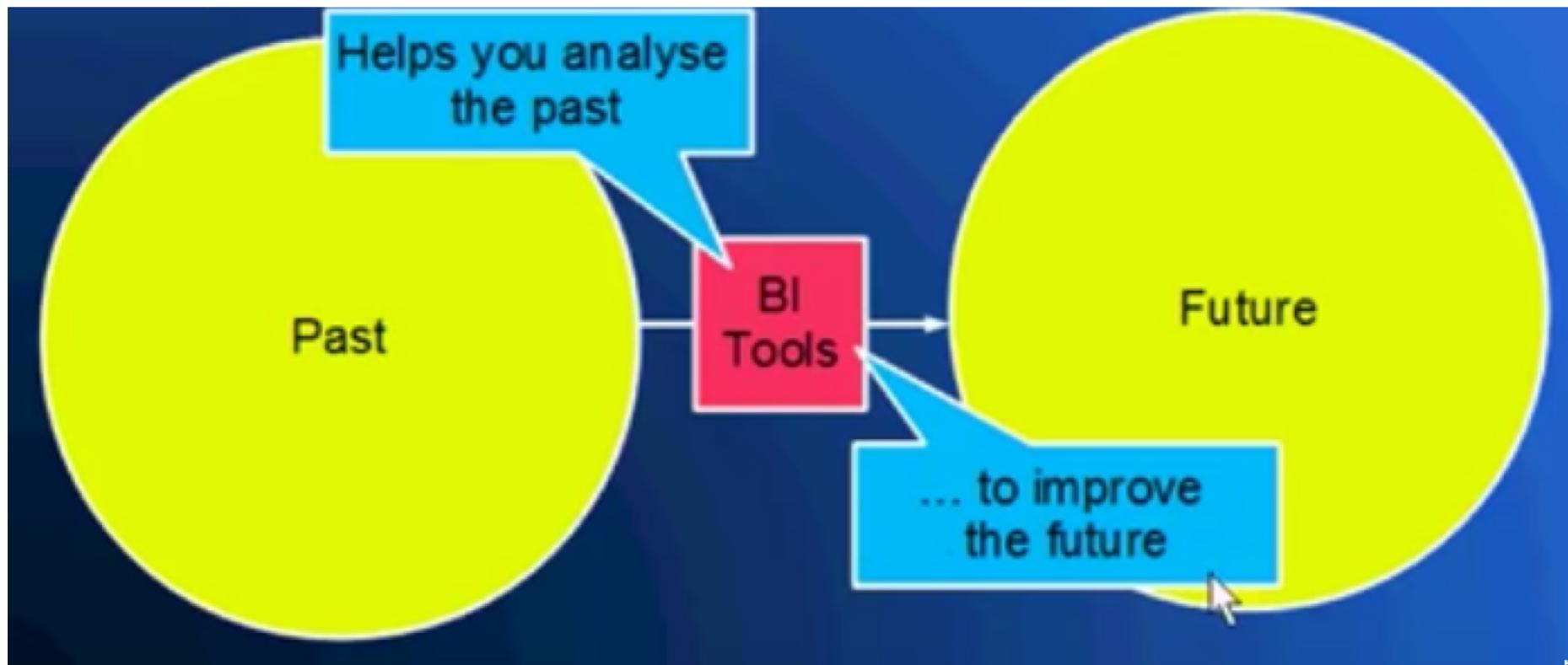


OBJECTIVES

- **To understand the concepts of BI (Business Intelligence)**

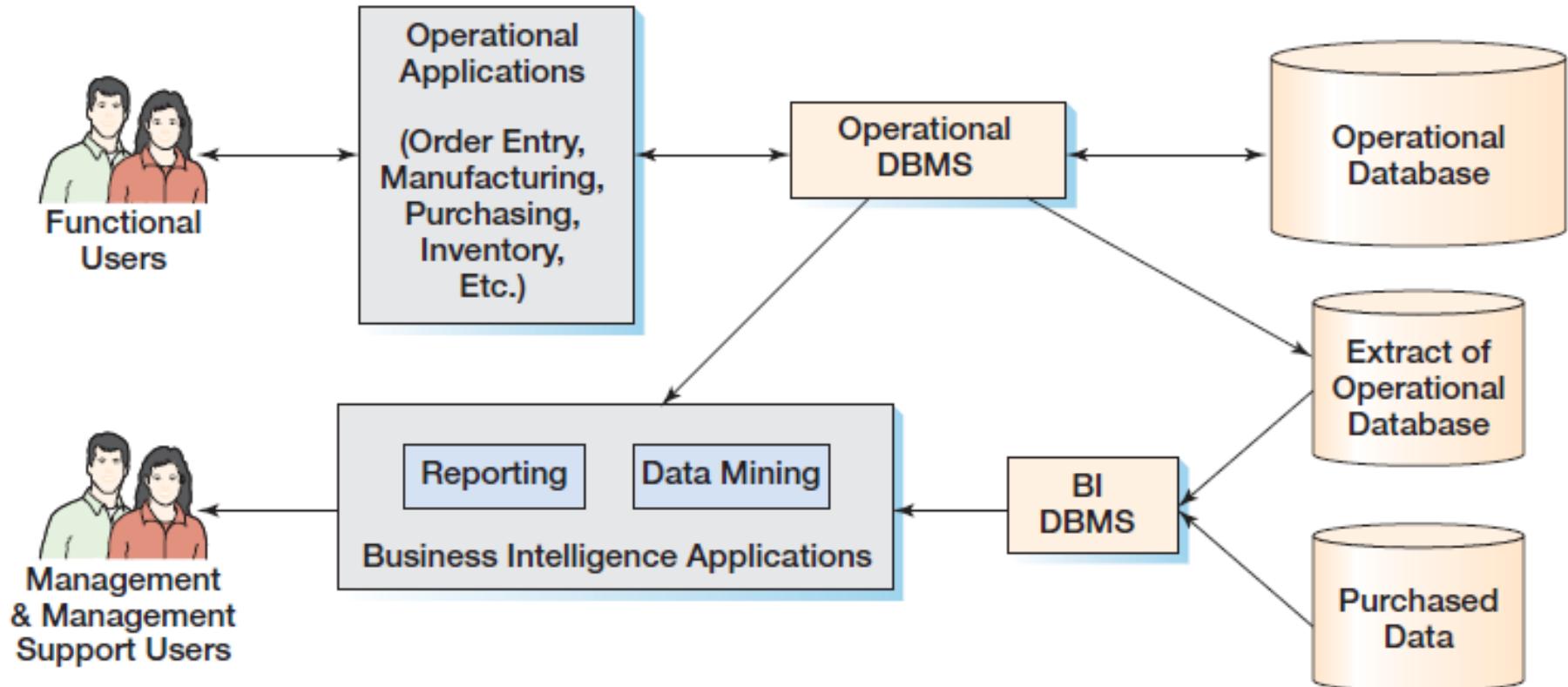
BI and Data Warehousing



What do we mean by Business Intelligence?

- **Analyze current and past events in order to predict future events**
- **Operational Activities**
 - Manufacturing Products, Inventory
 - Sales, Shipping
 - Financial Transactions, Payroll, Payables
 - Order Processing and Billing
- **BI Activities**
 - Analysis, planning, control
 - Decision Making

BI and Data Warehousing



In other words:

The Operational Database

is very different from

the Analytical Database

(i.e. Data Warehouse)

What do we mean by Business Intelligence?

- **Operational Activities – Referred to as OLTP**
 - Online Transaction Processing
- **BI Activities – Referred to as DSS or OLAP**
 - Decision Support Systems
 - Online Analytical Processing

Operational Database

- Transactional
- Queries with a small footprint in the database
 - Doesn't touch much
 - Runs relatively fast
 - Insert/Update/Delete
- Runs the day-to-day operations of the organization

BI Database

- Supports Analytics
- Queries are typically READS ONLY
 - May require LOTS of data
 - Runs relatively slowly
 - Consumes huge amounts of resources
- Supports organizational leadership as they
 - Watch the business
 - Study trends
 - Make decisions

What do we mean by Business Intelligence?

- **Two main types of application systems**
 - Reporting Systems
 - Data Mining Systems

BI and Data Warehousing

What do we mean by Business Intelligence?

- **Two main types of application systems**
 - Reporting Systems
 - Mostly use SQL (under the surface)
 - Many, Many Powerful Software tools - see article:
 - <http://bigdata-madesimple.com/top-business-intelligence-bi-tools-in-the-market/>
 - Data Mining Systems
 - Implement data mining algorithms
 - Many, Many Powerful Software tools - see article:
 - <https://www.softwareadvice.com/bi/data-mining-comparison/>

Videos illustrating BI concepts

<https://www.youtube.com/watch?v=LFnewuBsYiY>

<https://www.youtube.com/watch?v=LRdsZqrwOrc>

<https://www.youtube.com/watch?v=N8FbarXC0Oq>

<https://www.youtube.com/watch?v=yoE6bqJv08E>

Reporting

- **Filter, sort, group data**
- **Make simple calculations (sums, averages)**
- **Summarize current status of things we measure**
- **Compare current status to past or predicted status**
- **Classify entities (customers, products, employees, etc.)**
- **Report delivery is crucial**

BI and Data Warehousing

- **BI Analytics and Reporting tools**
 - <https://www.passionned.com/bi/tools/>

Scroll down to see main players

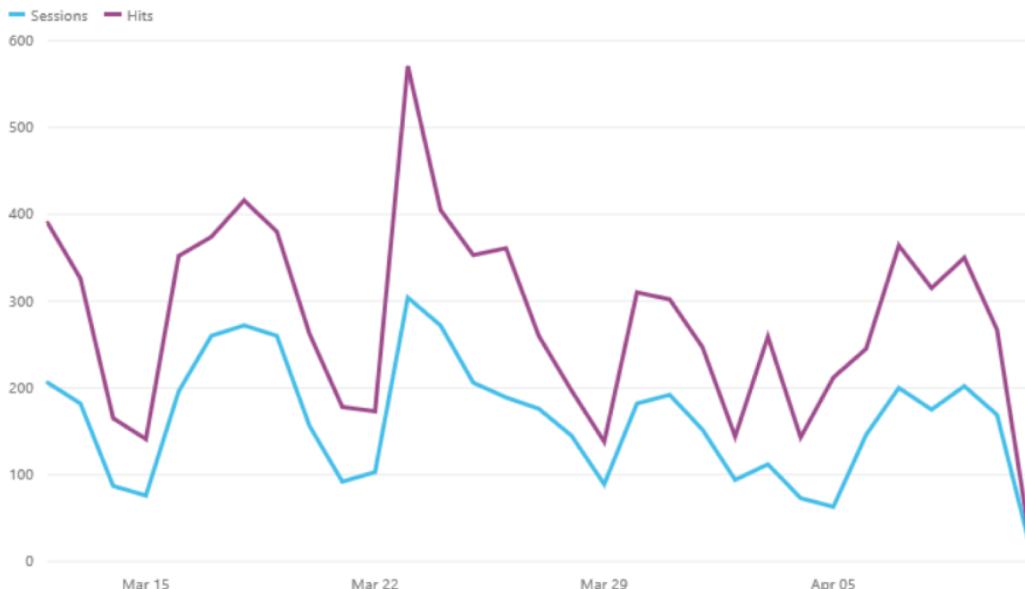
Then zoom in on Tableau, market position

Google Analytics

[Share Dashboard](#)

Ask a question about the data on this dashboard

Site Traffic (Last 30 days)



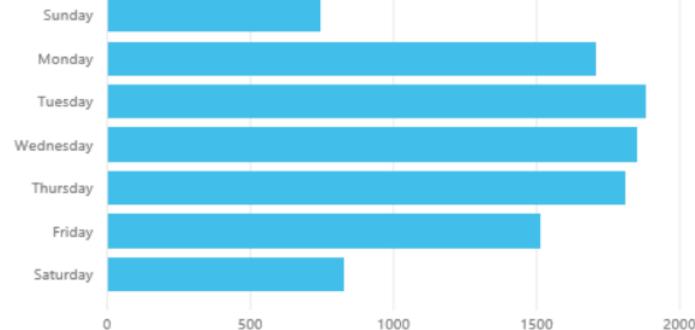
Avg. Daily New Users (Last 30 days)



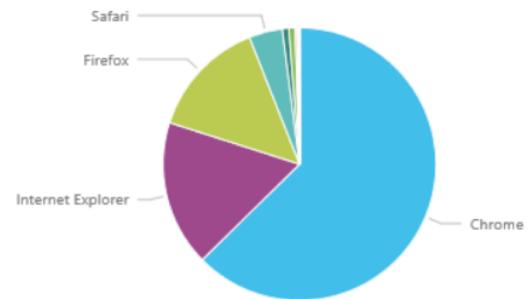
Sessions (Last 30 days)

5.05K

Sessions by Day of Week



Hits by Browser



Average of Page Load Time (sec)

Top Pages by Unique Page Views

Ask a question about your data

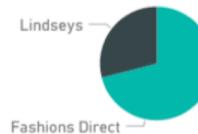
Total Stores
NEW & EXISTING STORES

104

This Year's Sales
NEW & EXISTING STORES

\$22M

This Year's Sales
BY CHAIN



New Stores, New Stores Target
YEAR TO DATE



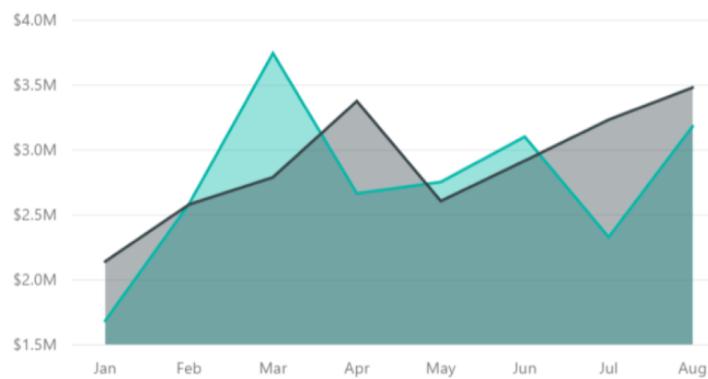
This Year's Sales
NEW STORES ONLY

\$2M

This Year's Sales, Last Year's Sales

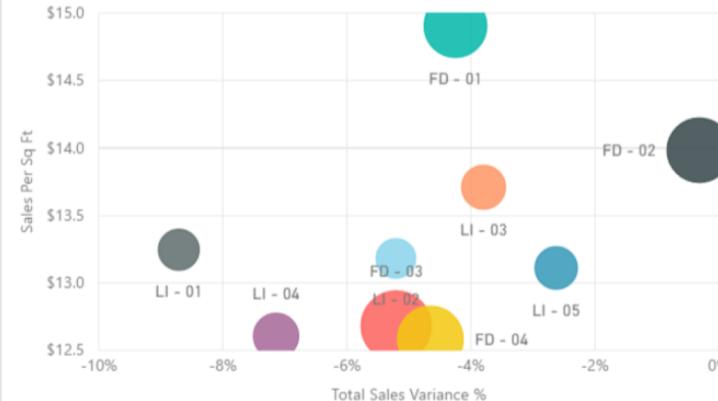
BY FISCAL MONTH

● This Year Sales ● Last Year Sales



Total Sales Variance %, Sales Per Sq Ft, This Year's Sales

BY DISTRICT

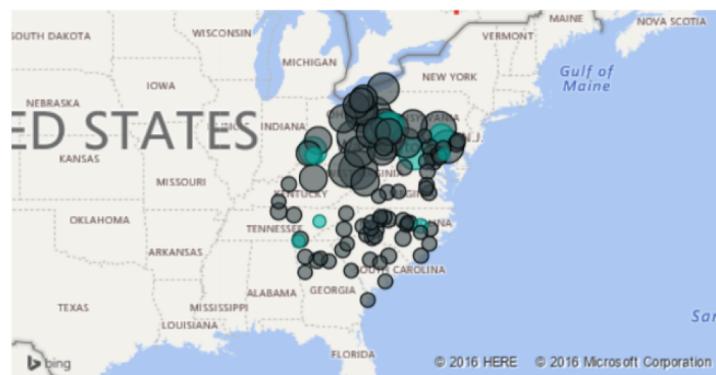


New Stores
NEW STORES ONLY

10

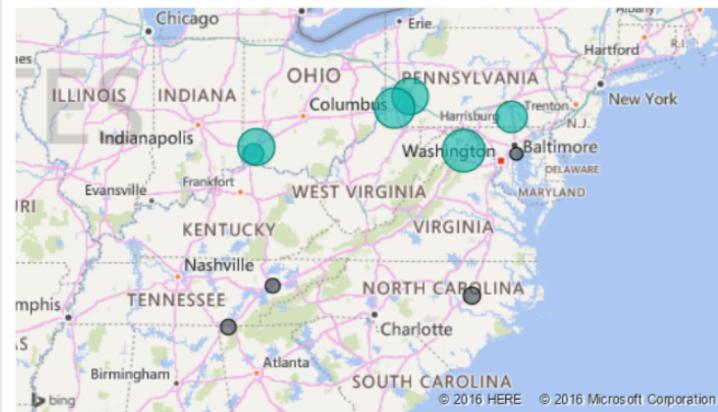
This Year's Sales

BY POSTAL CODE, STORE TYPE



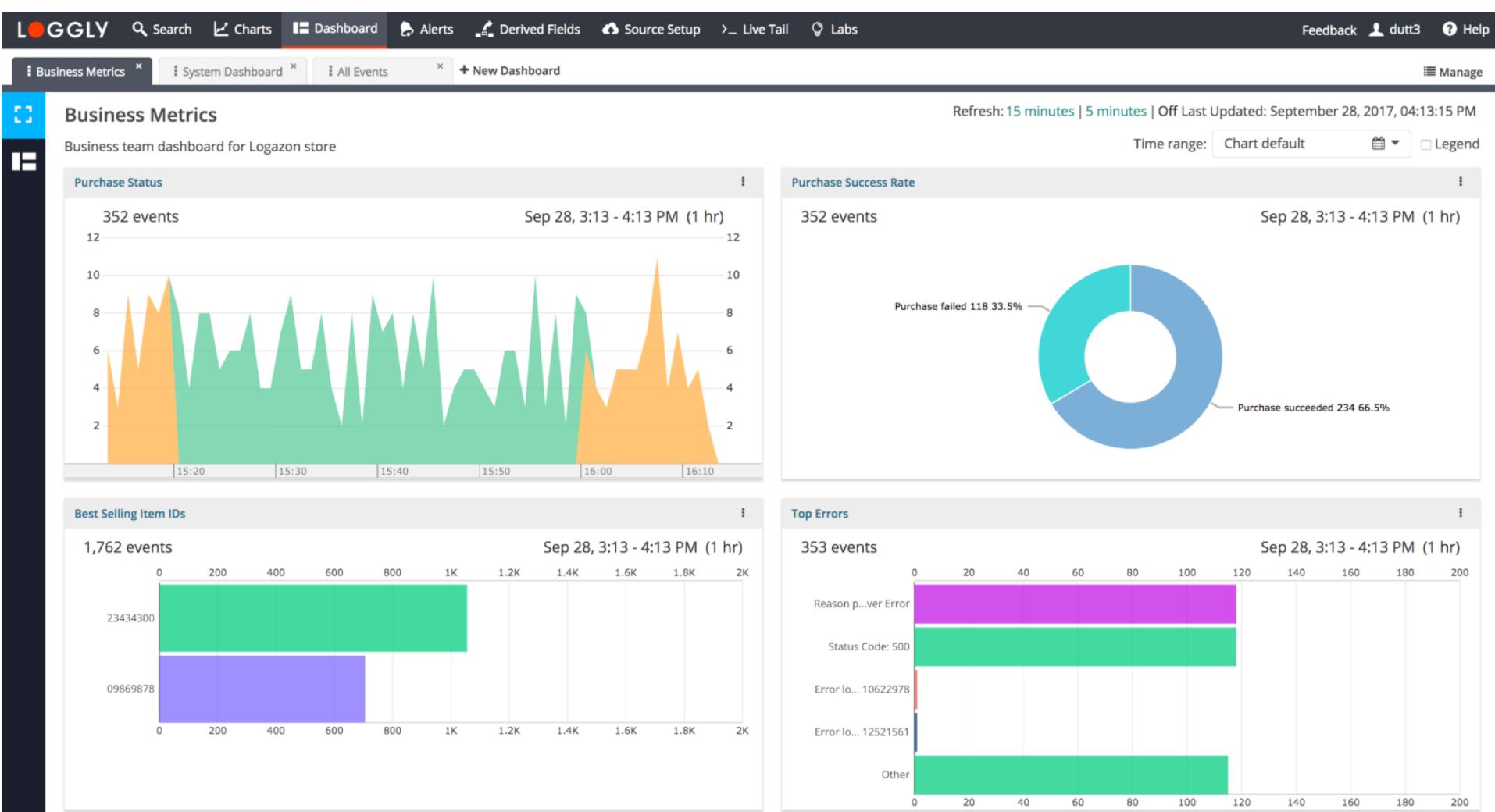
This Year's Sales

BY CITY, CHAIN



Sales Per Sq Ft
BY NAME





X

SALES YTD

\$49,917,304

Previous Year

\$49,523,112

%Changes

1%

GROSS PROFIT THIS YEAR

\$25,145,354

Previous Year

\$24,751,163

%Changes

2%

COST THIS YEAR

\$24,771,949

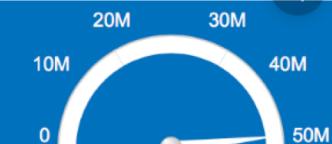
Previous Year

\$24,270,239

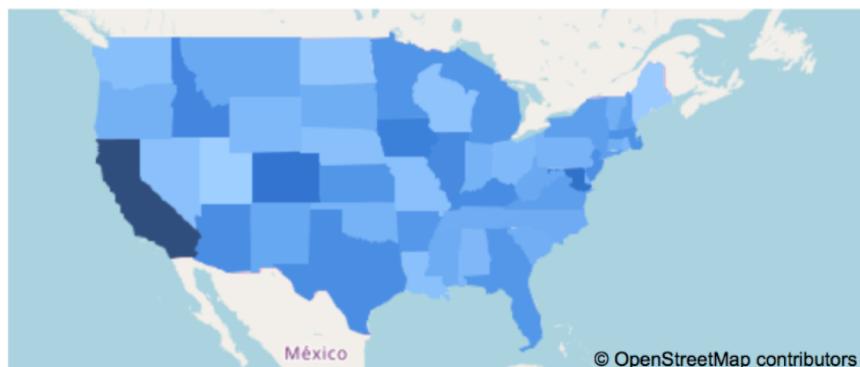
%Changes

2%

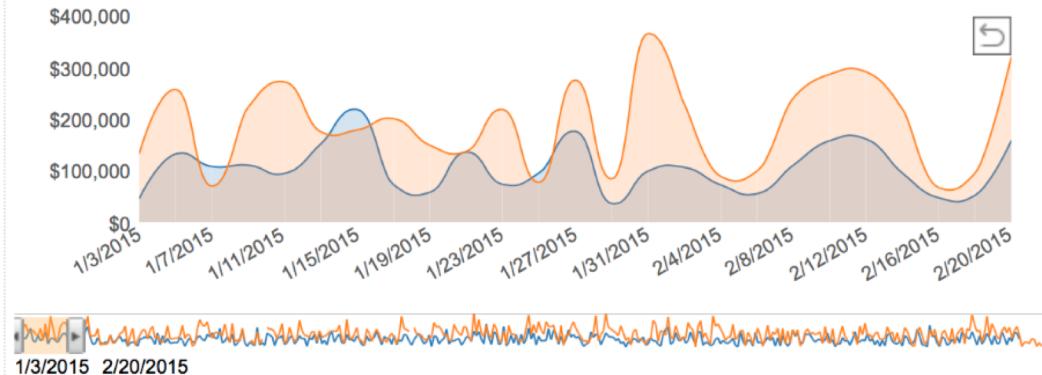
SALES THIS YEAR



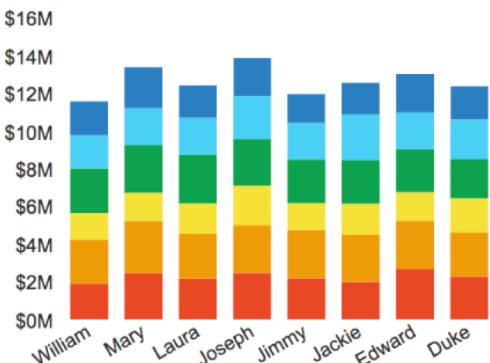
SALES MAP



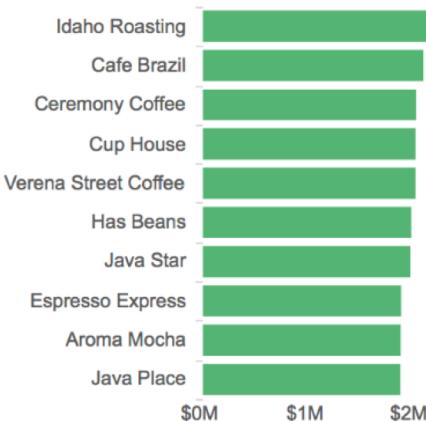
PRODUCT DAILY SALES



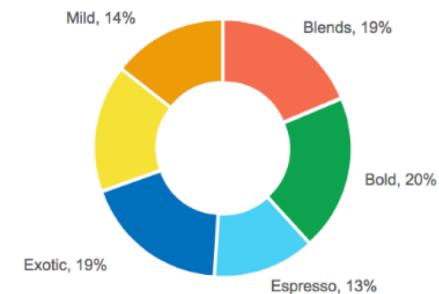
SALES BY ACCOUNT MANAGER



TOP 10 CUSTOMERS



SALES BY CATEGORY



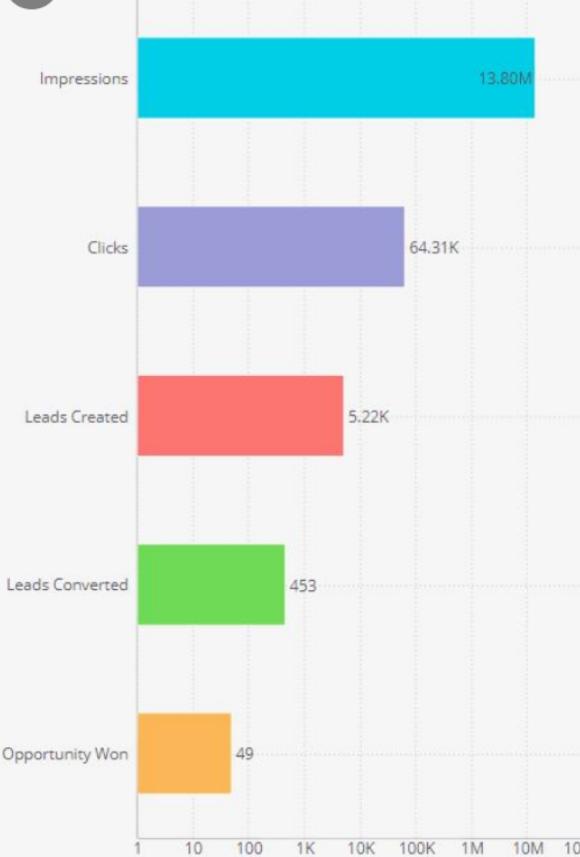
Data Mining

- **Software products that employ sophisticated statistical and mathematical techniques to find things in my huge data sets**
- **Identify patterns and relationships in data**
- **Use past activity to predict future events**
- **Used for:**
 - What-if analyses
 - Predictions
 - Decisions
- **Results often incorporated into a reporting system**

Funnel



Pay-per-click Campaign Optimization



GA Conversion Rate

3.47%

Growth of Conversion Rate: 68.6%

Leads To Opps Conversion

1.01%

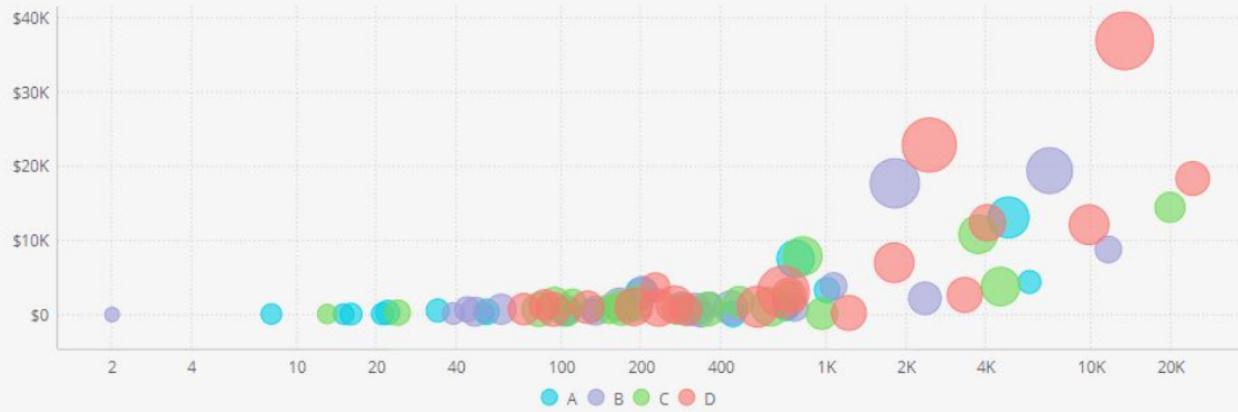
Growth From Past Month: -77.3%

Cost Per Click

\$68.50

Change From Last Month: -29.1%

Cost to Interaction Optimization - By Lead Scoring (Highest: A | Lowest: D)



Leads Converted Vs. Cost Trend



ba6b08b6efaf5fa80b0004ac

Business Intelligence

Stopped here Monday Mar 2

What do we mean by Business Intelligence?

- **Let's talk about some examples:**
 - The Retail Store
 - Wiland

Retail Example

- Capturing customer data at the POS
- Collecting, summarizing, analyzing
- Looking for trends
 - “Market Basket Analysis”
 - Human behavior in response to marketing
 - Ads
 - Promotions
 - Product Placement
 - Co-relating geography, weather, time-of-day

Market Basket Analysis:

- Uncover associations between items.
- Looks for combinations of items that occur together frequently in transactions.
- Allows retailers to identify relationships between the items that people buy.

- Association Rules are widely used to analyze retail basket or transaction data, and are intended to identify strong rules discovered in transaction data using measures of interestingness, based on the concept of strong rules.
- **An example of Association Rules**
 - Assume there are 100 customers
 - 10 of them bought milk, 8 bought butter and 6 bought both milk and butter.
 - How well does bought milk => bought butter?
 - **support** = $P(\text{Milk} \& \text{Butter}) = 6/100 = 0.06$
 - **confidence** = support/ $P(\text{Butter}) = 0.06/0.08 = 0.75$
 - **lift** = confidence/ $P(\text{Milk}) = 0.75/0.10 = 7.5$

buy milk => buy butter

support The probability that the antecedent will occur given the precedent

confidence Is the precedent a significant “driver”?

lift When > 1 , presence of the precedent indicates strongly that the antecedent will occur.

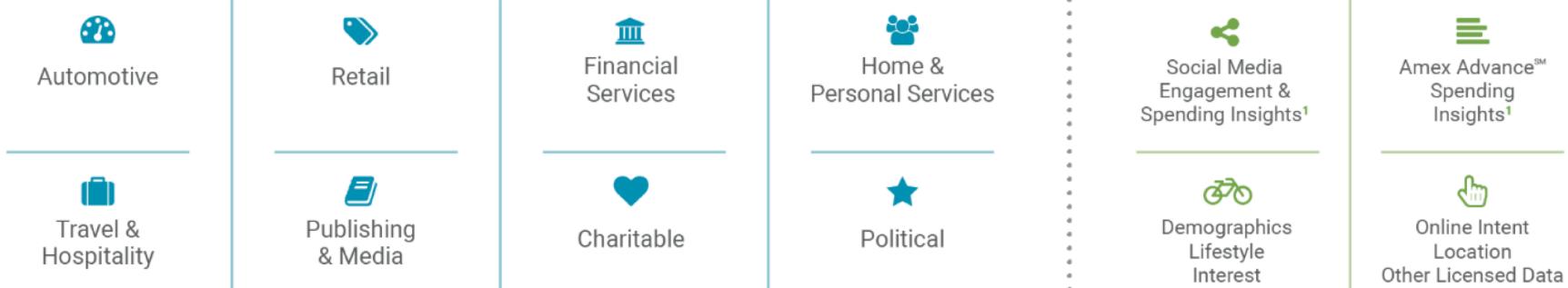
Business Intelligence

This kind of analysis can be done using Data Mining software against very large datasets

Why Market Basket Analysis?

To sell more high-margin products and make more money !!

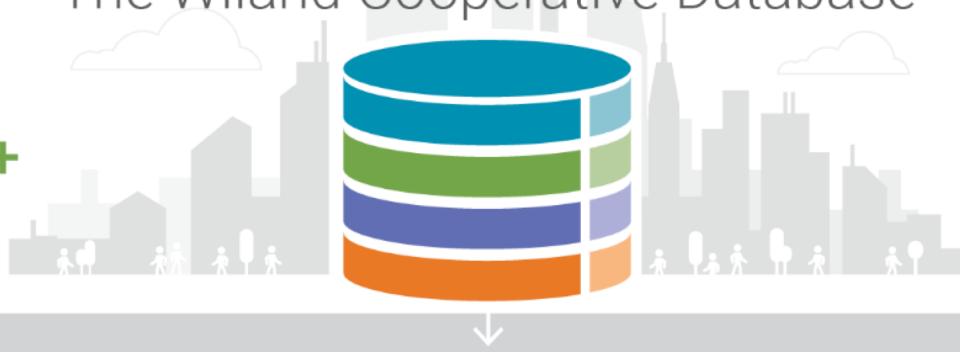
First-Party Transaction Data from **Thousands** of Brands



¹Available exclusively from Wiland and Ultimate Data


245,000,000+
Consumers

The Wiland Cooperative Database



Billions
of Consumer
Transactions

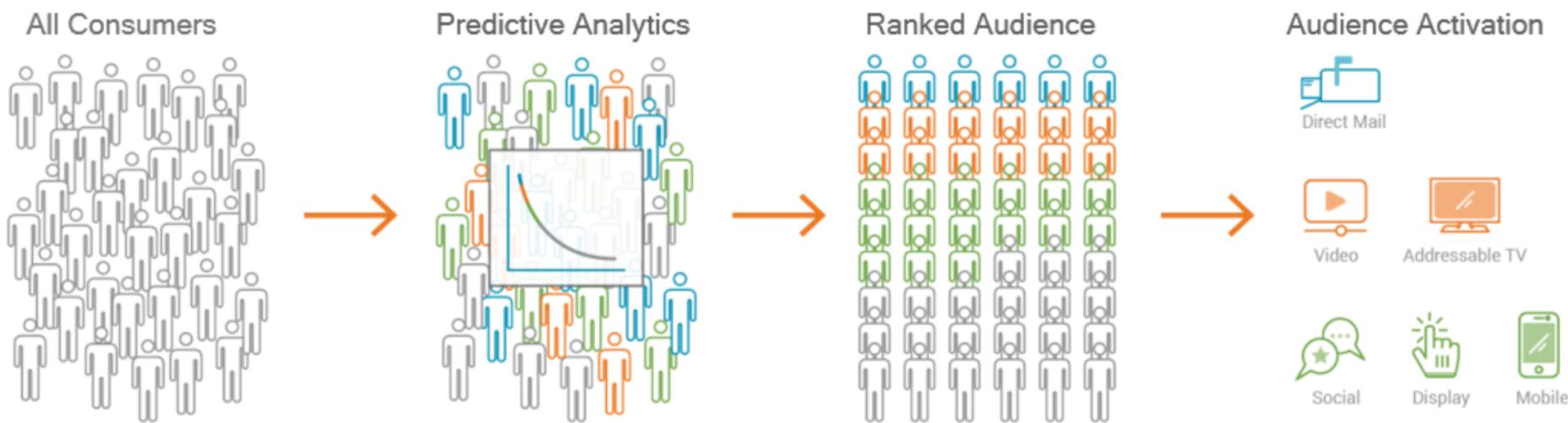

The Wiland Technology Platform


Marketing Audiences


Marketing Optimization


Business Intelligence

Business Intelligence



Business Intelligence

Wiland

<https://wiland.com/career-center/>