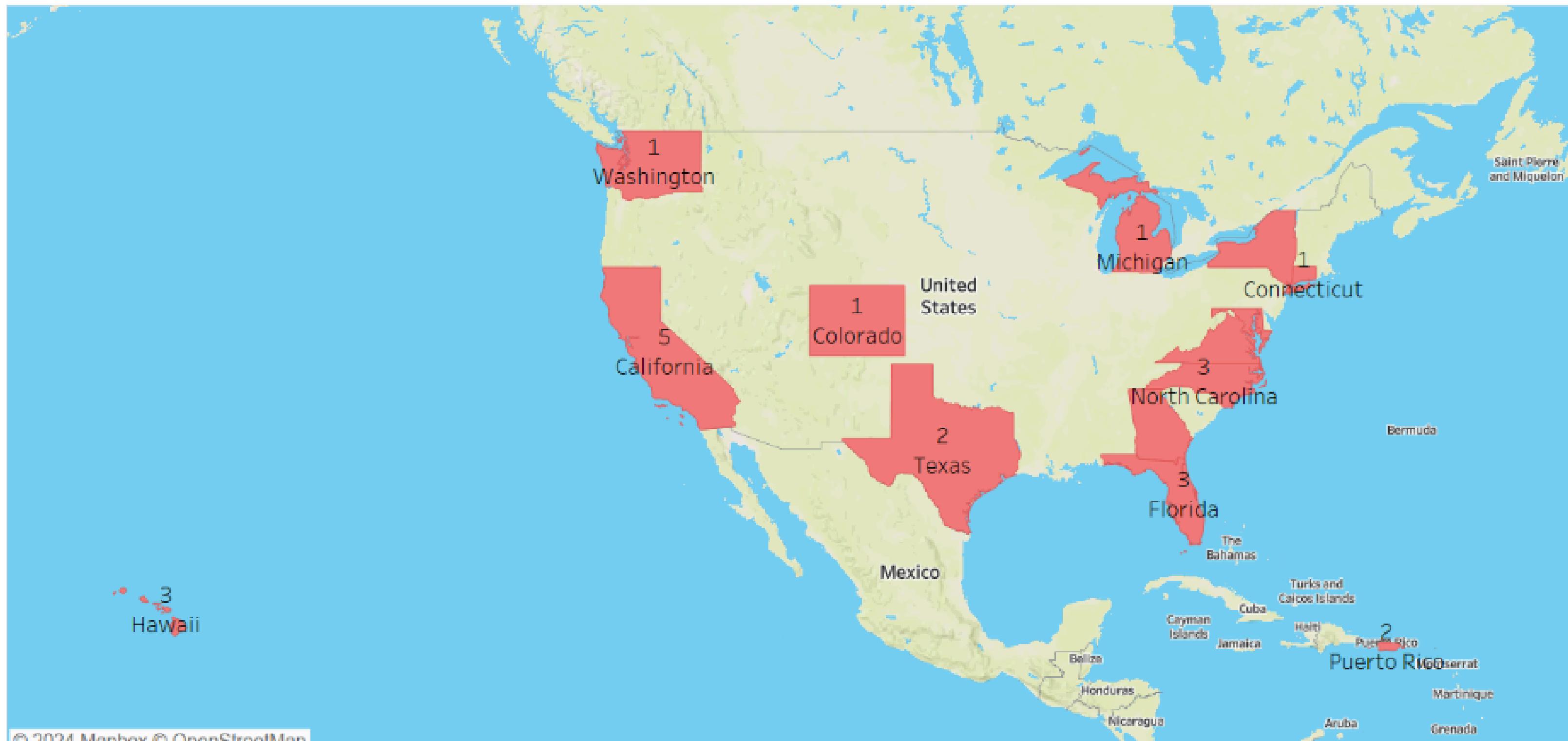
Number of stores in each state

```
3 -- 1. Count the Number of Stores in Each State  
4  
5 SELECT State, COUNT(*) AS StoreCount  
6 FROM storelocations  
7 GROUP BY State  
8 ORDER BY StoreCount DESC;
```

	State	StoreCount
1	California	5
2	New York	4
3	Hawaii	3
4	North Carolina	3
5	Florida	3
6	Virginia	2
7	Texas	2
8	Puerto Rico	2
9	Connecticut	1
10	Colorado	1
11	Michigan	1

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Number of Stores in each State



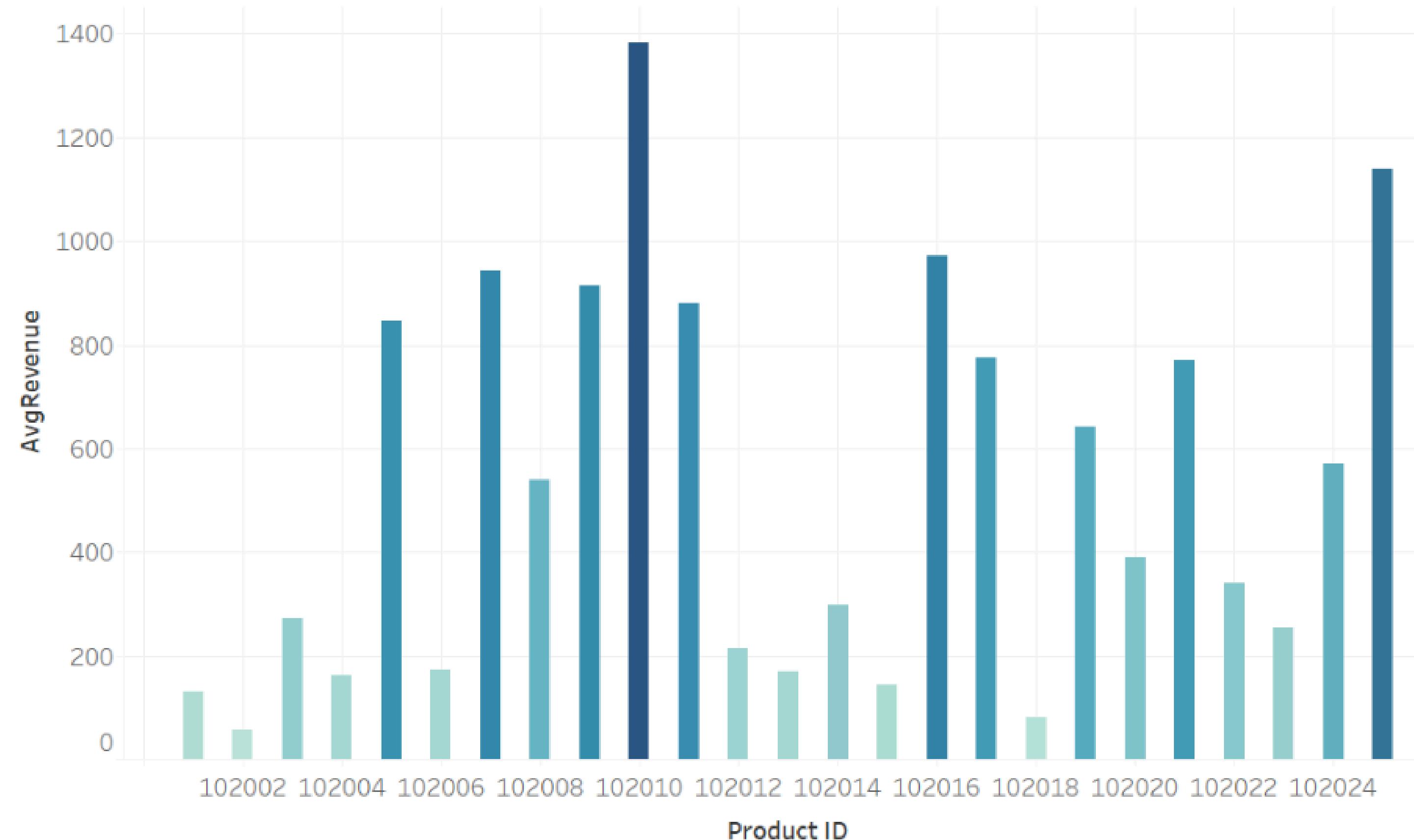
© 2024 Mapbox © OpenStreetMap

Average Revenue Generated By Each Product

```
SELECT ProductID, AVG(Revenue) AS AvgRevenue  
FROM sales_data  
GROUP BY ProductID;
```

	ProductID	AvgRevenue
1	102001.0	130.800000
2	102002.0	58.240000
3	102003.0	271.090000
4	102004.0	161.930000
5	102005.0	845.200000
6	102006.0	171.890000
7	102007.0	944.060000
8	102008.0	538.370000
9	102009.0	914.420000
10	102010.0	1381.840000
11	102011.0	879.310000

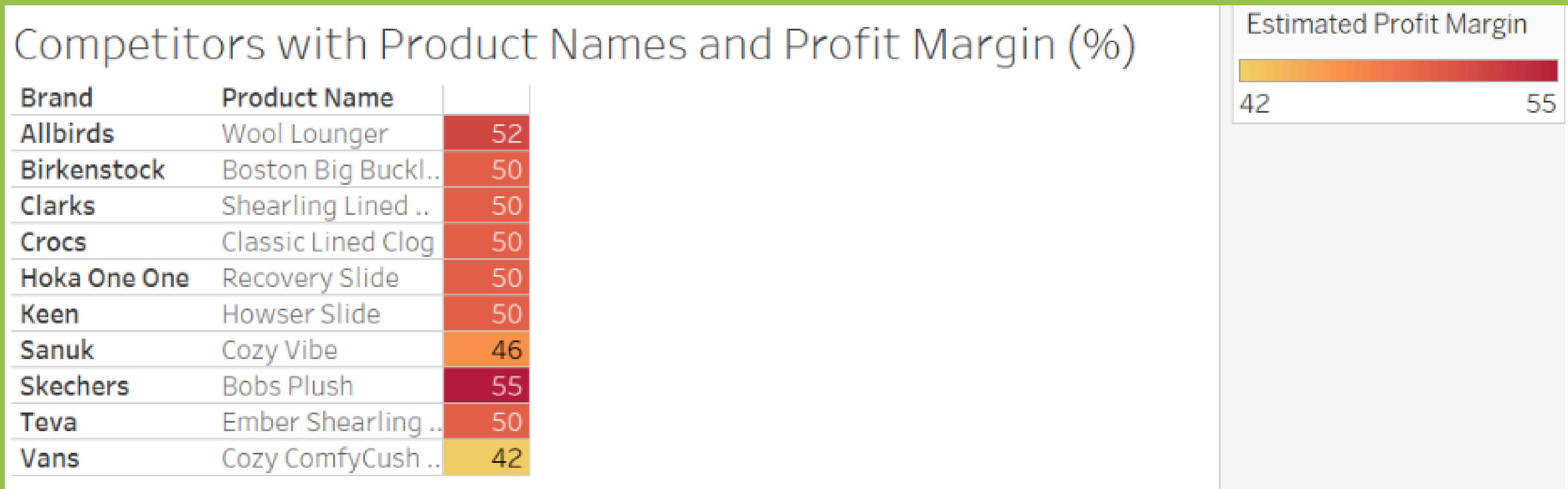
Average Revenue Generated By Each Product



Competitors with a Profit Margin > 50%

```
SELECT Brand, Product_Name, Estimated_Profit_Margin  
FROM competitors  
WHERE Estimated_Profit_Margin > 50;
```

	Brand	Product_Name	Estimated_Profit_Margin
1	Skechers	Bobs Plush	55
2	Allbirds	Wool Lounger	52

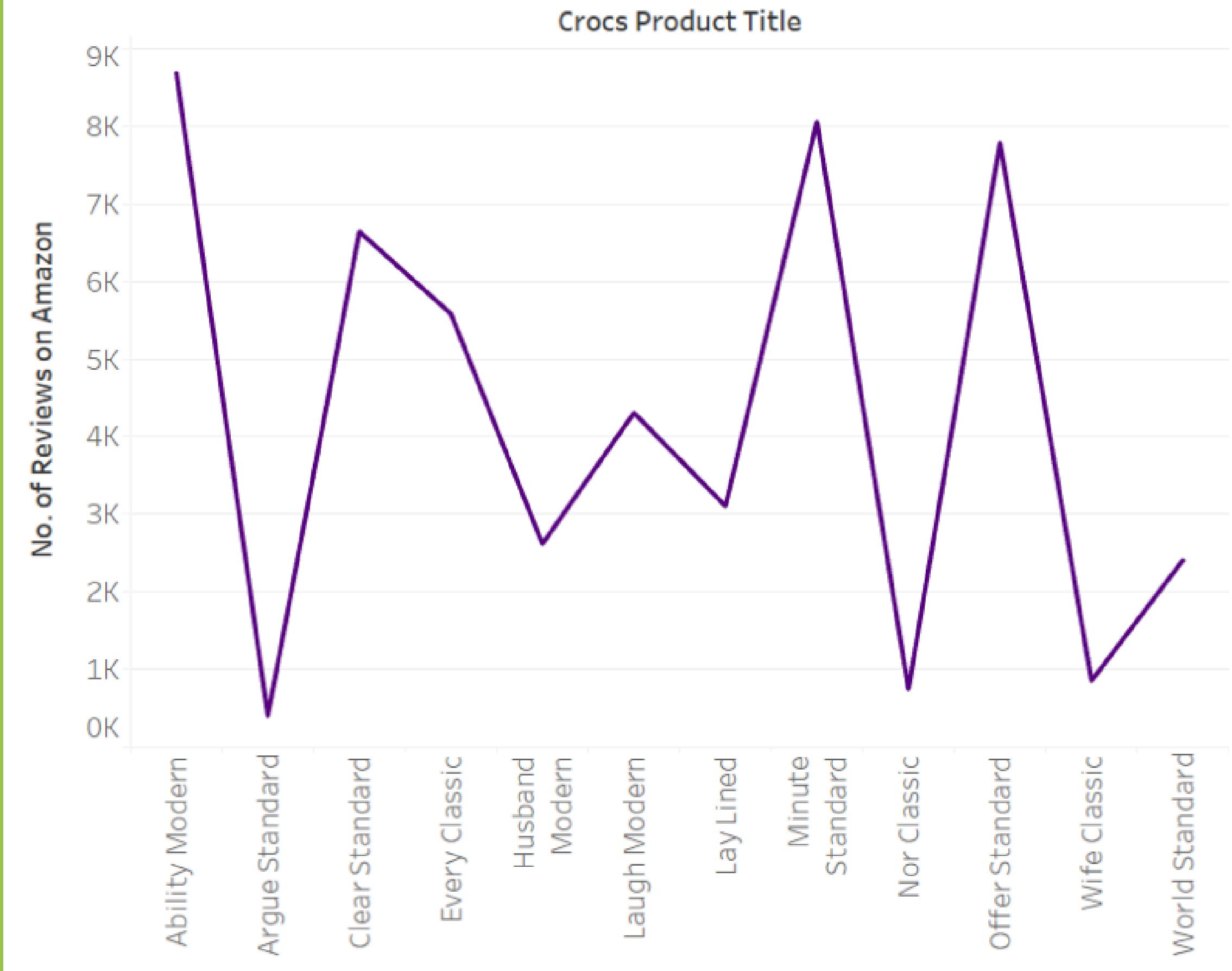


Customer Reviews for Products with Ratings > 4.5

```
SELECT Title, Rating, Number_of_Reviews  
FROM CustomerReviews  
WHERE Rating > 4.5;
```

	Title	Rating	Number_of_Reviews
1	Crocs Offer Standard	4.6	7791
2	Crocs Nor Classic	4.8	746
3	Crocs Clear Standard	4.6	6642
4	Crocs Ability Modern	4.9	8692
5	Crocs Lay Lined	4.9	3106
6	Crocs Every Classic	4.6	5583
7	Crocs Minute Standard	4.8	8057
8	Crocs Husband Modern	4.8	2618
9	Crocs Argue Standard	4.7	401
10	Crocs Wife Classic	4.9	853
11	Crocs World Standard	5.0	2411

Number of Reviews for Crocs Products on Amazon

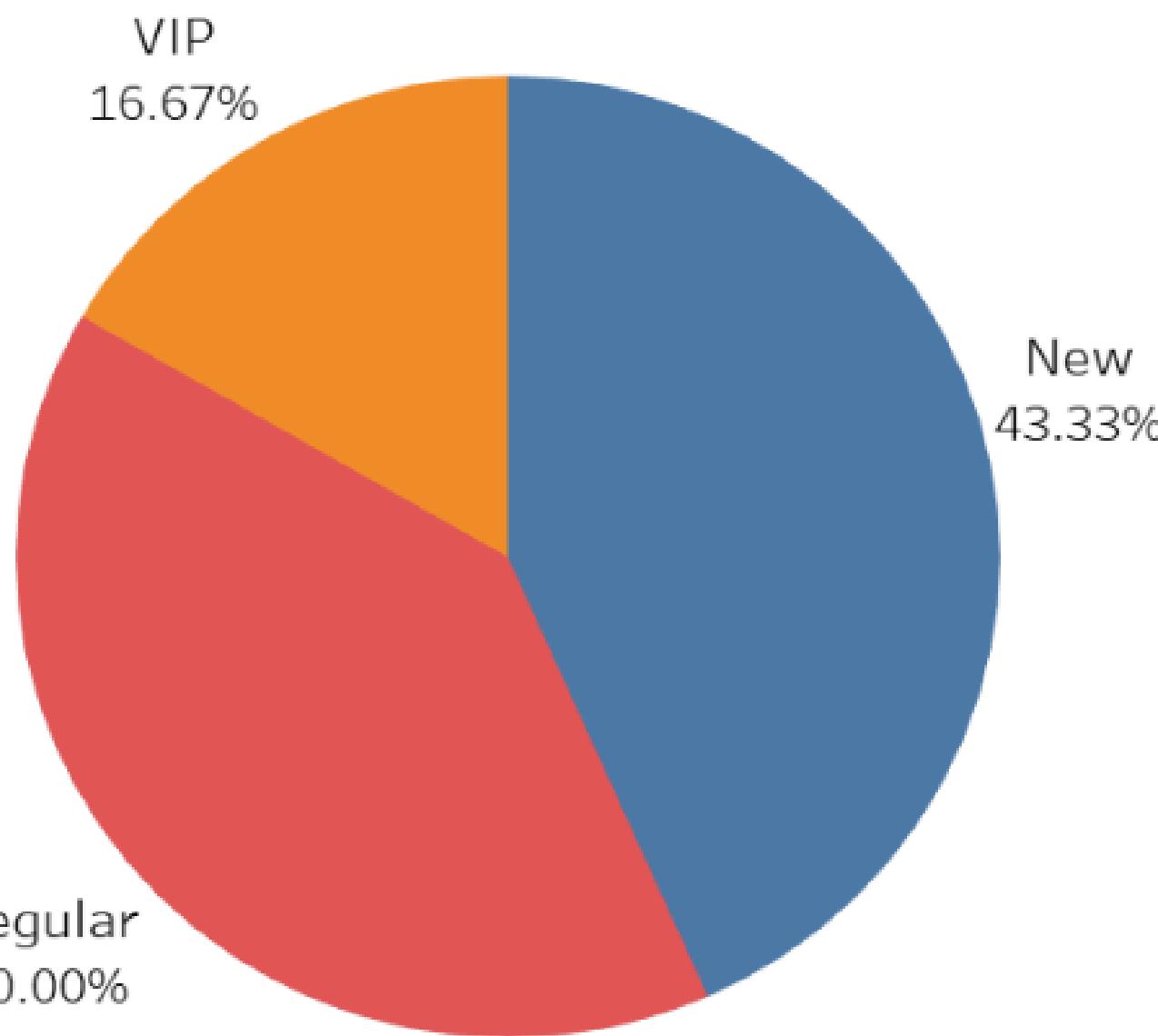


Customers Who Have Made VIP Purchases

```
SELECT DISTINCT c.Name, c.Email, c.CustomerType  
FROM customer_demographics c  
JOIN sales_data s ON c.CustomerType = s.CustomerType  
WHERE s.CustomerType = 'VIP';
```

	Name	Email	CustomerType
1	Kelly Obrien	ywatson@barnes-curtis.com	VIP
2	Dennis Smith	matthew23@hotmail.com	VIP
3	Sydney Juarez	rebecca47@sullivan.info	VIP
4	Robin Bryant	robert96@contreras-murray.org	VIP
5	David White	changjared@yahoo.com	VIP

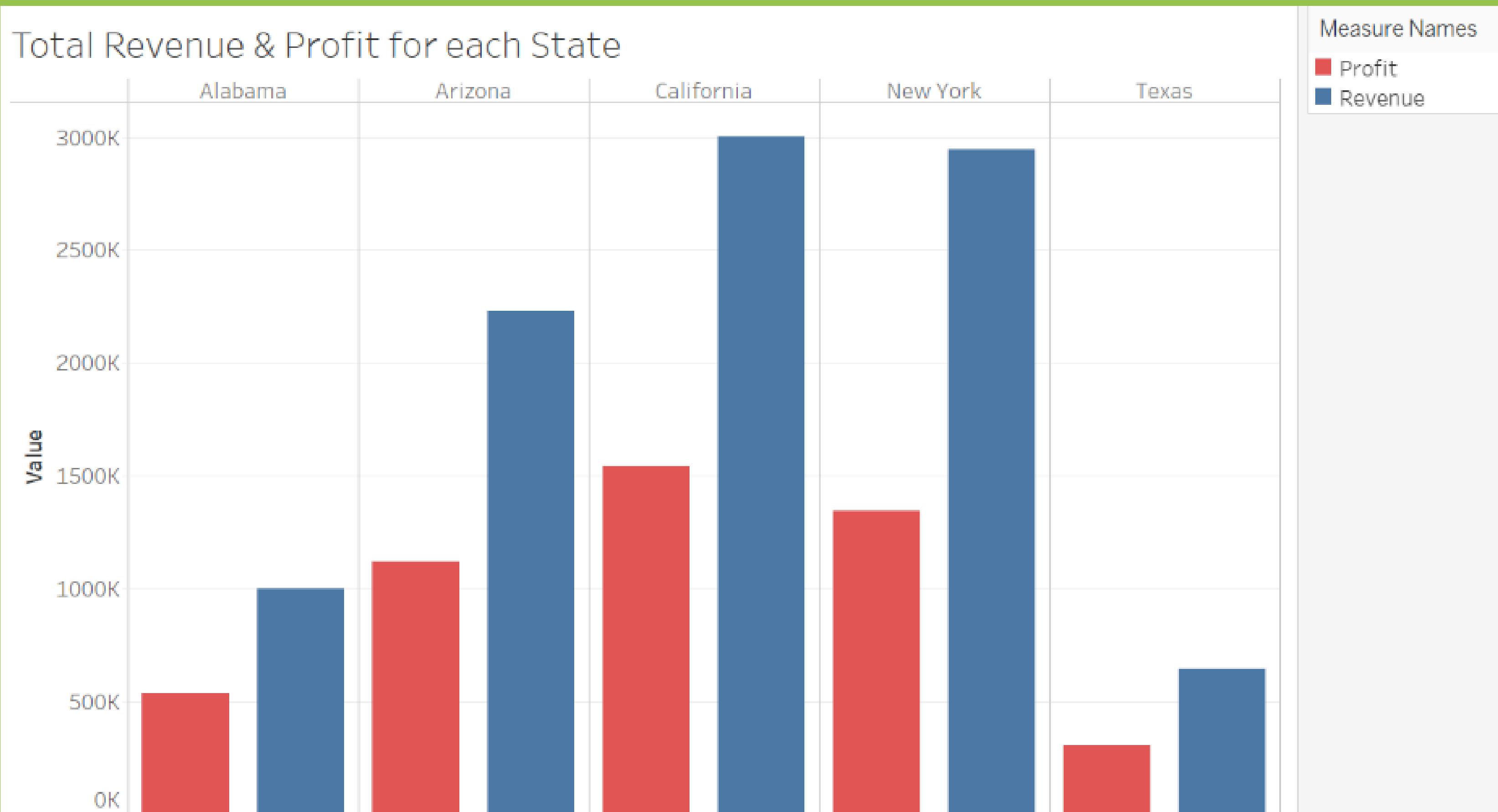
Customer Distribution By Type



Total Revenue and Profit for Each State

```
SELECT State, SUM(Revenue) AS TotalRevenue, SUM(Revenue - Cost_of_Sales) AS TotalProfit  
FROM business  
GROUP BY State;
```

	State	TotalRevenue	TotalProfit
1	Alabama	1000903	536410
2	Arizona	2228953	1123362
3	California	3003626	1543846
4	New York	2943325	1346418
5	Texas	645767	308047



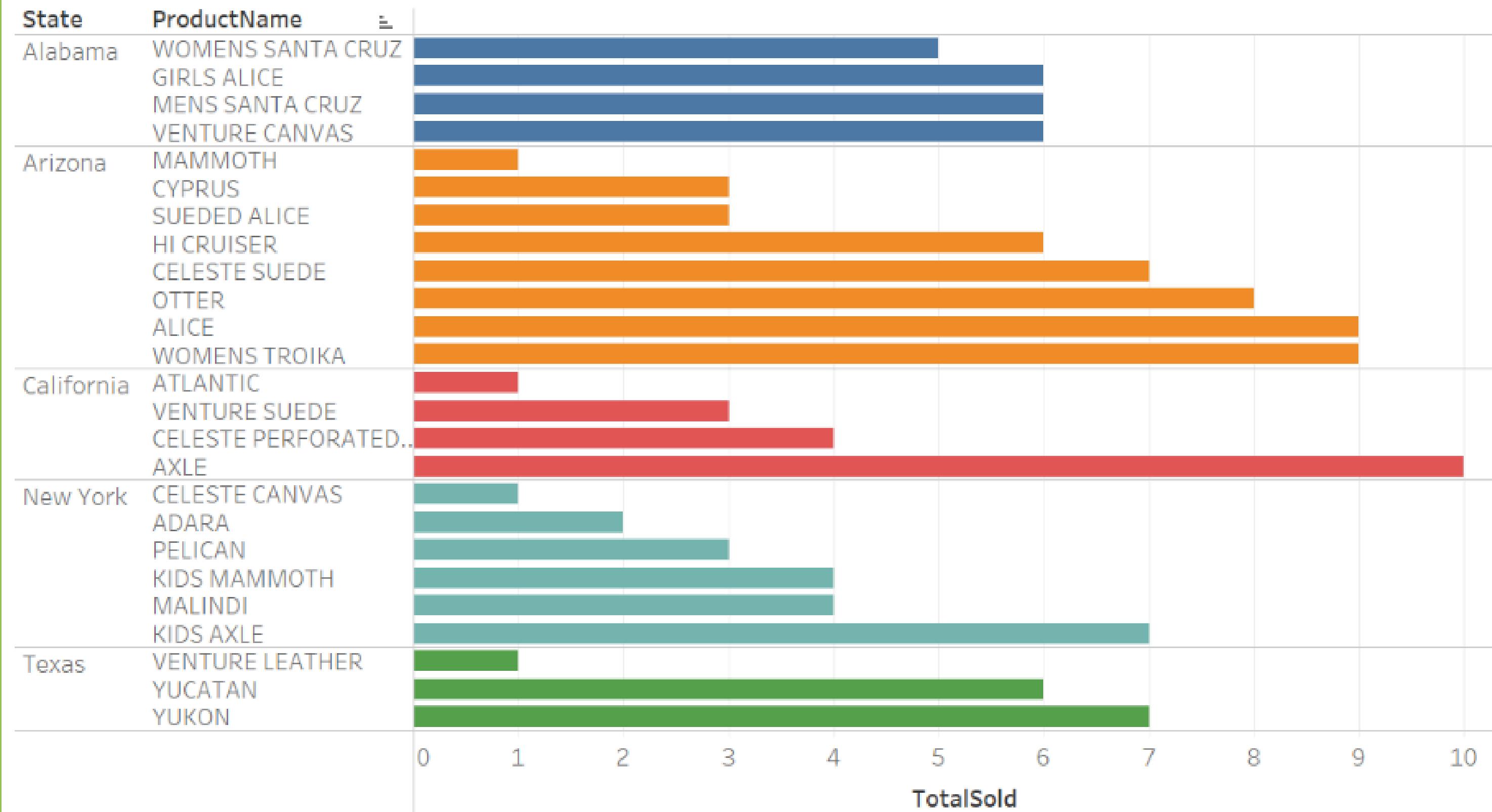
Top 3 Best-Selling Products in Each State

```
SELECT s.State, p.ProductName, SUM(s.Quantity) AS TotalSold
FROM sales_data s
JOIN ProductCatalog p ON s.ProductID = p.ProductID
GROUP BY s.State, p.ProductName
ORDER BY s.State, TotalSold DESC
```

	State	ProductName	TotalSold
1	Alabama	VENTURE CANVAS	6
2	Alabama	MENS SANTA CRUZ	6
3	Alabama	GIRLS ALICE	6
4	Alabama	WOMENS SANTA ...	5
5	Arizona	ALICE	9
6	Arizona	WOMENS TROIKA	9
7	Arizona	OTTER	8
8	Arizona	CELESTE SUEDE	7
9	Arizona	HI CRUISER	6
10	Arizona	CYPRUS	3
11	Arizona	SUEDED ALICE	3

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State-wise Distribution of Products by Total Units Sold

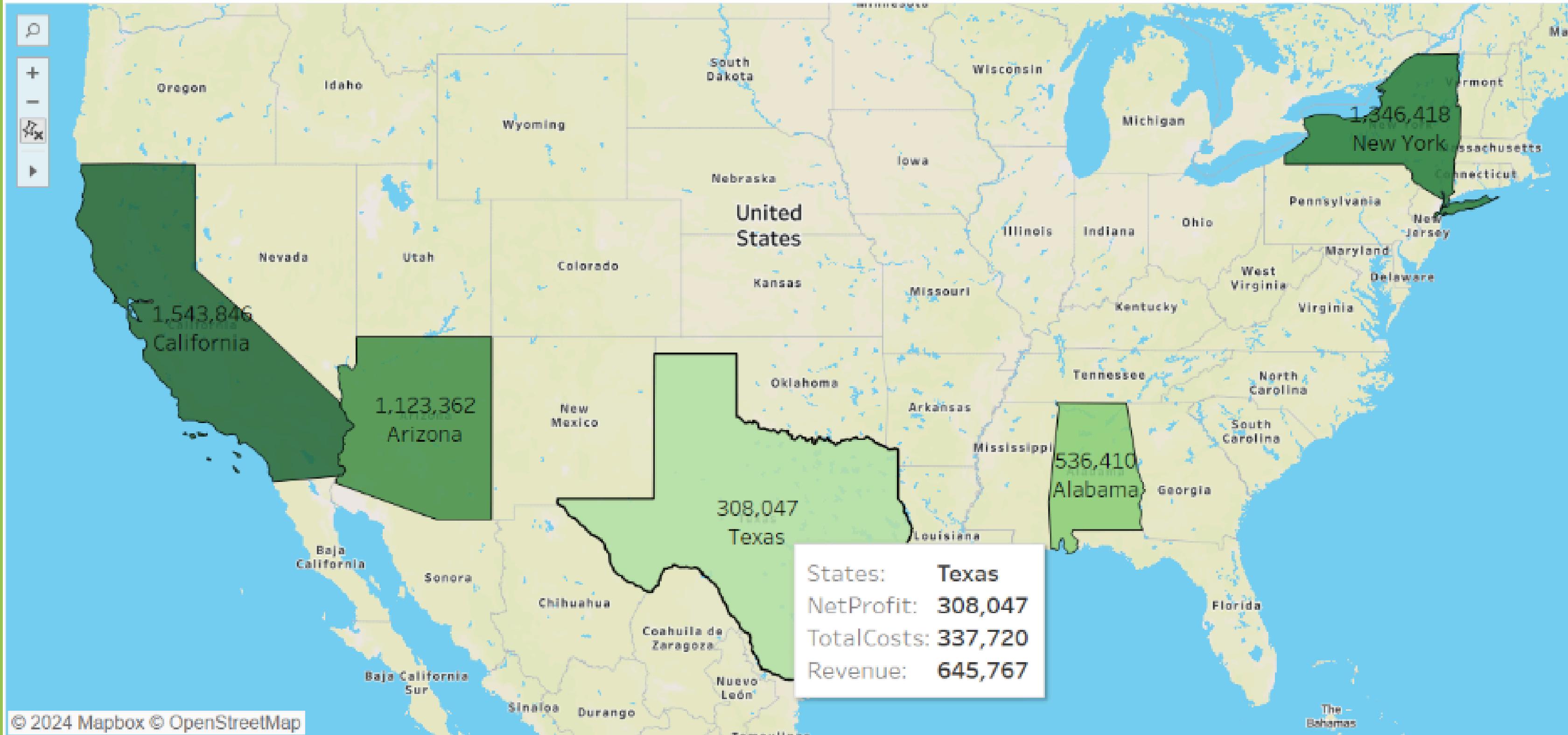


State-Level Profit and Loss Report

```
SELECT b.State, SUM(b.Revenue) AS TotalRevenue, SUM(b.Cost_of_Sales) AS TotalCosts,  
       SUM(b.Revenue - b.Cost_of_Sales) AS NetProfit  
FROM business b  
GROUP BY b.State  
ORDER BY NetProfit DESC;
```

	State	TotalRevenue	TotalCosts	NetProfit
1	California	3003626	1459780	1543846
2	New York	2943325	1596907	1346418
3	Arizona	2228953	1105591	1123362
4	Alabama	1000903	464493	536410
5	Texas	645767	337720	308047

State-wise Revenue, Costs, and Net Profit Analysis



CONCLUSION

- Successfully designed a structured and scalable relational database for managing diverse datasets.
- Implemented SQL queries to analyze business performance, sales trends, customer behavior, and competitor insights.
- Revealed valuable patterns, such as top-performing products, state-level profitability, and customer preferences.
- Empowered Crocs with actionable insights to enhance decision-making and drive growth.
- Demonstrated the power of structured data in optimizing operations, improving customer satisfaction, and sustaining market leadership.

FUTURE SCOPE

- Implement machine learning models for sales forecasting, customer behavior prediction, and sentiment analysis on reviews.
- Expand the database to include international markets, multi-currency data, and multilingual support.
- Integrate real-time data processing for live tracking of sales, inventory, and customer interactions.
- Use data to enable tailored marketing strategies, personalized product recommendations, and improved customer engagement.

THANK YOU