



1) SAS Visual Analytics 1 (YVA11D)



Objectives

- Understand the overall solution for SAS Viya
- Be able to create a simple dashboard on SAS Visual Analytics
- Be able to open & view the job in SAS Data Studio

Outline

Lesson1 Introduction

- Introduction to Big Data Analytics
- SAS Viya
- Getting start with SAS Visual Data Science Decisioning Trial

Lesson2 Prepare Data

- Investigating Data
- Transforming Data

Lesson3 Analyze Data

- Working with data items
- Exploring data with charts & graphs
- Creating data items & applying filters
- Performing data analysis

Lesson4 Dashboard

- Creating interactive reports
- Working with display rules
- Working with parameters



Lesson 1: Introduction

Outline

- Introduction to [Big Data Analytics](#)
- [SAS Viya](#)
- Getting start with [SAS Visual Data Science Decisioning Trial](#)

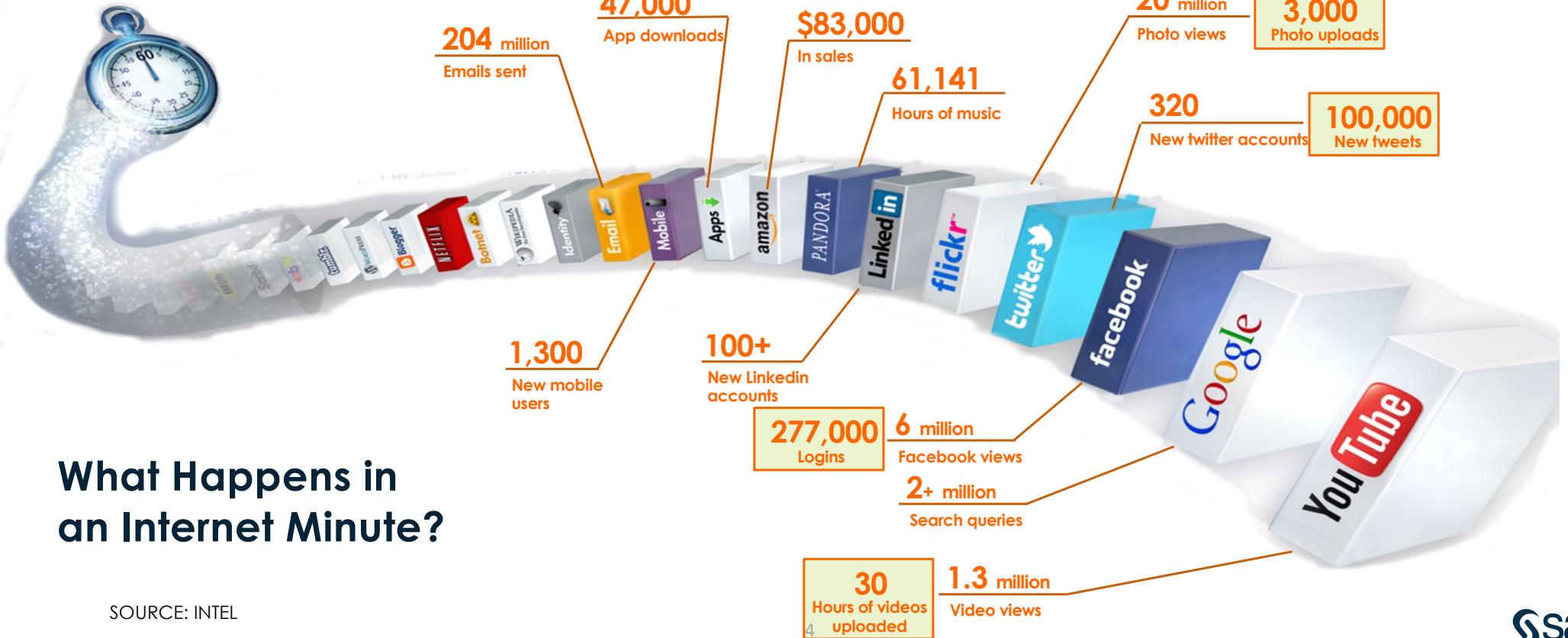


Introduction to Big Data Analytics



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Big Data Explosion



What Happens in
an Internet Minute?

SOURCE: INTEL

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sas

40 ZETTABYTES
[43 TRILLION GIGABYTES]
of data will be created by
2020, an increase of 300
times from 2005



Volume SCALE OF DATA

It's estimated that
2.5 QUINTILLION BYTES
[2.3 TRILLION GIGABYTES]
of data are created each day



Most companies in the
U.S. have at least
100 TERABYTES
[100,000 GIGABYTES]
of data stored

The New York Stock Exchange
captures
**1 TB OF TRADE
INFORMATION**
during each trading session



Velocity ANALYSIS OF STREAMING DATA

Modern cars have close to
100 SENSORS
that monitor items such as
fuel level and tire pressure



By 2016, it is projected
there will be
**18.9 BILLION
NETWORK
CONNECTIONS**
- almost 2.5 connections
per person on earth



The FOUR V's of Big Data

From traffic patterns and music downloads to web history and medical records, data is recorded, stored, and analyzed to enable the technology and services that the world relies on every day. But what exactly is big data, and how can these massive amounts of data be used?

As a leader in the sector, IBM data scientists break big data into four dimensions: Volume, Velocity, Variety and Veracity

Depending on the industry and organization, big data encompasses information from multiple internal and external sources such as transactions, social media, enterprise content, sensors and mobile devices. Companies can leverage data to adapt their products and services to better meet customer needs, optimize operations and infrastructure, and find new sources of revenue.

By 2015
4.4 MILLION IT JOBS
will be created globally to support big data, with 1.9 million in the United States



As of 2011, the global size of
data in healthcare was
estimated to be

150 EXABYTES
[161 BILLION GIGABYTES]



**30 BILLION
PIECES OF CONTENT**

are shared on Facebook
every month



Variety DIFFERENT FORMS OF DATA

By 2014, it's anticipated
there will be
**420 MILLION
WEARABLE, WIRELESS
HEALTH MONITORS**



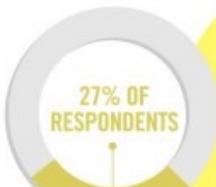
**4 BILLION+
HOURS OF VIDEO**
are watched on
YouTube each month



400 MILLION TWEETS
are sent per day by about 200
million monthly active users

**1 IN 3 BUSINESS
LEADERS**

don't trust the information
they use to make decisions



Veracity UNCERTAINTY OF DATA

Poor data quality costs the US
economy around
\$3.1 TRILLION A YEAR



**27% OF
RESPONDENTS**

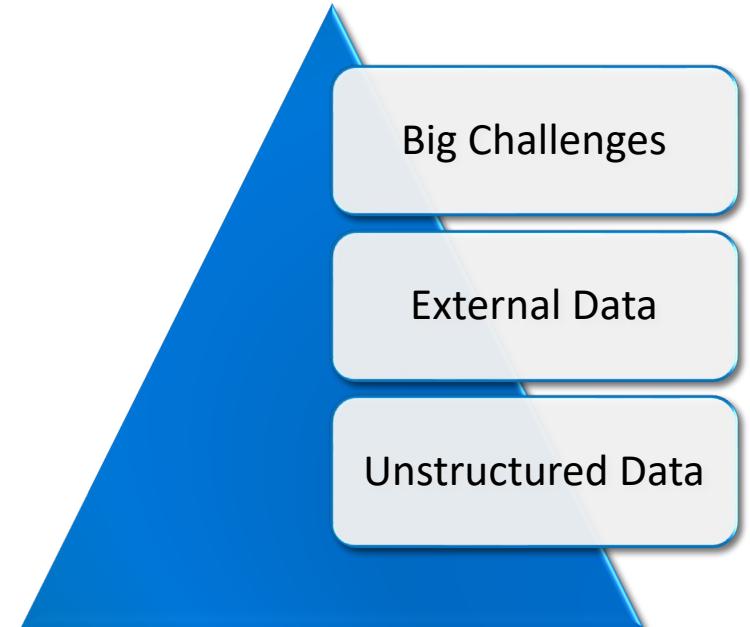
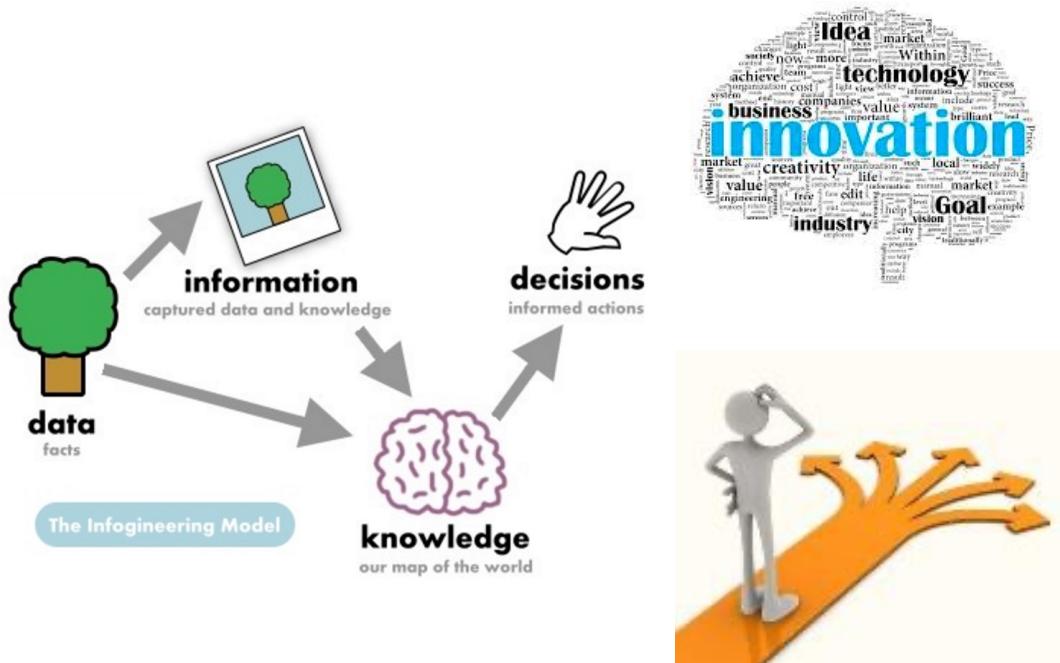
in one survey were unsure of
how much of their data was
inaccurate

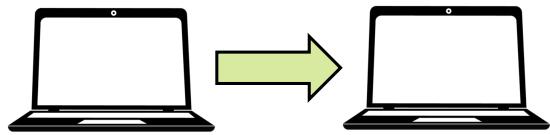
Big Data Driver: Internal + External Data



Big Data Analytics

- It is a process of examining **Big Data** to uncover useful information and knowledge.
- More data means better decision!





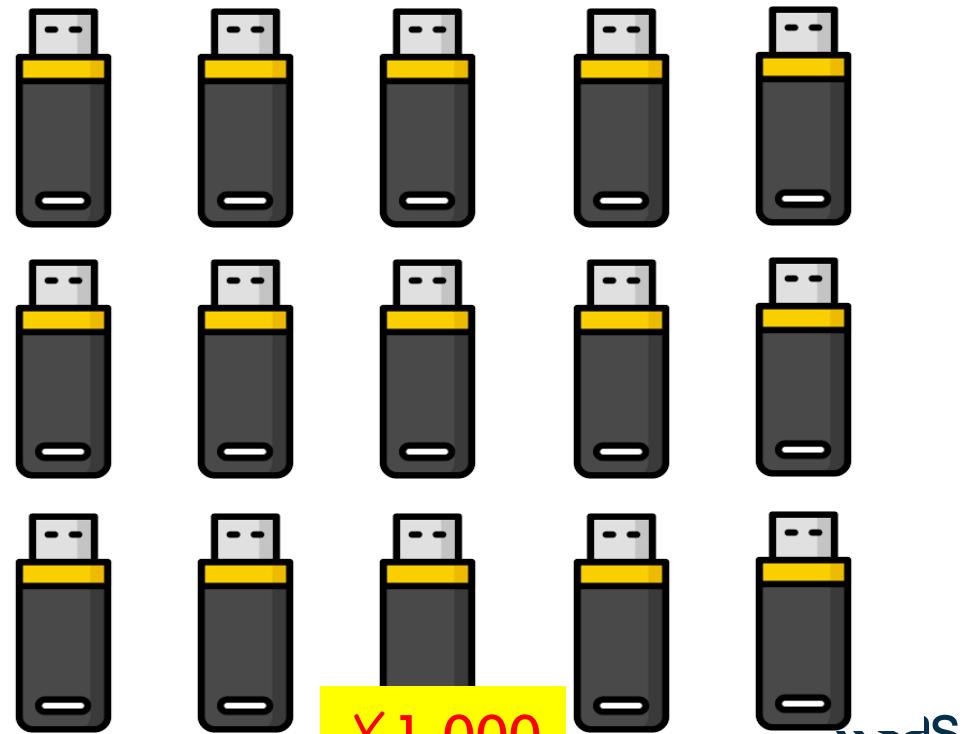
2MB



Big Data Challenges

Same tasks, but much more difficult!

2TB



Big Data Solution



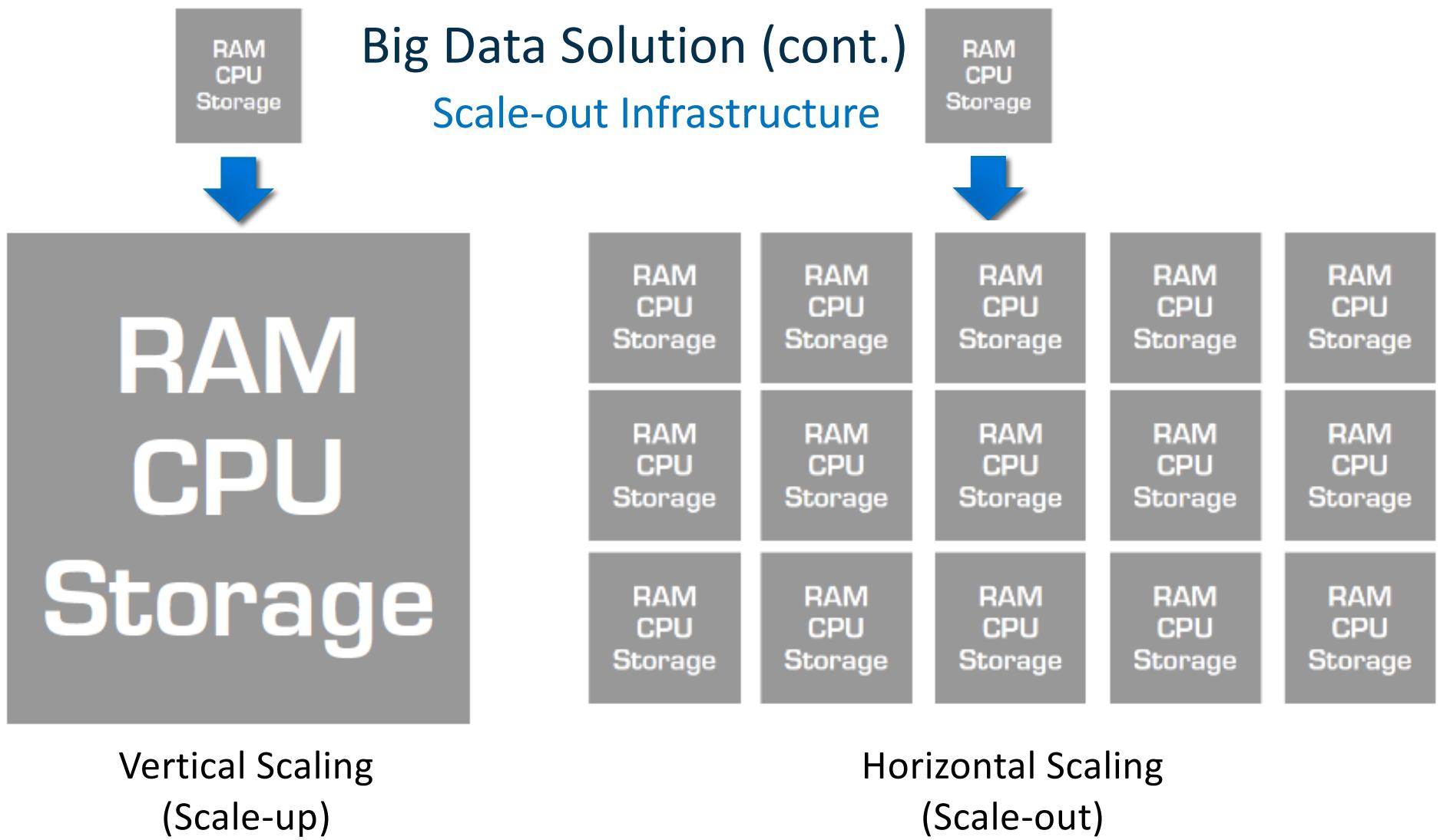
INFRASTRUCTURE



ALGORITHM

Big Data Solution (cont.)

Scale-out Infrastructure

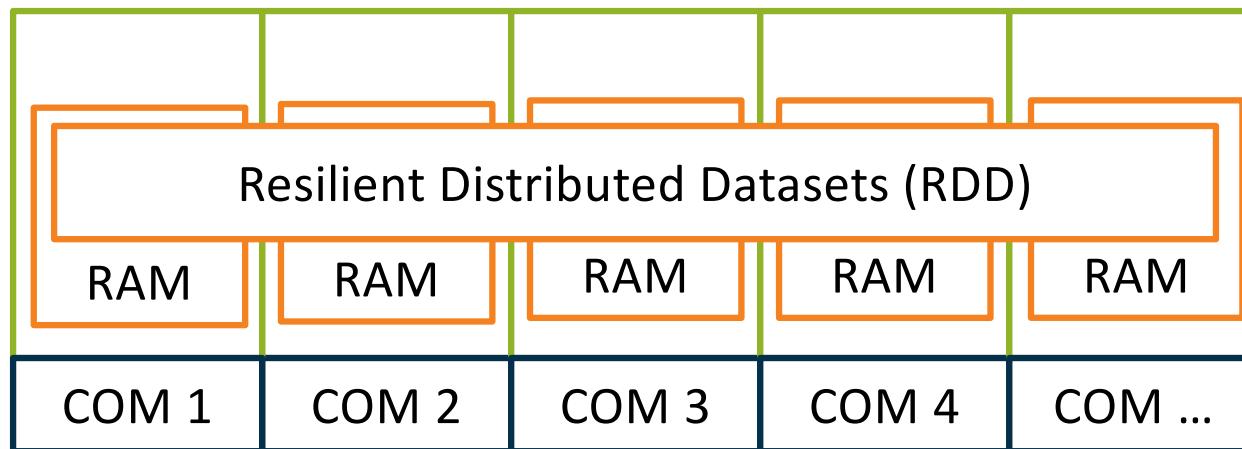


Vertical Scaling
(Scale-up)

Horizontal Scaling
(Scale-out)

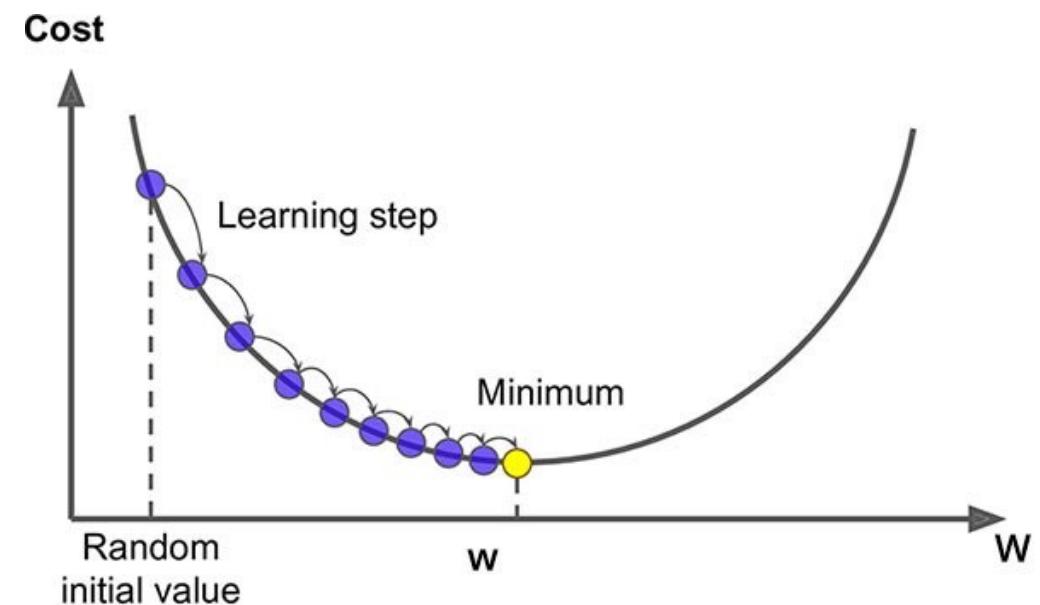
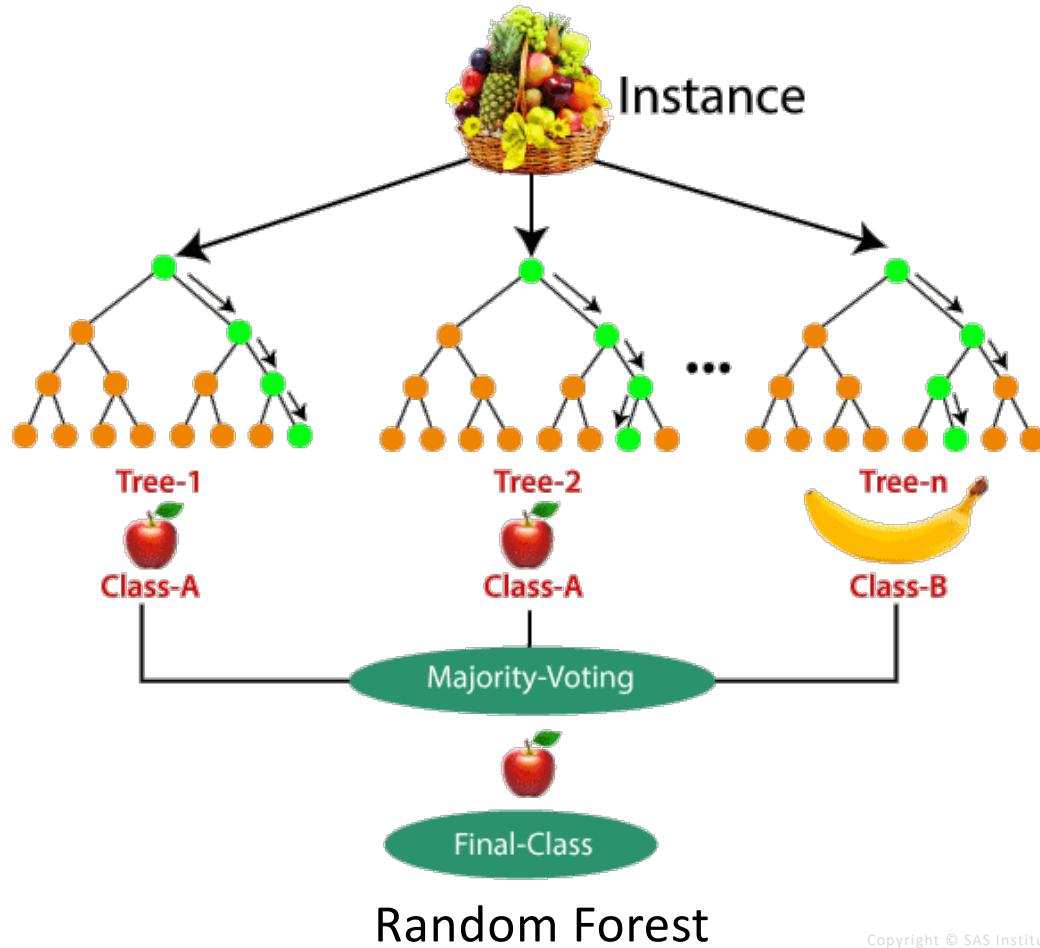
Big Data Solution (cont.)

In-memory & Distributed Computing



Big Data Solution (cont.)

Optimize model by parallelizing jobs and reducing iterations





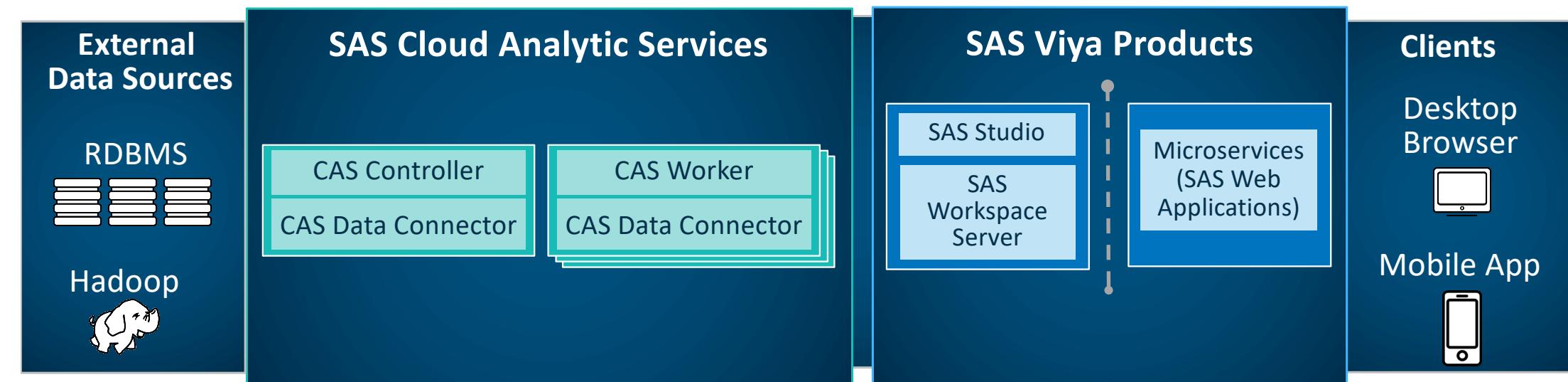
SAS Viya

Big Data Analytics Solution

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SAS Viya Architecture



SAS Cloud Analytic Services (CAS)



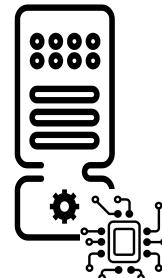
Cloud Analytic Services (CAS) is the server that provides the run-time environment for data management and analytics with SAS Viya.

CAS uses a high-performance, [in-memory engine and a distributed architecture](#) to execute multi-threaded analytic code. It can rapidly process requests against data of any size. CAS provides the following features:

- speed
- resiliency
- scalability
- node-to-node communication
- worker node fault tolerance

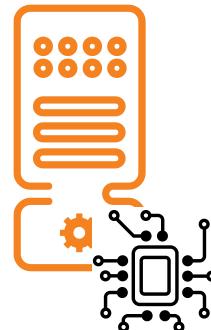


SAS Viya Architecture

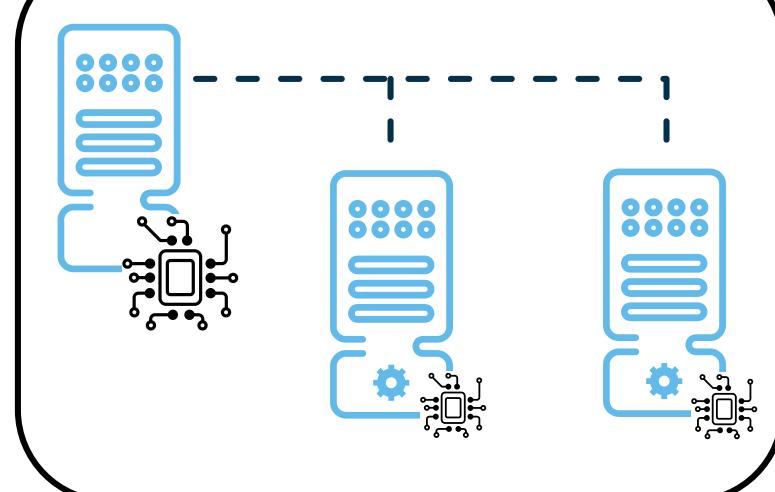


SAS Cloud Analytic Services (CAS)

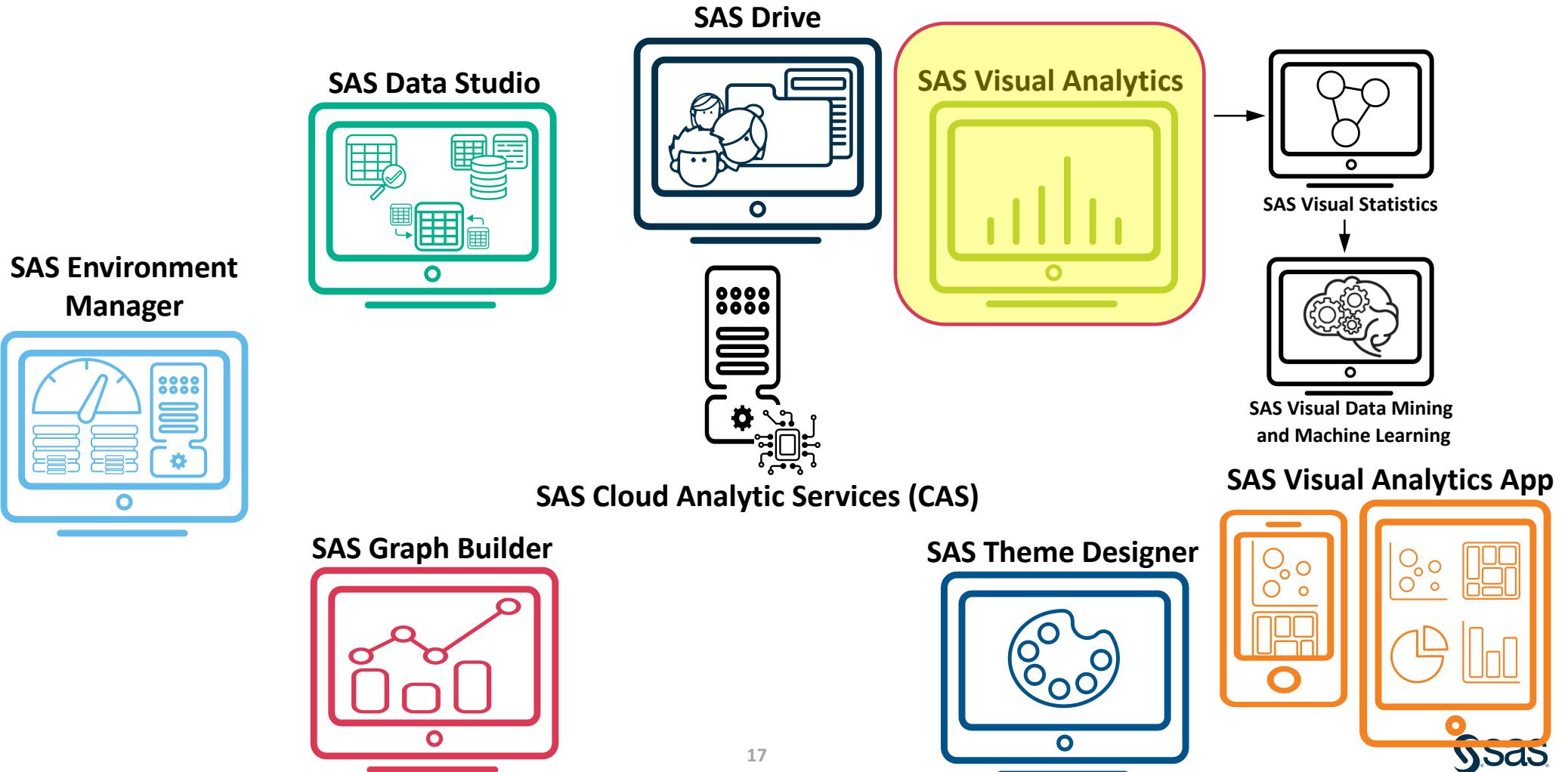
Symmetric Multiprocessing (SMP)



Massively Parallel Processing (MPP)



SAS Viya Applications



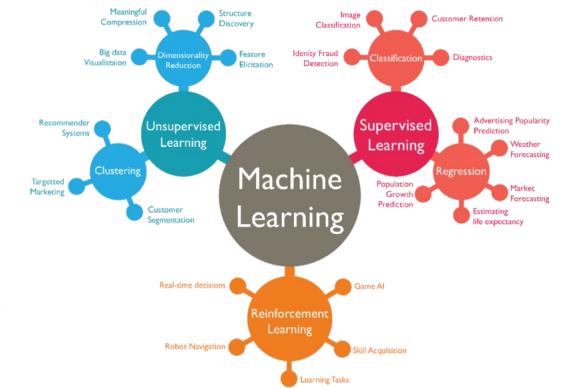


What Is SAS Visual Analytics (VA)?

SAS Visual Analytics is a web-based product that leverages **SAS High-Performance Analytics** technologies to empower organizations to explore huge volumes of data very quickly to identify patterns, trends, and opportunities for further analysis.



SAS Visual Analytics (VA): Full Stack Big Data Solution



BIG DATA

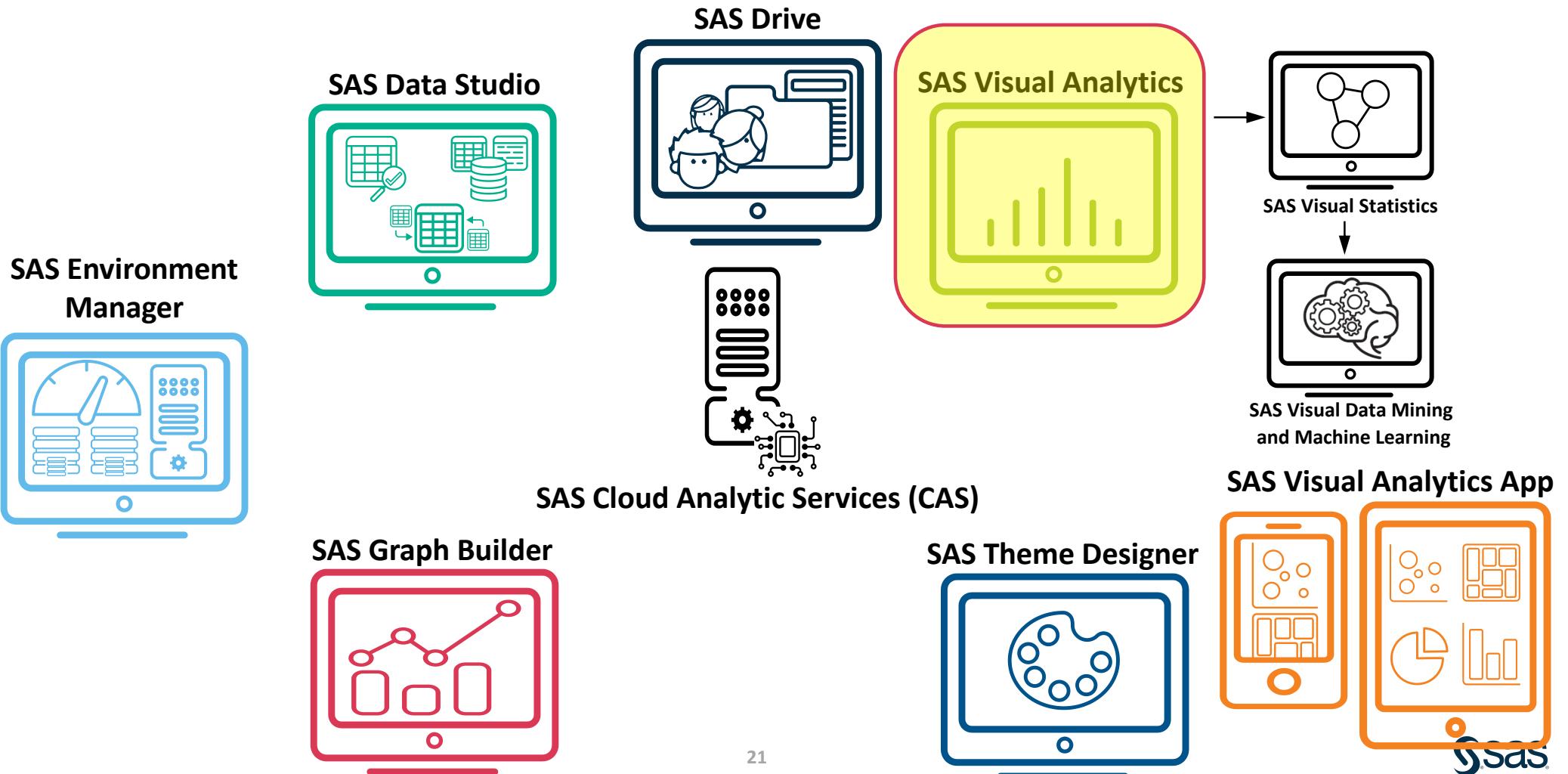


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SAS Visual Analytics Methodology



SAS Viya Applications (Recap)



SAS Drive (Home Page)

The screenshot shows the SAS® Drive - Share and Collaborate interface. The top navigation bar includes links for Prepare Data, All, Recent, Projects, Reports, Develop SAS Code, and Build Custom Graphs. A search bar and quick access icons are also present. On the left, a sidebar lists My Favorites, My Folder (which is selected), SAS Content, Shared, and Recycle Bin. The main content area displays a grid of six items under 'My Folder':

- My Snippets** (Date modified: 05/14/20)
- RTARF** (Date modified: 05/15/20)
- SAS Videos** (Date modified: 05/14/20)
- Dashboard** (Date modified: 05/18/20)
- dataunnamed_date.xlsx** (Date modified: 05/15/20)
- DrugNews** (Date modified: 05/15/20)

To the right of the main content area is a sidebar titled 'ANALYTICS LIFE CYCLE' and 'ADMINISTRATION'.

ANALYTICS LIFE CYCLE

- Prepare Data
- Explore and Visualize
- Share and Collaborate
- Develop SAS Code

ADMINISTRATION

- Build Custom Graphs
- Build Custom Themes
- Explore Lineage
- Manage Environment

SAS Data Studio (Prepare Data)

The screenshot shows the SAS Data Studio - Prepare Data interface. The main area displays a session named "DrugNews *". A message at the top says "No table is selected." Below it, another message states "The session table is not current to the plan. Run the session to refresh the table." A note indicates "All columns are hidden." On the left, a sidebar lists transform categories: Column Transforms (Change case, Convert column, Manage columns, Remove, Rename, Split, Trim whitespace), Custom Transforms (Calculated column, Code), and Multi-input Transforms (Append). The right side features a "Plan" panel with a table showing the session details (Name: DrugNews, Modified: 09/13/20 11:44 PM) and a list of four steps: 1. แปลงคอลัมน์, 2. นำออก, 3. แปลงคอลัมน์, and 4. นำออก. The fourth step is currently selected.

Name:	DrugNews
Modified:	09/13/20 11:44 PM

- 1. แปลงคอลัมน์
- 2. นำออก
- 3. แปลงคอลัมน์
- 4. นำออก

SAS Visual Analytics (VA): Dashboard

SAS® Visual Analytics - Explore and Visualize

Report 1

Editing

Page 1 Page 2 +

Data Roles

Page 1

Select an object to see its roles.

Objects

Frequency of petal.length

Frequency

petal.length

petal.length Bin	Frequency
[0, 1)	35
[1, 2)	13
[2, 3)	2
[3, 4)	10
[4, 5)	34
[5, 6)	29
[6, 7)	18
[7, 8)	5

Objects

Filter

Tables

Crosstab

List table

Graphs

Bar chart

Box plot

Bubble change plot

Bubble plot

Butterfly chart

Comparative time series plot

Correlation matrix

SAS Visual Statistics (VS): ML

SAS® Visual Analytics - Explore and Visualize

Report 1

Decision Tree variety (event=Virginica) KS (Youden) 0.9500 Observations Used 150

Tree

Variable Importance

Importance

Confusion Matrix

		Predicted		
		Setosa	Versicolor	Virginica
Observed	Setosa	50	47	3
	Virginica	1	49	49

Legend: Setosa (blue), Versicolor (yellow), Virginica (purple)

Objects

- Filter
- Text
- Web content
- SAS Visual Statistics
- Cluster
- Decision tree
- Generalized additive model
- Generalized linear model
- Linear regression
- Logistic regression
- Model comparison
- Nonparametric logistic regression

SAS Studio - Develop SAS Code

The screenshot shows the SAS Studio interface with the title "SAS® Studio - Develop SAS Code". The left sidebar contains a "Libraries" section with options for MAPS, MAPSGFK, MAPSSAS, MYCASLIB, SAMPSIO, SASHELP, SASUSER, and WORK. The main workspace has tabs for "Code", "Log", "Results", and "Output Data". The "Code" tab displays the following SAS code:

```
1 libname mycaslib cas caslib=casuser;
2
3 data mycaslib.hmeq;
4   set sampsio.hmeq;
5 run;
6
7 proc means data=mcaslib.hmeq;
8   run;
```

The "Results" tab shows the output of the PROC MEANS procedure:

The MEANS Procedure

Variable	N	Mean	Std Dev	Minimum	Maximum
BAD	5960	0.1994966	0.3996555	0	1.0000000
LOAN	5960	18607.97	11207.12	1100.00	89000.00

At the bottom, it says "Program.sas [temp] Line 8 Column 5 UTF-8" and "Recover (2) Submission (0)".



View report

Product Report

Report Overview Supplier Analysis Product Analysis

Australia/Pacific Europe North America

Supplier Locations

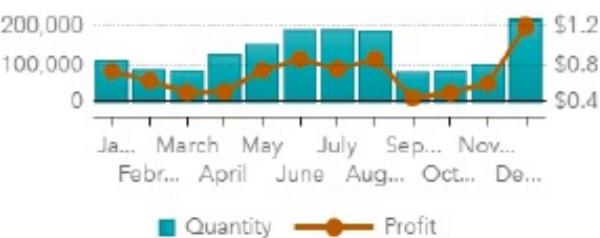


Map data © OpenStreetMap

Supplier Name	Number of Products	Revenue
3Top Sports	421	\$752,811.85
A Team Sports	70	\$225,763.55
A. Pereira Sport	1	\$185.50
AllSeasons Outdoor Clothing	68	\$807,612.30
Bianco Trading S.A.	4	\$9,306.90
Bon Garrments	7	(\$1,028.90)
British Sports Ltd	42	\$641,644.65
Carolina Sports	13	\$3,798.81

Quantity Sold and Profit Generated by Month

Quantity



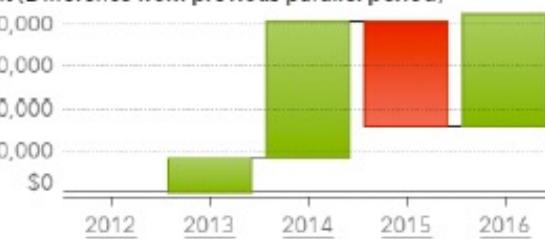
Profit (millions)

200,000
100,000
0

Jan... March May July Sep... Nov...
Febr... April June Aug... Oct... De...

■ Quantity ● Profit

Profit (Difference from previous parallel period)



\$400,000
\$300,000
\$200,000
\$100,000
\$0

2012 2013 2014 2015 2016

Profit (Difference from previous parallel period)
■ Increasing ■ Decreasing



Lesson 2: Preparing Data Using SAS® Data Studio

Outline

- Investigating Data
- Transforming Data

ANALYTICS LIFE CYCLE

- Manage Data
- Prepare Data
- Explore and Visualize
- Build Models
- Manage Models
- Build Decisions
- Share and Collaborate
- Develop SAS Code

ADMINISTRATION

- Build Custom Graphs
- Explore Lineage
- Manage Environment
- Manage Workflows

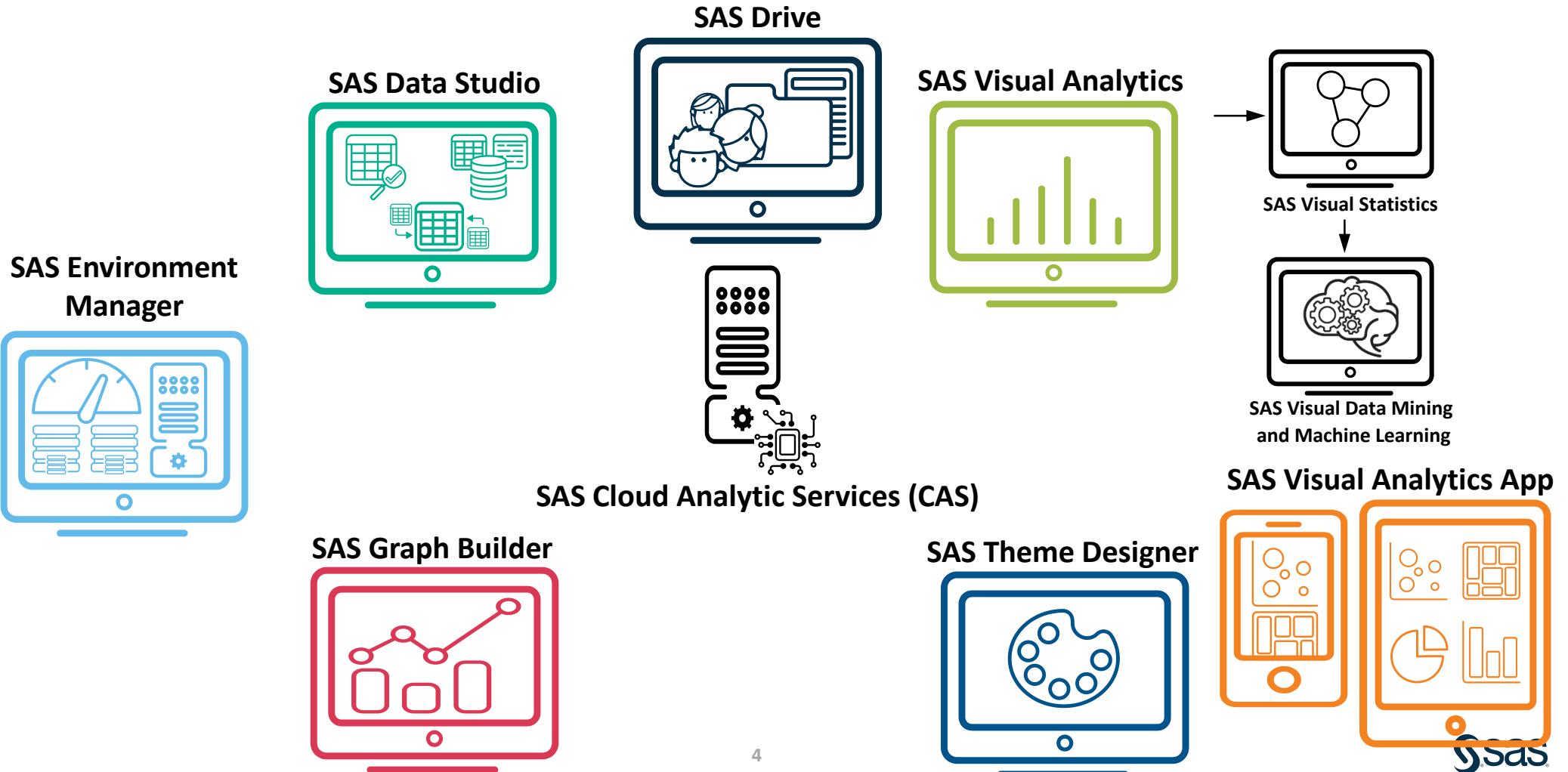


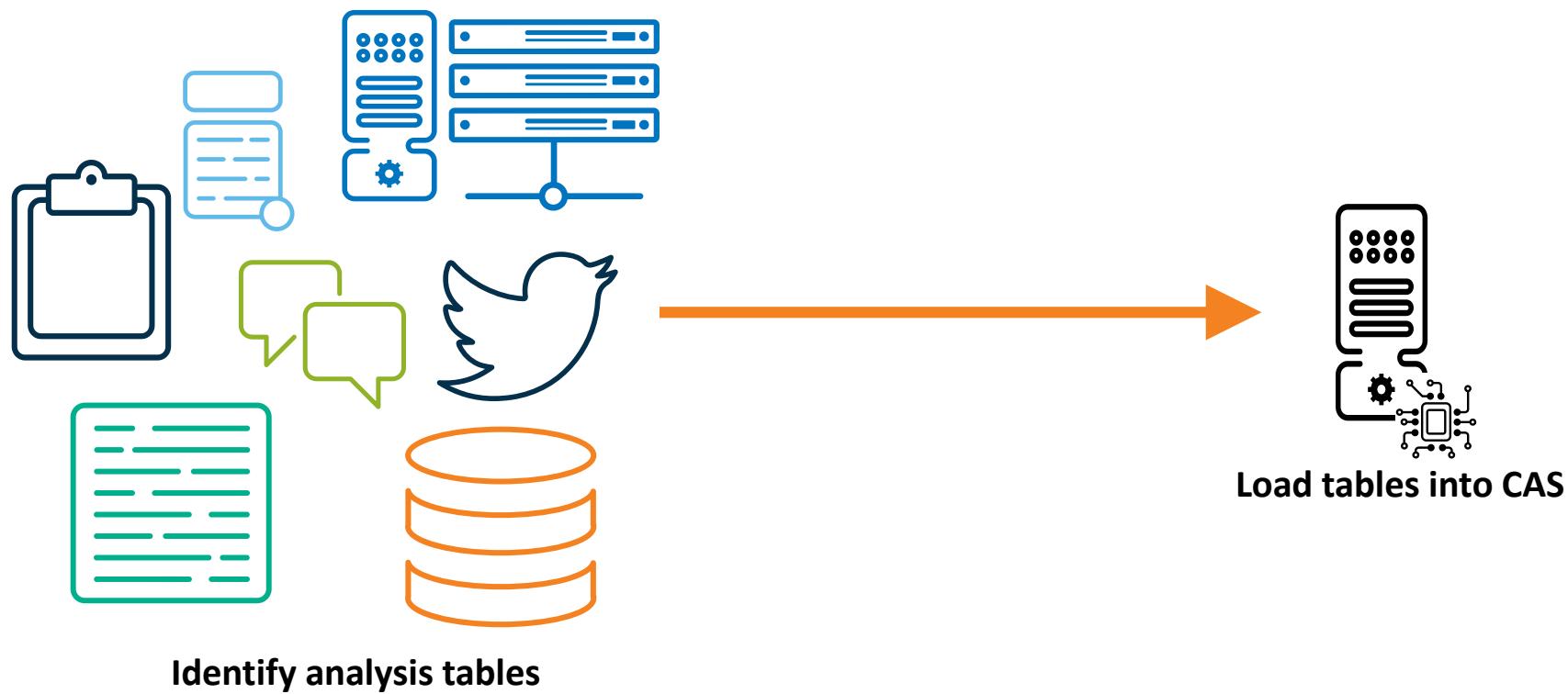
Investigating Data



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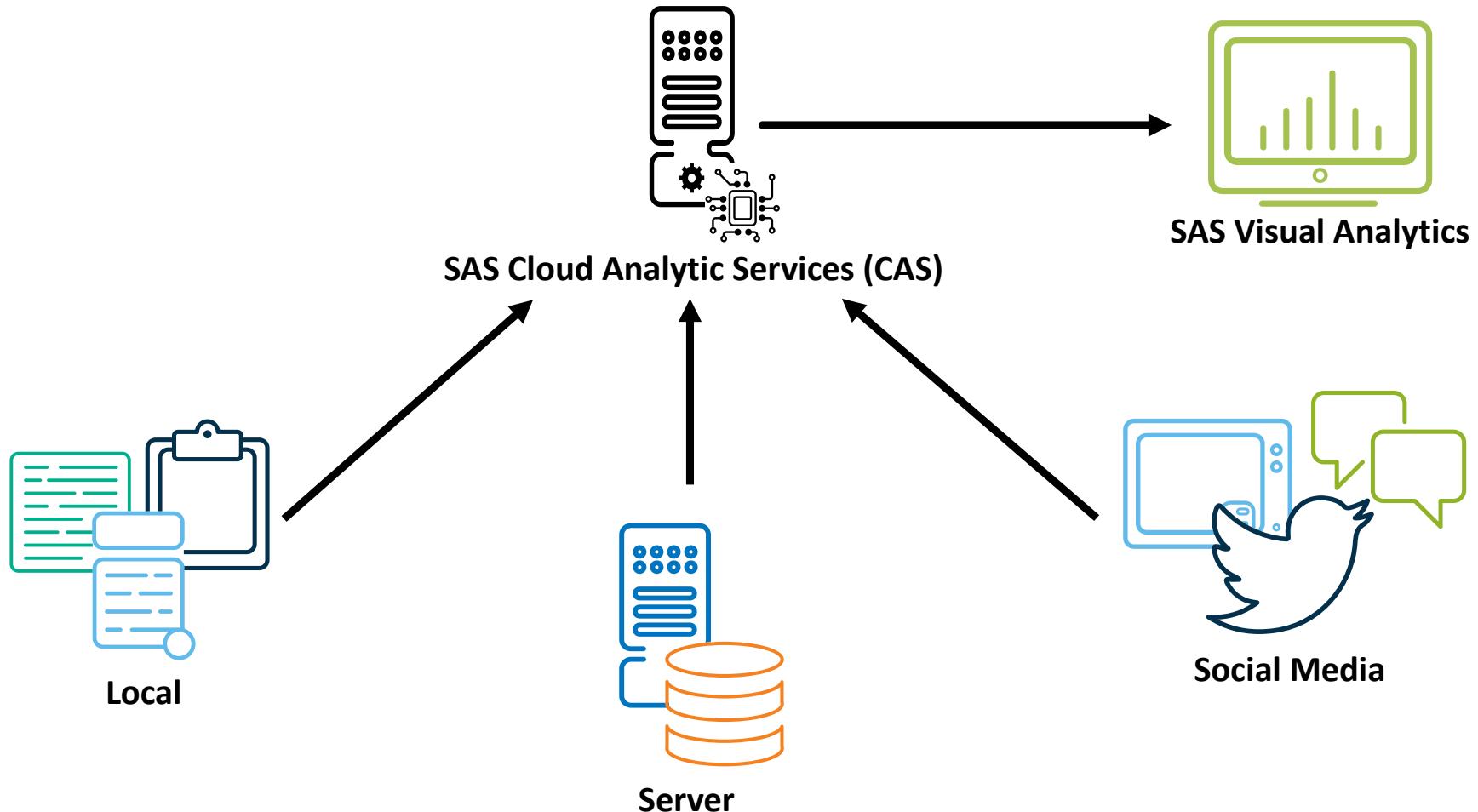
SAS Viya Applications (Recap)







Self-Service Import



Acces Data Using SAS Data Explorer

SAS® Data Explorer - Manage Data 27 Days Left   

Available Data Sources Import

Filter   ?

 AUSTIN_DAY_OF_WEEK_STATS 12/10/20 10:57 PM • peejank@gmail.com	
 AUSTIN_MERGED 12/10/20 10:57 PM • peejank@gmail.com	
 CUSTOMERS 12/11/20 12:38 AM • peejank@gmail.com	
 CUSTOMERS_CLEAN 12/11/20 10:00 PM • peejank@gmail.com	
 CUSTOMERS_CLEAN_ORG 12/13/20 05:56 PM • peejank@gmail.com	
 EMPLOYEES 12/11/20 12:12 AM • peejank@gmail.com	
 EMPLOYEES_CLEAN 12/11/20 12:11 AM • peejank@gmail.com	
 EMPLOYEES_CLEAN 12/11/20 01:33 AM • peejank@gmail.com	

No data is selected.

Waiting for vfe.sas.com...      

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Investigate

Visual Analytics Methodology: Investigate



Table size



Table contents

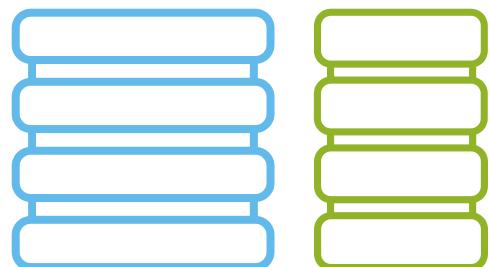
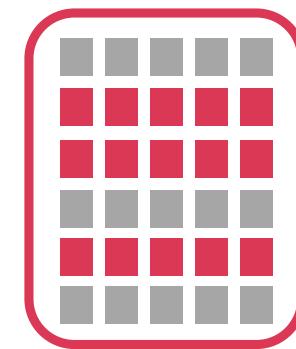


Table shape

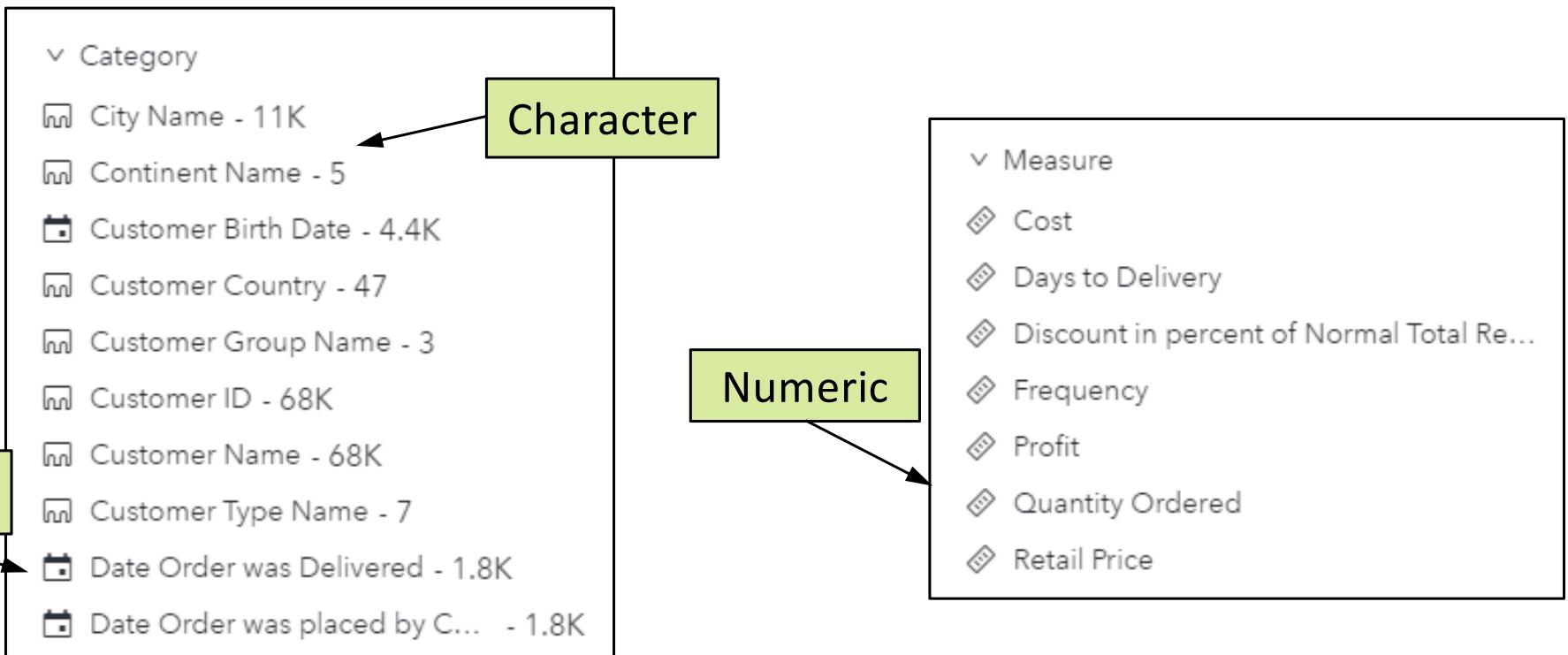


Detail data



Investigate

Data Types in Visual Analytics



Objects: Tables

Customer Name ▼	Quantity Ordered
Zylda Saigeon	2
Zygmunt Gnisci	27
Zvonimir Miller	5
Zvi Etheredge	8
Zuzana Markulic	14
Zulma Satterwhite-Brown	13
Zuleika Lysaght	15
Zuleen Pinol	43
Zul Walker	48
Zul Mullaney	35
Zul Marik	23
Zul Brandt	74

Use a *crosstab* to view summary information for multiple categories.

Use a *list table* to view summary or detail data about your data source.

Order Type ▲	Catalog Sale	Internet Sale	Retail Sale
Continent Name ▲	Quantity Ordered	Quantity Ordered	Quantity Ordered
Africa	548	793	—
Asia	845	1,073	—
Europe	142,511	120,384	836,473
North America	63,480	55,688	280,652
Oceania	14,811	12,551	67,508

Objects: Automatic Chart



Use an *automatic chart* to get a quick view of your data.

-
- ▼ Measure
Days to Delivery
Discount
Quantity
Total Revenue
Unit Cost



Investigate Data Using SAS Visual Analytics

SAS® Visual Analytics - Explore and Visualize

Explore and Visualize

Explore data, apply predictive analytics, and build interactive reports with SAS Visual Analytics.

New Report Start with Data

Search

Recent

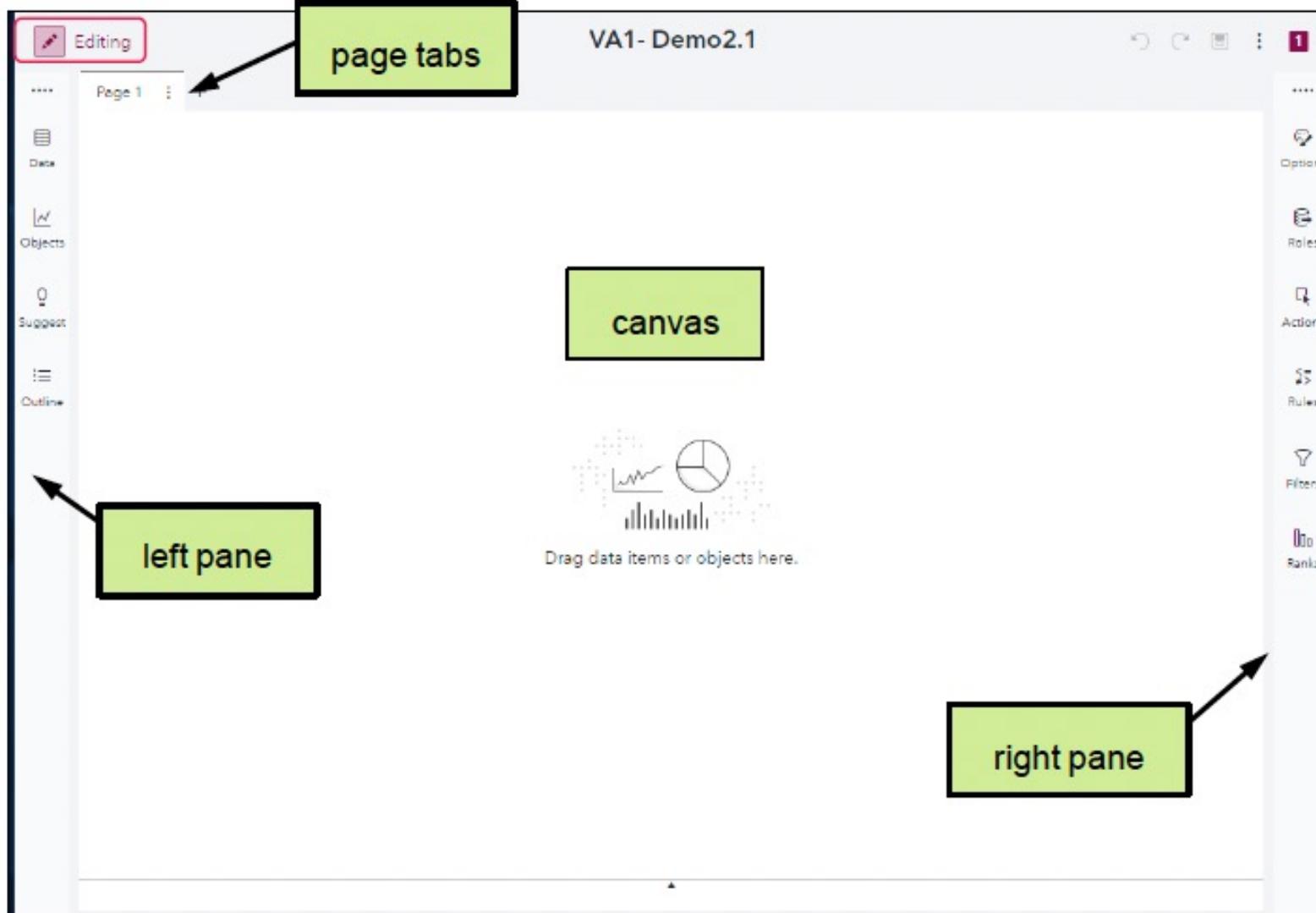
- My Favorites
- My Folder
- Shared with Me
- All Reports

Name	Date Modified
Austin Animal Center Das...	05/28/20 08:59 PM
VA2 - Demo9.1	12/13/20 02:38 PM
VA1 - Demo3.4b	12/12/20 12:14 PM
VA2 - Demo6.1	12/13/20 03:54 AM
VA2 - Demo5	12/13/20 02:57 AM
VA2 - Demo2.3	12/13/20 12:33 AM
VA2 - Demo1.2	12/12/20 11:20 PM
VA1 - Demo4.3	12/12/20 09:10 PM

The interface shows a dashboard with three main visualizations: a line chart with a blue line, a map with red and green dots, and a bar chart with horizontal bars. On the right side, there is a sidebar with various filters and settings, including sections for Options, Roles, Actions, Rules, Filters, Ranks, and a specific section for 'Regic' with a value of '1.7K'.



Accessing and Investigate data



Category	
City Name	- 11K
Continent Name	- 5
Customer Birth Date	- 4.4K
Customer Country	- 47
Customer Group Name	- 3
Customer Name	- 68K
Customer Type Name	- 7
Date Order was Delivered	- 1.8K
Date Order was placed by C...	- 1.8K
Name of Street	- 21K
Order Type	- 3
Postal code	- 19K
State Name	- 272

The list table should resemble the following:

City Name	Continent Name	Customer Birth Date	Customer Country	Customer Group Name	Customer Name	Customer Type Name	Postal code
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Africa	07Apr1953	South Africa	Orion Club members	Johann Adams	Orion Club members	12345678901234567890
	Europe	07Oct1938	United Kingdom	Orion Club members	James Dunkin	Orion Club members	12345678901234567890
	Europe	12Jan1958	Austria	Orion Club members	Richard Finster	Orion Club members	12345678901234567890
	Africa	07Apr1953	South Africa	Orion Club members	Johann Adams	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	07Oct1938	United Kingdom	Orion Club members	James Dunkin	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	07Oct1938	United Kingdom	Orion Club members	James Dunkin	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	07Oct1938	United Kingdom	Orion Club members	James Dunkin	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club members	James Dunkin	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Europe	12Jan1958	Austria	Orion Club members	Richard Finster	Orion Club members	12345678901234567890
	Europe	08May1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890
	Africa	07Apr1953	South Africa	Orion Club members	Johann Adams	Orion Club members	12345678901234567890
	Europe	04Dec1990	Ireland	Orion Club Gold members	Flor Donnelly	Orion Club members	12345678901234567890
	Europe	12Jan1958	Austria	Orion Club members	Richard Finster	Orion Club members	12345678901234567890
	Europe	10Mar1953	United Kingdom	Orion Club Gold members	Natalie Pedder	Orion Club members	12345678901234567890

The crosstab should resemble the following:

Order Type	Frequency
Catalog Sale	127,129
Internet Sale	108,570
Retail Sale	715,970

Click  **(Actions)** and select **View measure details**.



Transforming Data



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SAS Data Studio

SAS® Data Studio - Prepare Data 27 Days Left

Add Transform

- Column Transforms
 - Change case
 - Convert column
 - Manage columns
 - Remove
 - Rename
 - Split
 - Trim whitespace
- Custom Transforms
 - Calculated column
 - Code
- Data Quality Transforms
 - Casing
 - Field extraction

Untitled : +

There is no open plan.

New Plan Open Plan

The screenshot shows the SAS Data Studio interface for 'Prepare Data'. The top navigation bar includes a blue header with the title 'SAS® Data Studio - Prepare Data', a '27 Days Left' badge, and standard search and notification icons. On the left, a sidebar contains a 'Transforms' section with a 'Add Transform' button, followed by three expandable categories: 'Column Transforms' (listing Change case, Convert column, Manage columns, Remove, Rename, Split, Trim whitespace), 'Custom Transforms' (listing Calculated column, Code), and 'Data Quality Transforms' (listing Casing, Field extraction). The main workspace is titled 'Untitled' and displays a message: 'There is no open plan.' with 'New Plan' and 'Open Plan' buttons. The bottom right corner features the SAS logo.

SAS Data Studio (cont.)

▼ Column Transforms

- Aa Change case
- Convert column
- Manage columns
- Remove
- Rename
- Split
- Trim whitespace

▼ Custom Transforms

- Calculated column
- Code

▼ Data Quality Transforms

- Casing
- Field extraction
- Gender analysis
- Identification analysis
- Match and cluster
- Matchcodes
- Parsing
- Remove duplicates
- Standardize

▼ Multi-input Transforms

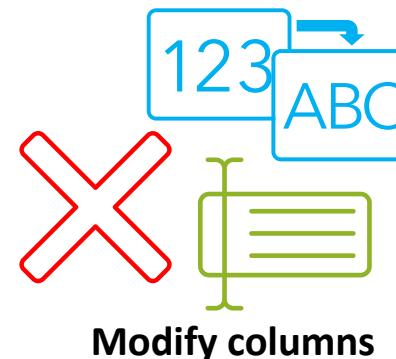
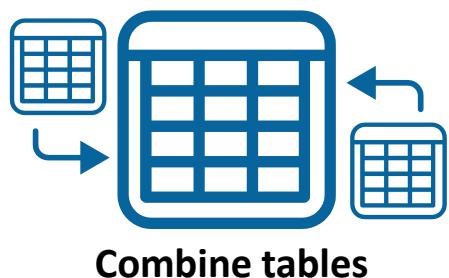
- Append
- Join

▼ Row Transforms

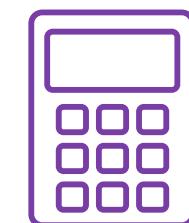
- Analytic partitioning
- Filter
- Transpose
- Unique identifier



Visual Analytics Methodology: Prepare



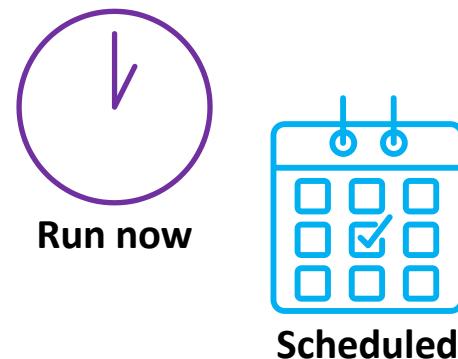
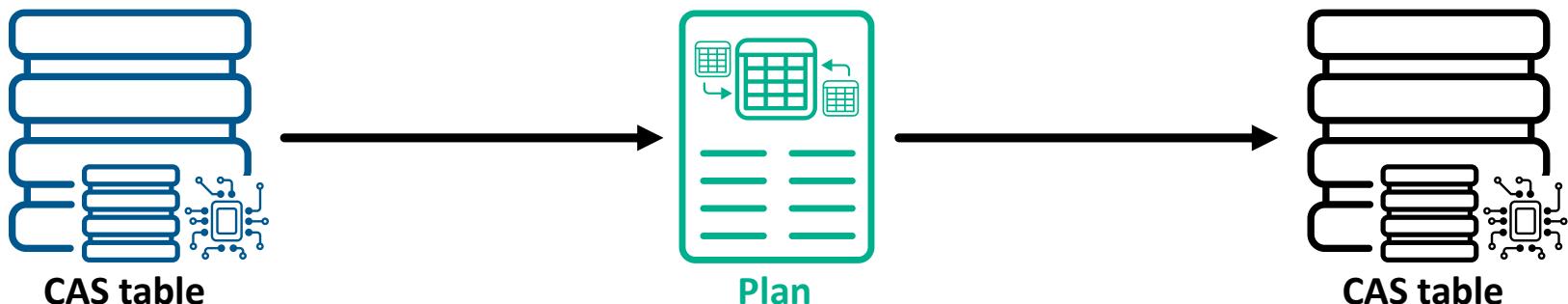
**Correct data
quality issues**



**Create new
columns**



SAS Data Studio



SAS Data Studio: Table Details

Table	Profile	Metadata
Date profiled: Dec 17, 2019 09:18 AM		
Column	Unique	Null
Ⓐ City	1.10% (10,507)	
Ⓐ Continent	<0.01% (5)	
⊕ Cost	0.20% (1,883)	
Ⓐ CustomerCount ryLabel	<0.01% (47)	
⊕ Customer_Birth Date	0.46% (4,368)	77.76
Ⓐ Customer_Grou p	<0.01% (3)	3,867.29

CUSTOMERS

The session table is not current to the plan. Run the plan to update the table.

Result rows: 100

City	Continent	Postal Code	State Province	Street Name	xyContinentLat	xyContinentLon	Employee ID	Street Number
Leinster	Oceania	6437	Western...	Bembo...	-18.3...	138....	9999...	16001...
Berowra	Oceania	2081	New So...	Circuit ...	-18.3...	138....	9999...	16001...
Berowra	Oceania	2081	New So...	Circuit ...	-18.3...	138....	9999...	16001...
Northbr...	Oceania	2063	New So...	Exhibiti...	-18.3...	138....	9999...	16001...

Table Profile Metadata

Filter

#	Name	Label	Type	Raw Length
1	Ⓐ City	City Name	char	45
2	Ⓐ Continent	Continent Name	char	45
3	Ⓐ Postal_Code	Postal code	char	15
4	Ⓐ State_Province	State Name	char	38
5	Ⓐ Street_Name	Name of Street	char	68
6	⊕ xyContinentLat	xyContinentLat	double	8
7	⊕ xyContinentLon	xyContinentLon	double	8
8	⊕ Employee_ID	Employee ID	double	8



Preparing Data

VA1-Demo2.2 +

Table Profile Metadata

CUSTOMERS

The session table is not current to the plan. Run the plan to update the table.

Result rows: 100

	Post...	Stat...	Stre...	xyC...	xyC...		
Berowra	Oceania	2081	New So...	Circuit ...	-18.3...	138....	9999... 16001...
Berowra	Oceania	2081	New So...	Circuit ...	-18.3...	138....	9999... 16001...
Northbr...	Oceania	2063	New So...	Exhibitio...	-18.3...	138....	9999... 16001...
Montréal	North A...		Quebec	rue Bea...	46.0...	-100....	9999... 26001...

8. Calculated Column

Run

workspace

1 Delivery_Date - Order_Date

Replace existing column
 Create new column Days to Delivery

Options for new columns

The diagram illustrates the layout of the SAS Visual Analytics interface. It features four main panes:

- top pane:** Located at the top center, containing the title "VA1-Demo2.2" and navigation tabs like Table, Profile, and Metadata.
- left pane:** Located on the left side, displaying a list of customers with columns for Postcode, State, Street, and xyCoordinates.
- right pane:** Located on the right side, showing a preview of the data with columns for Postcode, State, Street, and xyCoordinates.
- workspace:** The main working area where a calculated column named "Delivery_Date - Order_Date" is being created, resulting in a new column "Days to Delivery".

 Arrows point from each labeled pane to its corresponding section in the interface.

Plan

Name: VA1-Demo2.2
Modified: 12/17/19 09:29 AM

1. Rename
 2. Convert Column
 3. Trim Whitespace
 4. Trim Whitespace
 5. Split
 6. Remove
 7. Calculated Column
 8. Calculated Column

This screenshot shows the "Plan" pane on the right side of the interface. It displays a list of steps taken to create the current plan, including:

- 1. Rename
- 2. Convert Column
- 3. Trim Whitespace
- 4. Trim Whitespace
- 5. Split
- 6. Remove
- 7. Calculated Column
- 8. Calculated Column

 The last two steps, 7 and 8, are highlighted in grey, indicating they are the most recent changes made to the plan.

Name:

Type:

Save plan and target table Save plan Save target table

Target table name: *

Label:

Format:

Library: 

Save as an in-memory table only

If the name of the target table already exists: Cancel save Replace table



Lesson 3: Analyze Data Using SAS® Visual Analytics

Outline

- Working with data items
- Exploring data with charts & graphs
- Creating data items & applying filters
- Performing data analysis

ANALYTICS LIFE CYCLE

- Manage Data
- Prepare Data
- Explore and Visualize
- Build Models
- Manage Models
- Build Decisions
- Share and Collaborate
- Develop SAS Code

ADMINISTRATION

- Build Custom Graphs
- Explore Lineage
- Manage Environment
- Manage Workflows



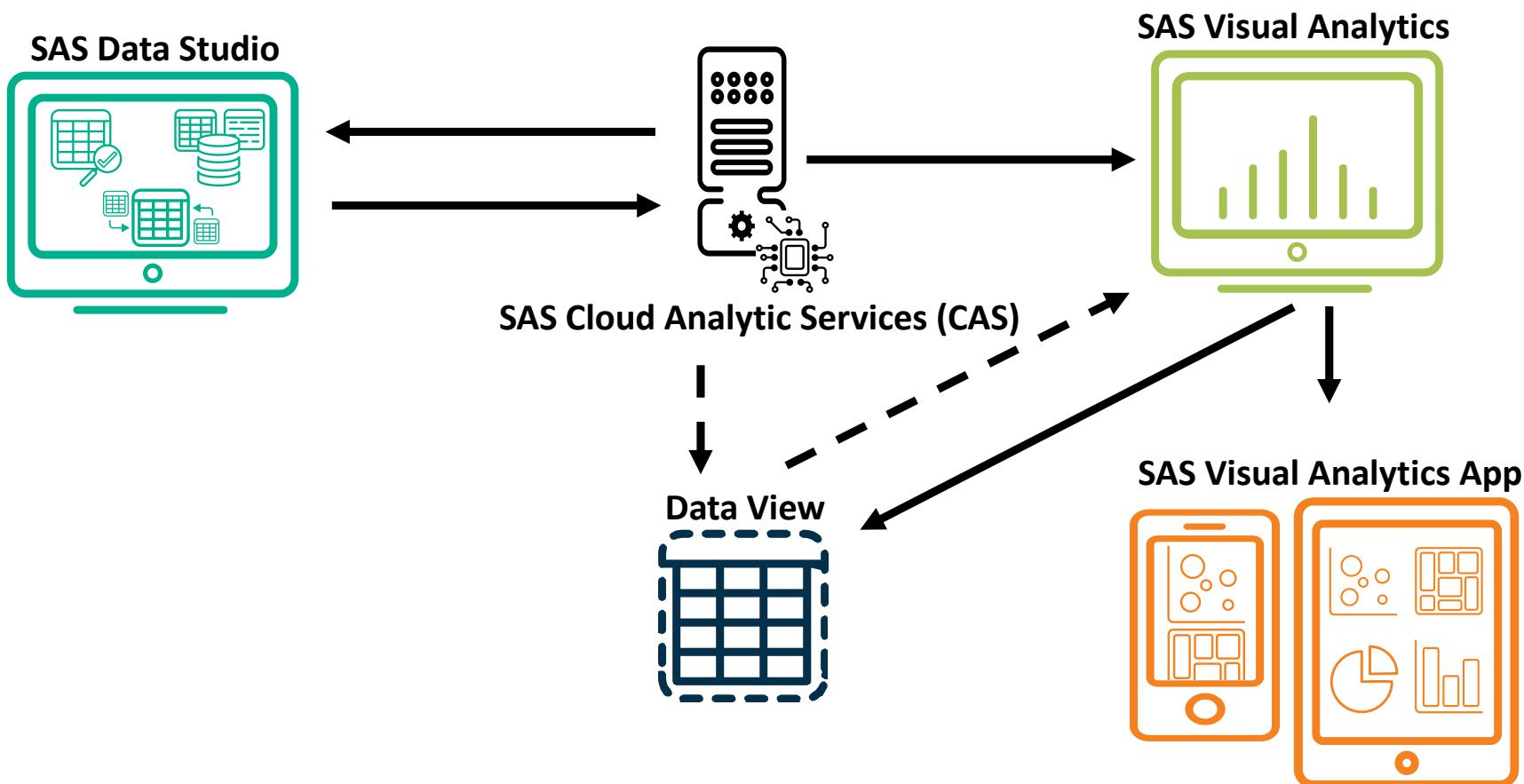


Working with data items



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SAS Data Studio versus Visual Analytics



Prepare Data in SAS VA

SAS® Visual Analytics - Explore and Visualize

Editing

Data

CUSTOMERS_CLEAN

Filter

New data item

Category

City Name - 11K

Continent Name - 5

Customer Birth Date - 4.4K

Customer Country - 47

Customer Group Name - 3

Customer ID - 68K

Customer Name - 68K

Customer Type Name - 7

Customer_ID_CONVERTED - 68K

Start from a Page Template

Measure by Time Axis

1.7K

5.4K

Sales of Product Lines grouped by Store Types

1

Actions

Rules

Filters

Ranks

Prepare Data in SAS VA (cont.)

The screenshot shows the SAS Visual Analytics Data pane. On the left, under the 'Data' tab, there is a list of data items: 'CUSTOMERS_CLEAN', 'Product ID', 'Days to Delivery', 'Discount in percent of Norm...', 'Order ID', and 'Product ID'. The 'Product ID' item is highlighted with a yellow box and has a tooltip 'Direct at variable' over it. On the right, a context menu is open for the same 'Product ID' item, also highlighted with a yellow box and a tooltip 'Right Click'. The menu options include: Select, Hide, Duplicate, Convert to category, Aggregation, Format, New aggregated data, New custom category..., New calculation..., New geography..., New parameter..., New partition..., New interaction effect, and New spline effect. The 'New calculation...' option is currently selected.

Data Item & Join (cont.)

New data item

+ New data item

Hierarchy

Custom category

Calculated item

Geography item

Parameter

Interaction effect

Spline effect

Partition

From data option icon

The screenshot shows the SAS Data view interface. The main area displays a list of objects from the 'CUSTOMERS_CLEAN' data source. A context menu is open on the right side, triggered by the 'Data' option icon. The menu includes:

- Add data...
- New data from join...
- New data from join with CUSTOMERS_CLEAN
- New data from aggregation of CUSTOMERS_CLEAN...
- Save data view...
- Data views...
- Remove CUSTOMERS_CLEAN
- Change CUSTOMERS_CLEAN...
- Refresh CUSTOMERS_CLEAN
- Apply data filter...
- Set unique row identifier...
- View measure details...

The 'Data' tab is selected, and the 'CUSTOMERS_CLEAN' data source is chosen. The 'Objects' section shows a search bar and a list of objects: Days to Delivery, Discount in percent of Normal Total Re..., Employee ID, Frequency, Order ID, and Product ID. The 'Product ID' object is currently selected, showing its name and classification fields.

Data View

Data

A screenshot of a data management interface. On the left, there's a sidebar with a 'Data' section header. Below it, a dropdown menu shows 'CUSTOMERS_CLEAN'. A context menu is open over this dropdown, listing options like 'Add data...', 'New data from join...', and 'Save data view...'. Other items in the menu include 'Data views...', 'Remove CUSTOMERS_CLEAN', and 'View measure details...'. The background shows a list of data items including 'Retail Price', 'Street ID', and 'Total Revenue'.

- Add data...
- New data from join...
- New data from join with CUSTOMERS_CLEAN
- New data from aggregation of CUSTOMERS_CLEAN...
- Save data view...
- Data views...
- Remove CUSTOMERS_CLEAN
- Change CUSTOMERS_CLEAN...
- Refresh CUSTOMERS_CLEAN
- Apply data filter...
- Set unique row identifier...
- View measure details...

A screenshot of a 'Data Views' dialog box. It contains a list of data views, with one named 'CUSTOMERS_CLEAN_View_1' selected. The dialog has standard controls at the bottom: 'Apply' (highlighted in blue) and 'Close'.

Data Views

- CUSTOMERS_CLEAN_View_1

Apply Close



Working with Data Items

Data

CUSTOMERS_CLEAN

+ New data item

Category

- City Name - 11K
- Continent Name - 5
- Customer Birth Date - 4.4K
- Customer Country - 47
- Customer Group Name - 3
- Customer ID - 68K
- Customer Name - 68K
- Customer Type Name - 7
- Date Order was Delivered - 1.8K
- Date Order was placed by C... - 1.8K
- Loyalty Num - 2
- Order ID - 748K
- Order Type - 3
- Postal code - 19K
- State Name - 272

8. Modify properties for a data item, Date Order was Delivered.
 - a. In the Category group, right-click Date Order was Delivered.
 - b. Select Format \Rightarrow MMMYYYY(MONYY7).
 - c. Next to Date Order was Delivered, click  (Edit properties).
 - d. In the Name field, enter Delivery Date and press the Enter key.
9. Modify properties for a data item, Discount in percent of Normal Total Retail Price.
 - a. In the Measure group, next to Discount in percent of Normal Total Retail Price, click  (Edit properties).
 - b. For the Aggregation field, select Average.
 - c. In the Name field, enter Discount and press Enter.
10. Modify the aggregation for a data item, Days to Delivery.
 - a. In the Measure group, next to Days to Delivery, click  (Edit properties).
 - b. For the Aggregation field, select Average.
 - c. In the Name field, enter Average Days to Delivery and press Enter.
11. Rename data items.
 - a. In the Category group, next to Date Order was placed by Customer, click  (Edit properties).
 - b. In the Name field, enter Order Date and press Enter.
 - c. In the Measure group, next to Cost, click  (Edit properties).
 - d. In the Name field, enter Unit Cost and press Enter.
 - e. In the Measure group, next to Quantity Ordered, click  (Edit properties).
 - f. In the Name field, enter Quantity and press Enter.
 - g. In the Measure group, next to Retail Price, click  (Edit properties).
 - h. In the Name field, enter Total Revenue and press Enter.
12. Create a data view.
 - a. At the top of the Data pane, next to the table name, click  (Actions) and select Save data view.
 - b. For the Name field, verify that CUSTOMER_CLEAN_View_1 is specified.

Save Data View

No data views

Name:

Description:

Default data view

Click **Save**.





Exploring data with charts & graphs



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Objects in SAS VA

....

Objects

Filter

Objects > Tables

Objects > Graphs

Suggest > Geo maps

Outline > Controls

> Analytics

> Containers

> Content

> SAS Visual Statistics

> SAS Visual Data Mining and Machine Lear...

Objects

Filter

Graphs

Bar chart

Box plot

Bubble change plot

Bubble plot

Butterfly chart

Comparative time series plot

Correlation matrix

Dot plot

Dual axis bar chart

Dual axis bar-line chart

Dual axis line chart

Dual axis time series plot

Needle plot

Numeric series plot

Parallel coordinates plot

Pie chart

Scatter plot

Schedule chart

Step plot

Targeted bar chart

Time series plot

Treemap

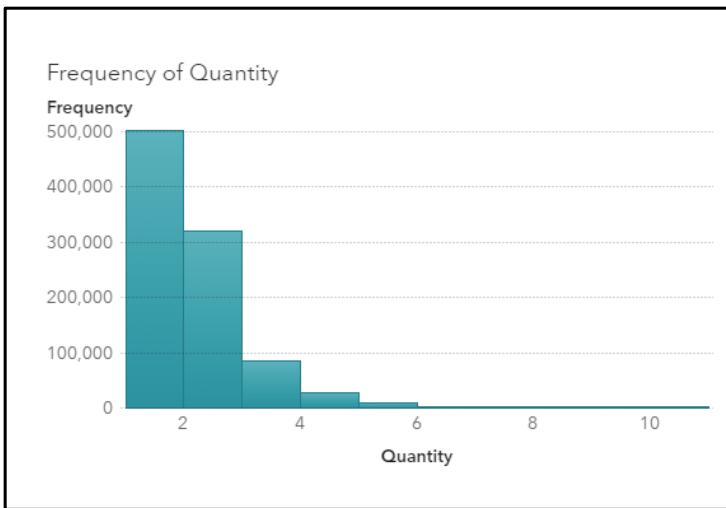
Vector plot

Waterfall chart

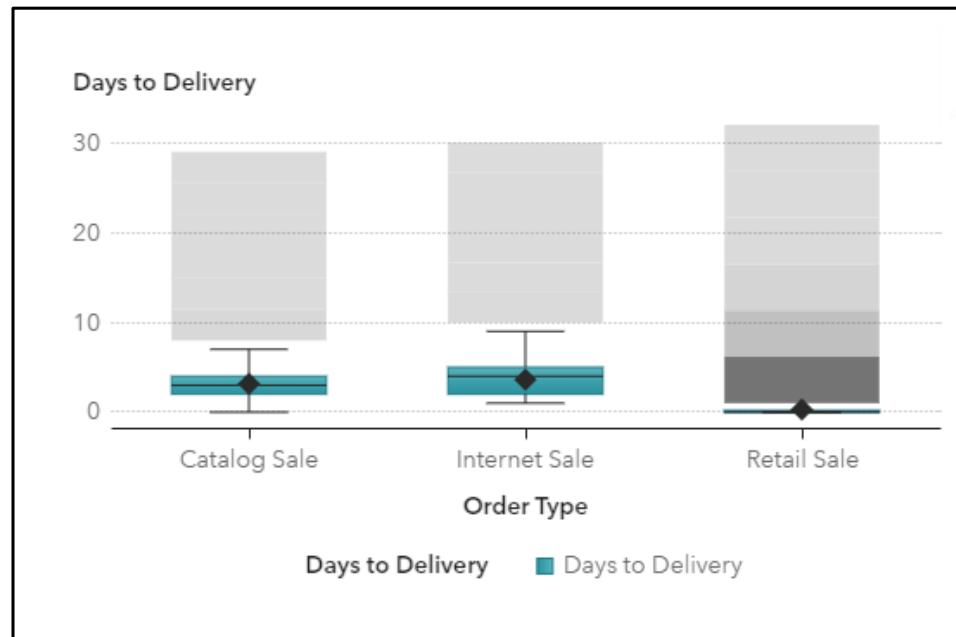
Word cloud



Objects: Graphs (Descriptive)



Use a *histogram* to view the distribution of a single measure.



Use a *box plot* to view information about the variability of the data and extreme values.

Objects: Graphs (Descriptive)

Use a *bar chart* to compare summarized data for the following:

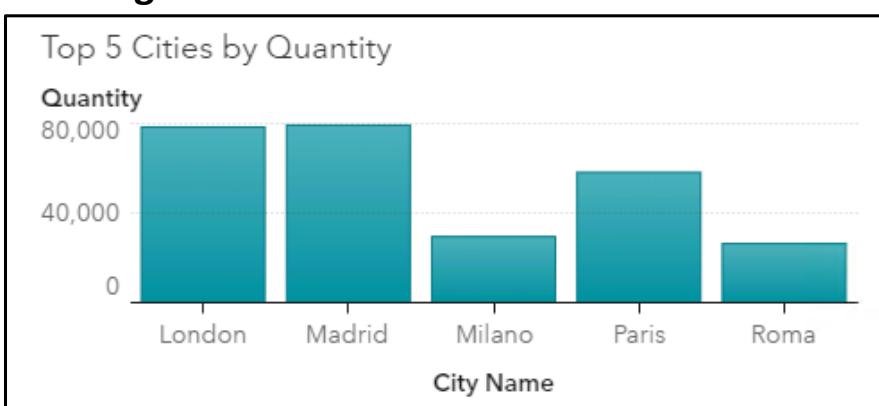
Nominal values



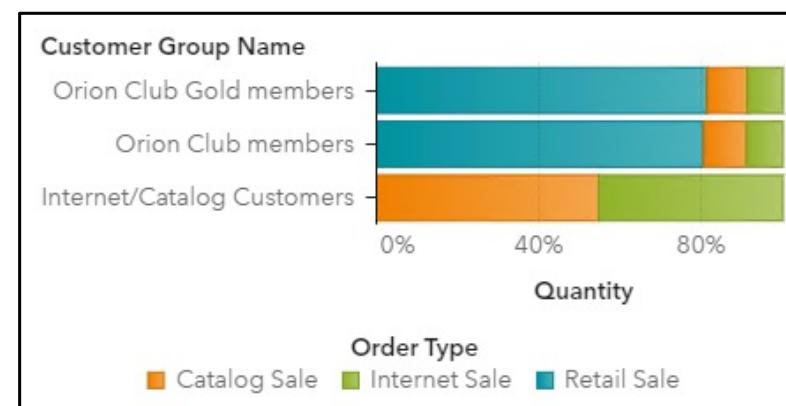
Time series data



Rankings



Parts of a whole

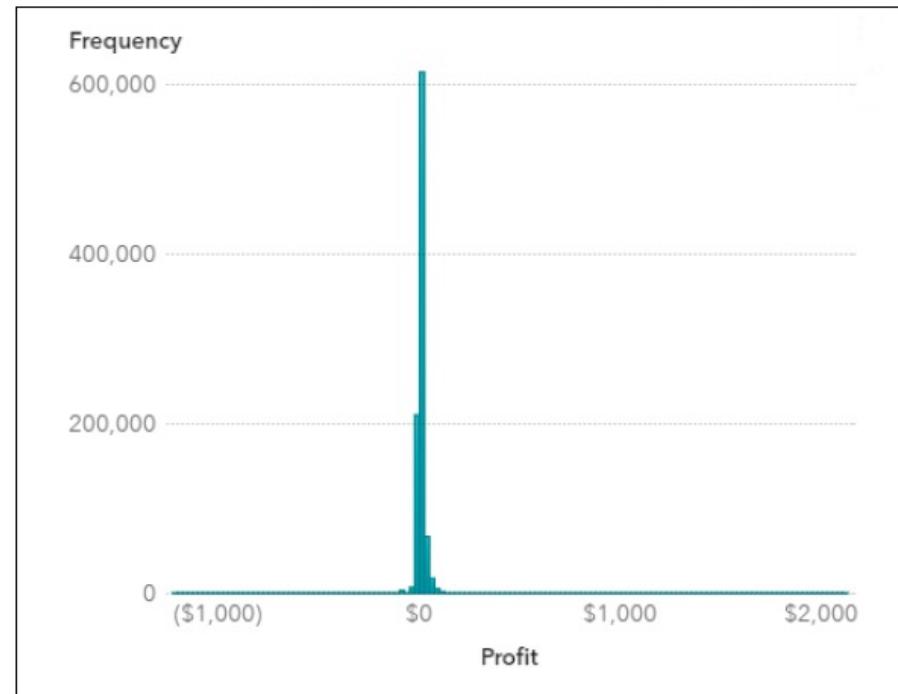




Exploring Data: Part1

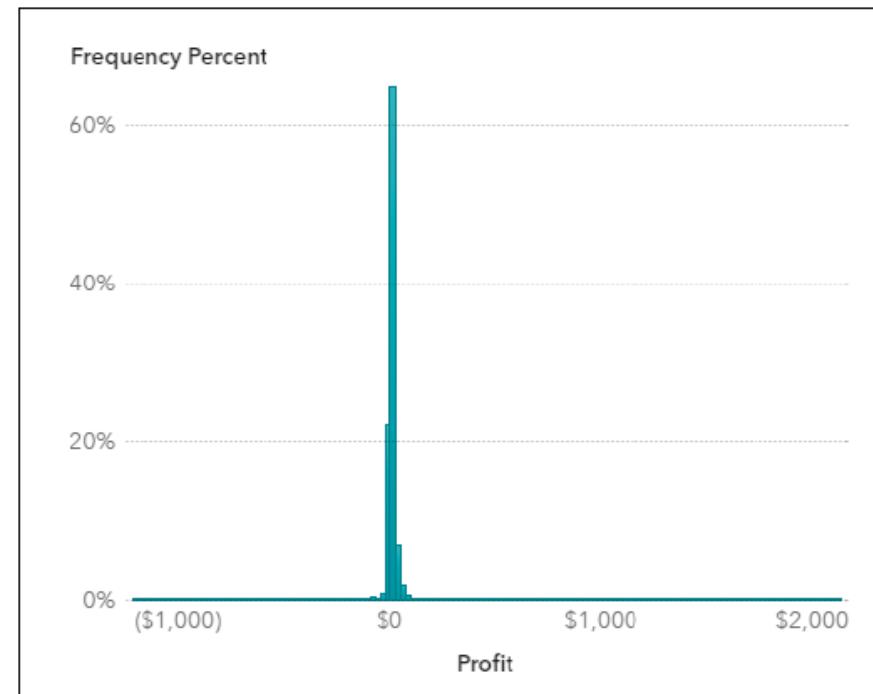
Drag **Profit** from the Data pane to the canvas.

The automatic chart functionality determines the best way to display the selected data.



For the **Frequency** role, select **Frequency** \Rightarrow **Frequency Percent**.

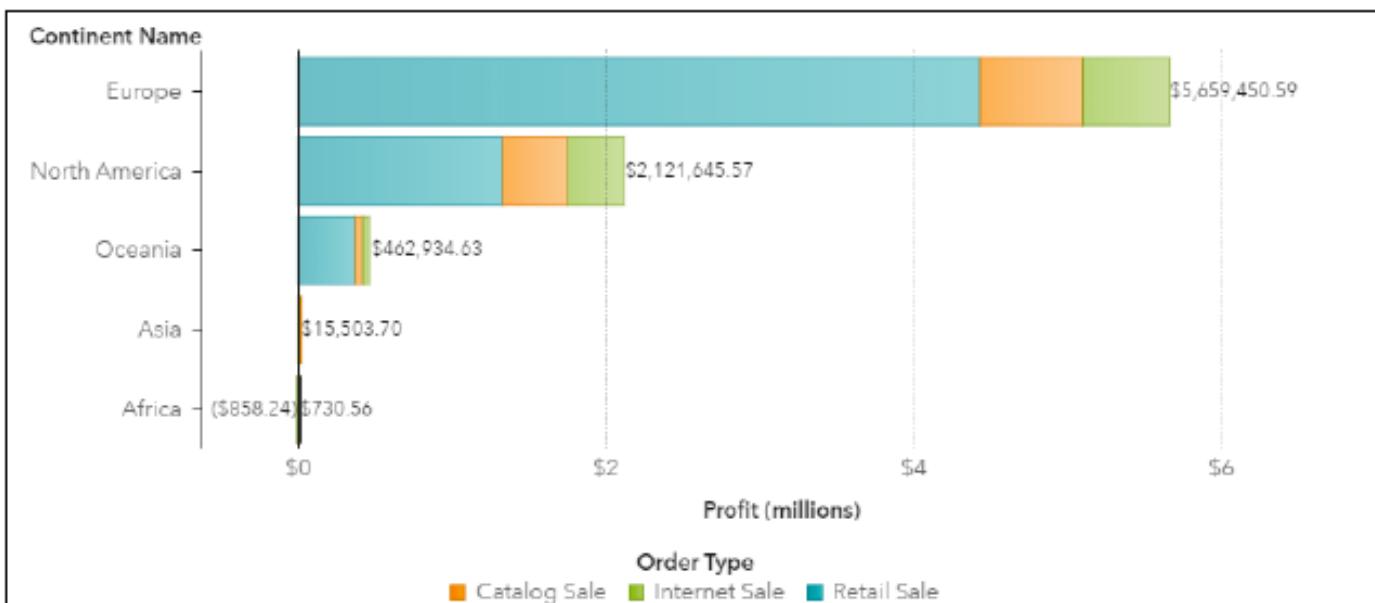
The histogram is updated to use frequency percent for the Y axis.



Data Roles

- Crosstab - Order Type 1
- ▼ Columns
 - + Add
- ▼ Rows
 - Order Type
 - + Add
- ▼ Measures
 - Profit
 - + Add

Continent Name ▲	Africa	Asia	Europe	North America	Oceania
Order Type ▲	Profit	Profit	Profit	Profit	Profit
Total	(\$127.68)	\$15,503.70	\$5,659,450.59	\$2,121,645.57	\$462,934.63
Catalog Sale	\$730.56	\$7,564.99	\$670,252.82	\$423,428.89	\$51,403.52
Internet Sale	(\$858.24)	\$7,938.71	\$559,663.83	\$370,621.44	\$43,804.75
Retail Sale	—	—	\$4,429,533.94	\$1,327,595.24	\$367,726.36



The chart displays the total profit for each continent, broken down by order type: Catalog Sale (orange), Internet Sale (green), and Retail Sale (blue). The y-axis lists the continents from highest profit at the top to lowest at the bottom. The x-axis represents profit in millions of dollars, ranging from \$0 to \$6.

Continent Name	Profit (millions)
Europe	\$5,659,450.59
North America	\$2,121,645.57
Oceania	\$462,934.63
Asia	\$15,503.70
Africa	(\$858.24) \$730.56

Order Type

- Catalog Sale
- Internet Sale
- Retail Sale



Exploring Data: Part2

Data Roles

Box - Order Type 1

- Category
 - Order Type
- Measures
 - Profit
 - + Add
- Lattice columns
 - + Add
- Lattice rows
 - + Add

Select the check box for **Averages**.

Box Plot

Box direction:

Measure layout:

Automatic

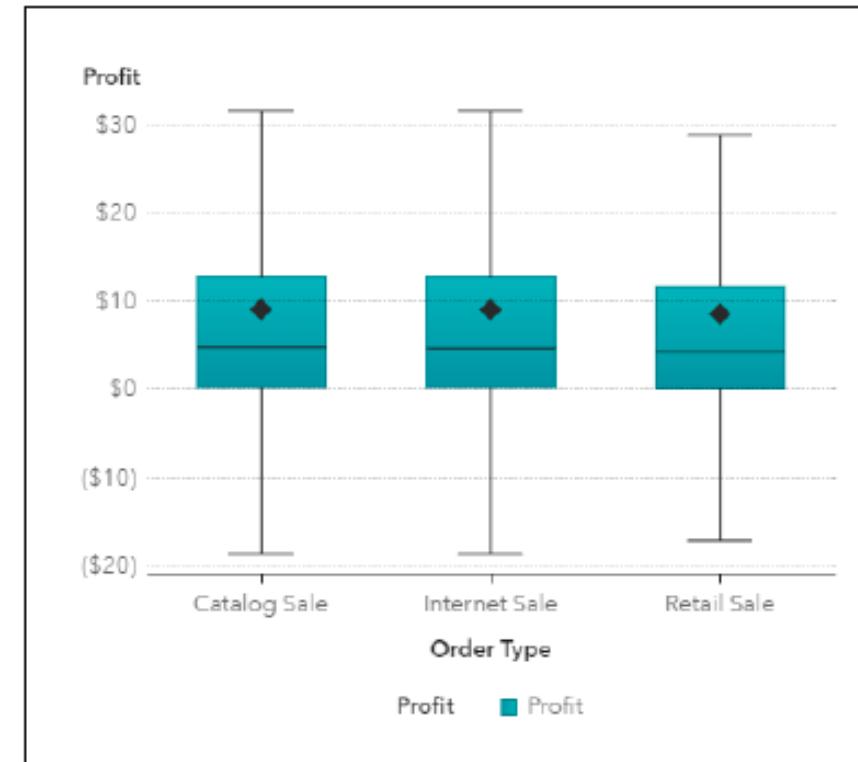
Outliers:

Ignore Outliers

Outlier bin outlines

Averages

The box plot should resemble the following:





Creating data items & applying filters



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Data Item & Join (recap)

New data item

+ New data item

Hierarchy

Custom category

Calculated item

Geography item

Parameter

Interaction effect

Spline effect

Partition

From data option icon

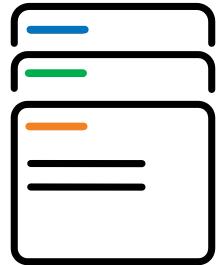
The screenshot shows the SAS Data view interface. The 'Data' tab is selected. A context menu is open over a data item named 'CUSTOMERS_CLEAN'. The menu includes the following options:

- Add data...
- New data from join...
- New data from join with CUSTOMERS_CLEAN
- New data from aggregation of CUSTOMERS_CLEAN...
- Save data view...
- Data views...
- Remove CUSTOMERS_CLEAN
- Change CUSTOMERS_CLEAN...
- Refresh CUSTOMERS_CLEAN
- Apply data filter...
- Set unique row identifier...
- View measure details...

At the bottom of the menu, there are buttons for 'Clear selection' and '21'.

Creating Data Items

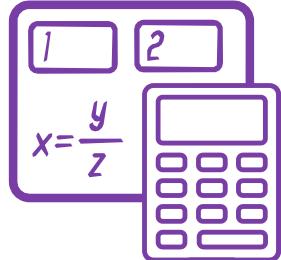
Custom category



Duplicate



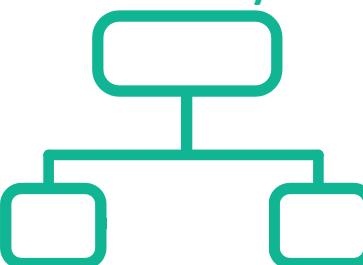
Calculated



Geography



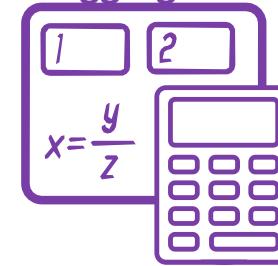
Hierarchy



Parameters



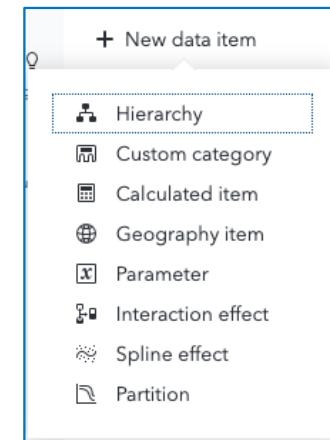
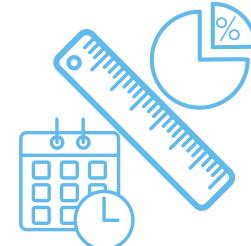
Aggregated



Distinct count



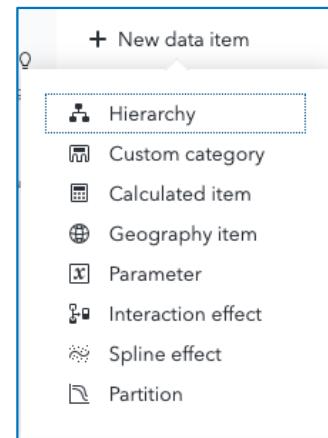
Derived items



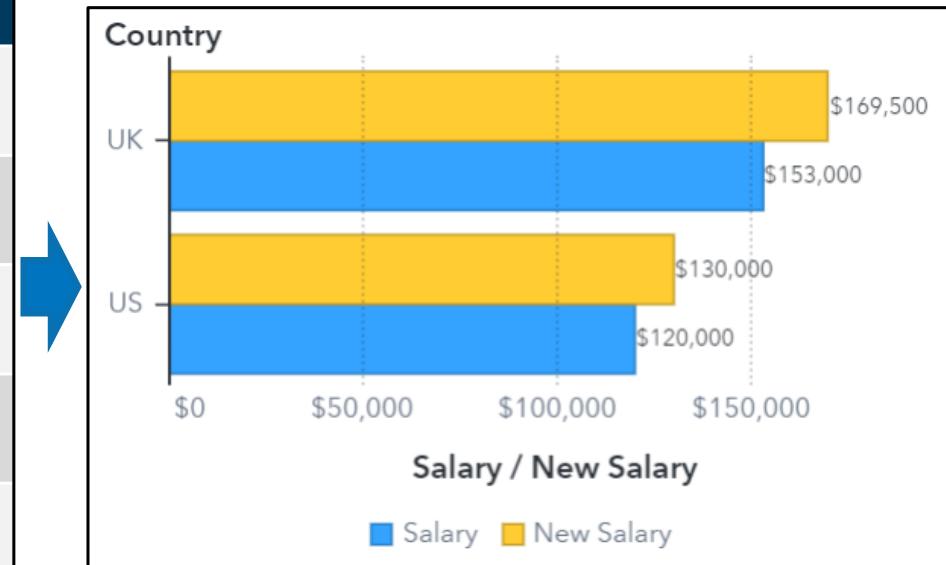
1) Calculated Item: Example

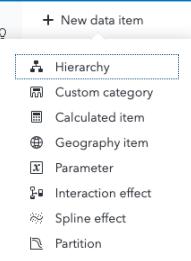
Calculated items are created by performing operations on unaggregated data.

$$(\text{Salary} * \text{Increase})$$



Country	Salary	Increase	New Salary
US	40,000	X 1.05	42,000
UK	65,000	X 1.10	71,500
UK	32,000	X 1.05	33,600
US	80,000	X 1.10	88,000
UK	56,000	X 1.15	64,400





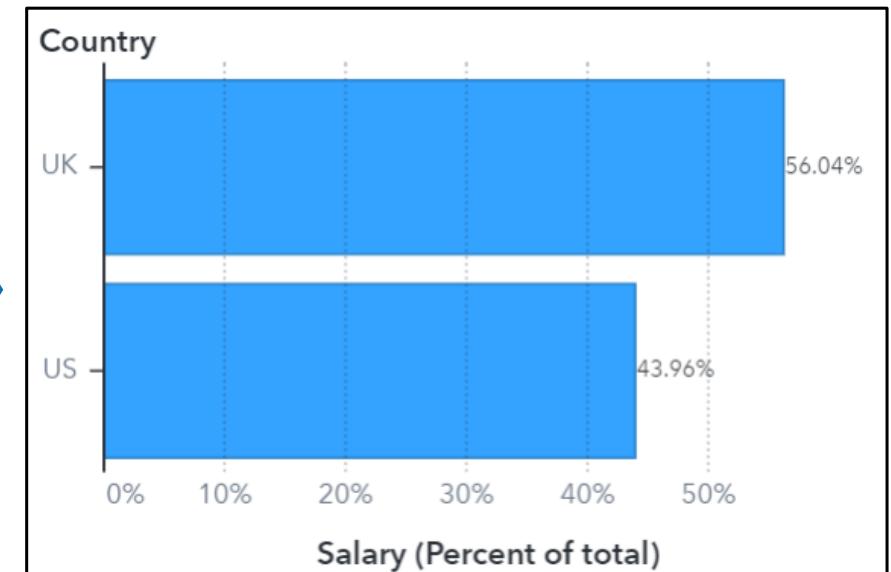
1) Aggregated Measure: Example

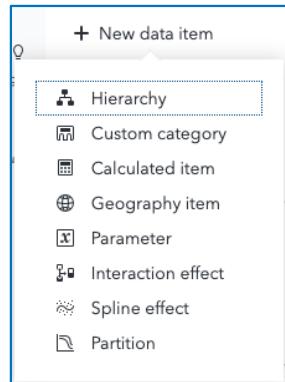
Aggregated measures are created by aggregating first and then performing the operation.

```
( Sum _ByGroup_ ( Salary ) / Sum _ForAll_ ( Salary ) )
```

Country	Salary
US	40,000
UK	65,000
UK	32,000
US	80,000
UK	56,000

Country	Salary
US	120,000
UK	153,000
TOTAL	273,000





2) Custom Category: Example

Custom categories create labels for groups of category or measure data items.

Custom category

Value Groups

- ✓ Northern
 - Asia
 - Europe
 - North America
- ✓ Southern
 - Africa
 - Oceania

Calculated item

```
IF    Continent Name    In    (multiple selected)
      RETURN "Northern"
      ELSE   "Southern"
```

(Asia, Europe, North America)

This calculated item and custom category produce equivalent results.



Create Data Items

- Aggregated Measure
- Frequency Percent
- Number of Orders**

Distinct (Order ID)

- Measure
- Customer Age**
- Days to Delivery
- Discount

Floor ((TreatAs DatePart (Now ())) - TreatAs Customer Birth Date) / 365.25))

Customer Age Group

IF (Customer Age <= 29)

RETURN " 29 and below "

IF Customer Age BetweenInclusive [30]
[44]

RETURN " 30-44 years "

ELSE

IF Customer Age BetweenInclusive [45]
[59]

RETURN " 45-59 years "



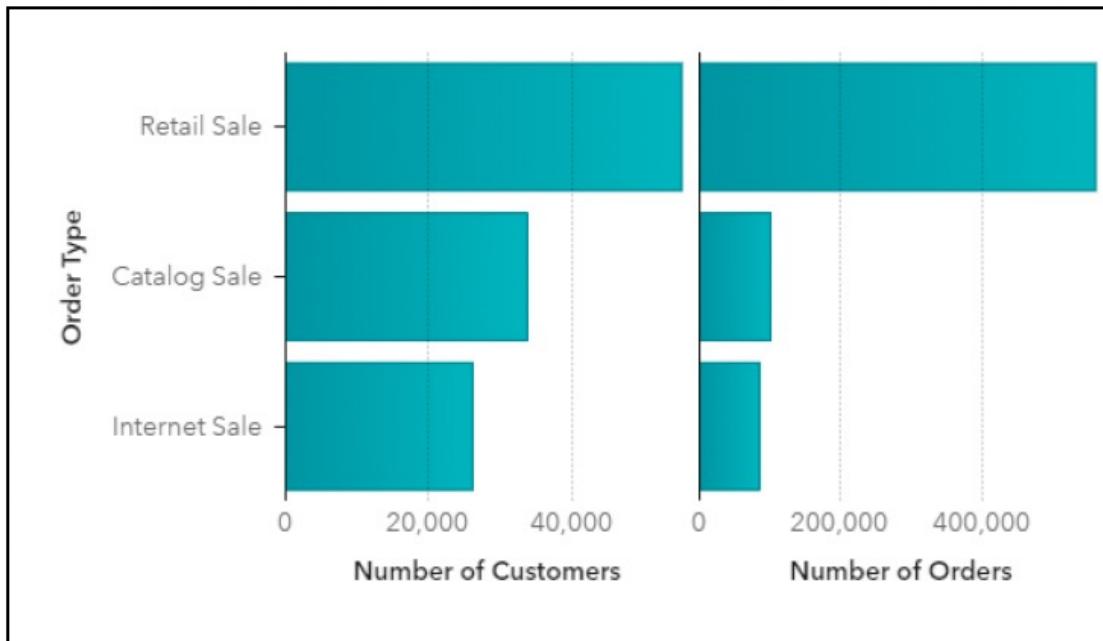
New custom category...
New calculation...
New geography...
New parameter...

Create Calculation

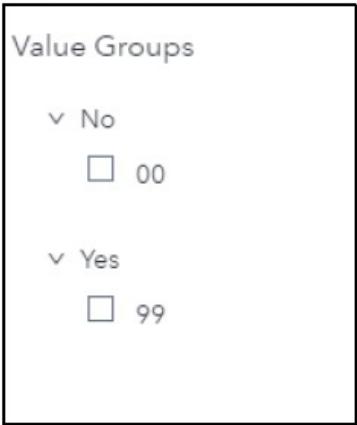
Name:

Type:

- ✓ Aggregated Measure
- ❖ Frequency Percent
- ❖ Number of Customers
- ❖ Number of Orders



Loyalty Member



Objects: Graphs (Geography)

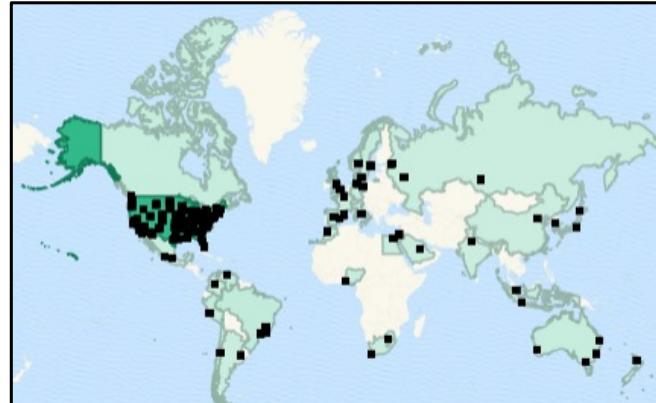
<input checked="" type="checkbox"/>	Geo maps
<input type="checkbox"/>	Geo contour
<input type="checkbox"/>	Geo coordinate
<input type="checkbox"/>	Geo network
<input type="checkbox"/>	Geo region
<input type="checkbox"/>	Geo region-coordinate

Use a *geo map* when location is a critical component of the analysis.

Coordinate



Region-Coordinate



Use a *region* or *region-coordinate* map only when there is an even distribution of values within each region.

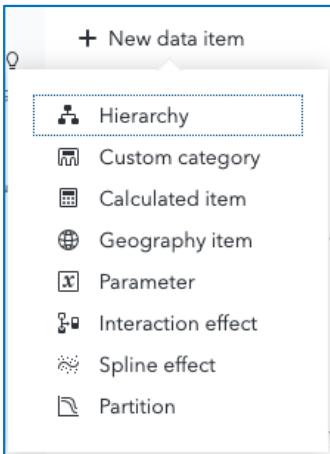
Contour



Region



Use a *geo contour* map to show very dense data.



3) Geography Data Items

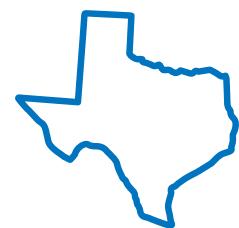
Geographic name or code lookup



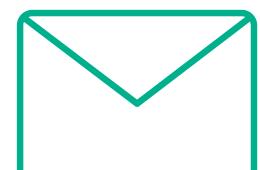
Country names or codes



State or province names or ID values



US state names or abbreviations



US postal codes

Latitude and longitude in data*

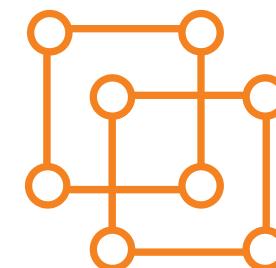


Latitude



Longitude

Geographic data provider**



+ New data item

Hierarchy

Custom category

Calculated item

Geography item

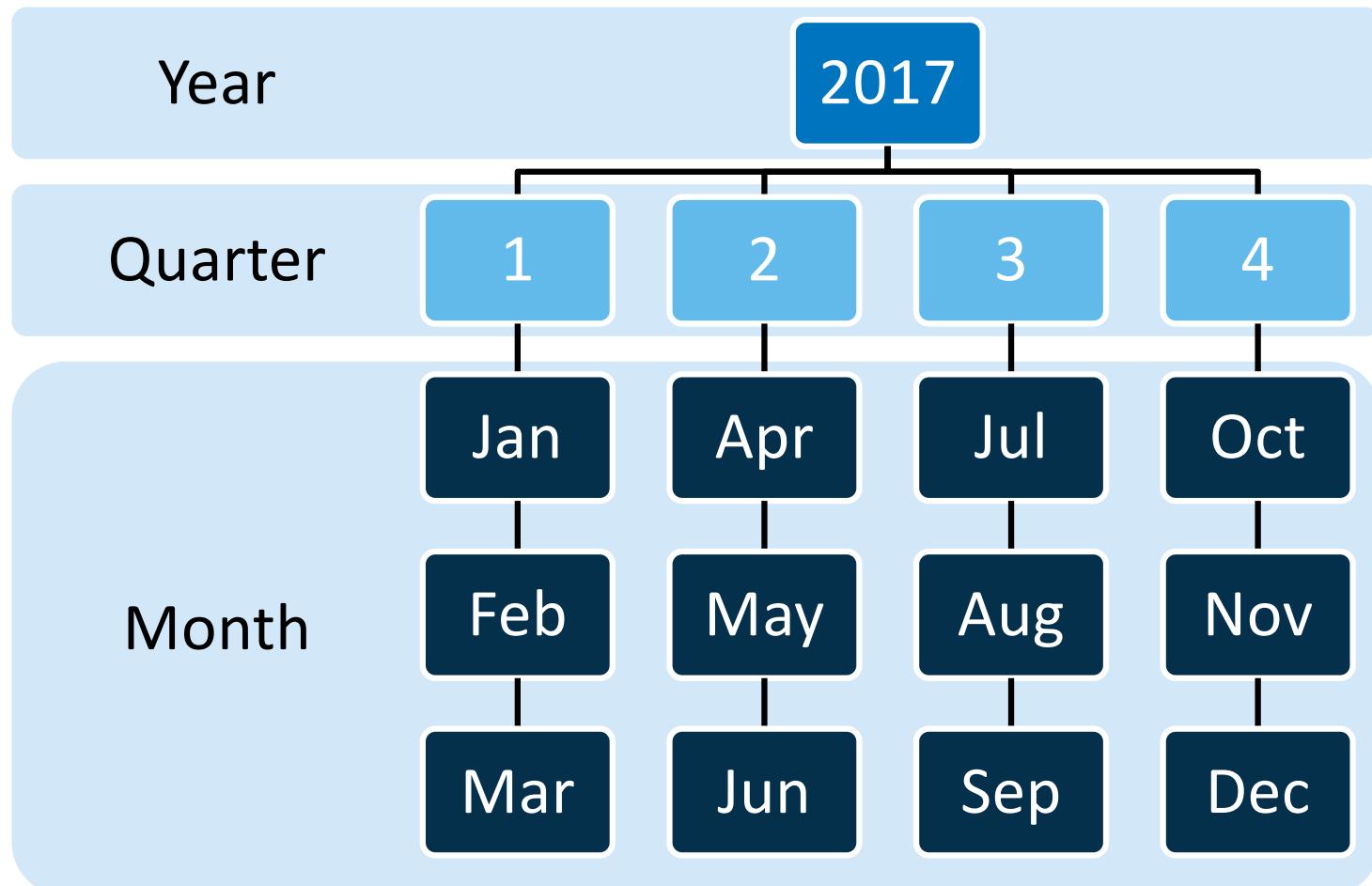
Parameter

Interaction effect

Spline effect

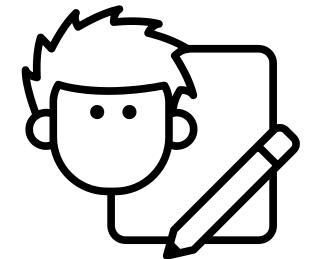
Partition

4) What Is a Hierarchy?



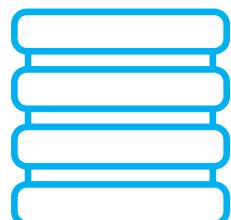


Filtering Data

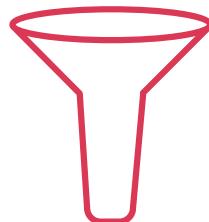


Report Designer

Detail report filters



Data source

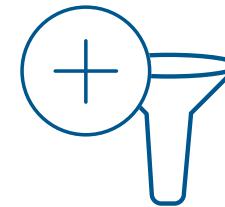


Basic



Advanced

Summary report filters



Post-aggregate

Filtering Data (cont.)

Data Filter

The screenshot shows the SAS Data Filter interface. On the left, there's a sidebar with sections for Data, Objects, Suggest, and Outline. The Data section is active, showing a dropdown menu set to 'CUSTOMERS_CLEAN'. A context menu is open over this dropdown, listing options like 'Add data...', 'New data from join...', 'New data from join with CUSTOMERS_CLEAN', 'New data from aggregation of CUSTOMERS_CLEAN...', 'Save data view...', 'Data views...', 'Remove CUSTOMERS_CLEAN', 'Change CUSTOMERS_CLEAN...', 'Refresh CUSTOMERS_CLEAN', 'Apply data filter...', 'Set unique row identifier...', and 'View measure details...'. The 'Apply data filter...' option is highlighted.

Report & Object Filters

The screenshot shows the SAS Report & Object Filters interface. On the left, there's a sidebar with sections for Options, Roles, Actions, Rules, Filters, Ranks, and a logo for 'Sas'. The main area is titled 'Filters' and shows a dropdown menu set to 'Page 2'. Below it, a message says 'Select an object to see its filters.' To the right of the message is a small chart icon. The sidebar on the right lists various filter-related items with corresponding icons.



Applying Filters

Edit Geography Item

Name:
State Name

Based on:
State Name

Geography data:
Geographic name or code lookup

Name or code context:
US State Names



5 of 220 unmapped values:

Aberdeen City

OK

Cancel

▼ Geography

- 🌐 Postal code - 19K
- 🌐 State Name - 272

Name:
US Hierarchy

Available items (15):

- 🌐 City Name - 11K
- 🌐 Continent Name - 5

Selected items (2):

- 🌐 State Name - 272
- 🌐 Postal code - 19K

In the Data pane, click (Actions) and select Apply data filter.

The expression should resemble the following:

Customer Country In

The bottom of the Apply Data Filter window should resemble the following:

Returned observations: 232,258

Total observations: 951,669

Data Roles

Geo coordinate - US Hierarchy 1

Coordinate

Geography

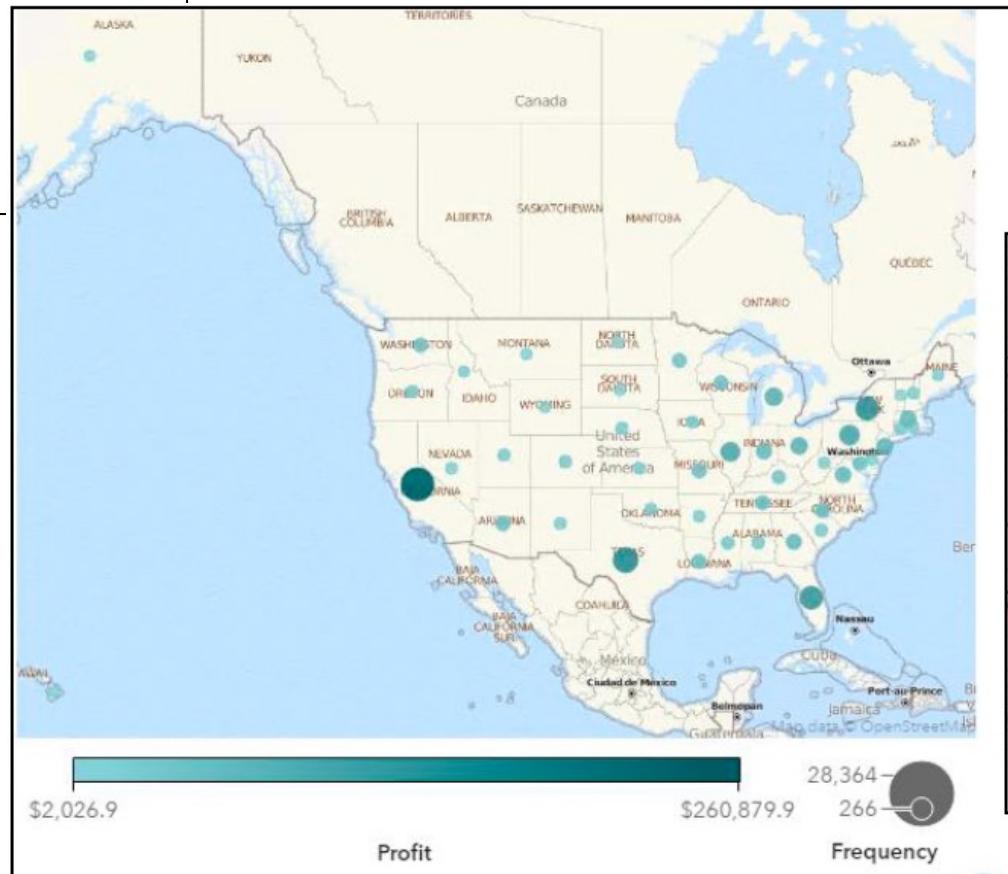
US Hierarchy

Size

Frequency

Color

Profit



Geographic Selection

1 Austin
Austin, Texas

Type:

Distance

Unit:

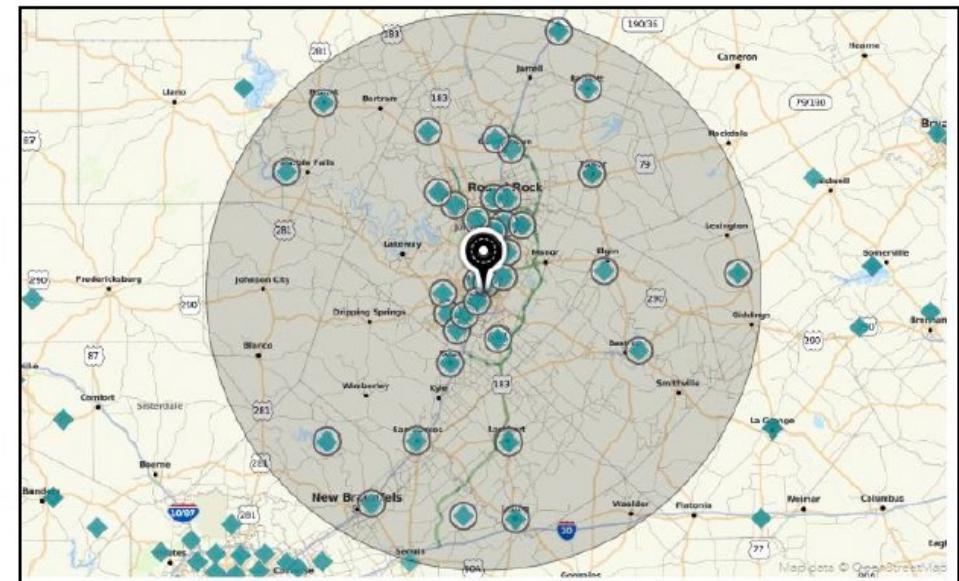
Miles

Distance:

50

Specify the radius of the circular region to select.

Draw Selection



Right-click the Geo coordinate map and select New filter from selection ⇒ Include only selection.



Performing data analysis



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Objects in SAS VA: Graphs

....

Objects

Objects > Tables

Objects > Graphs

Suggest > Geo maps

Outline > Controls

> Analytics

> Containers

> Content

> SAS Visual Statistics

> SAS Visual Data Mining and Machine Lear...

Objects

↳ **Graphs**

- ↳ Bar chart
- ↳ Box plot
- ↳ Bubble change plot
- ↳ Bubble plot
- ↳ Butterfly chart
- ↳ Comparative time series plot
- ↳ Correlation matrix
- ↳ Dot plot
- ↳ Dual axis bar chart
- ↳ Dual axis bar-line chart
- ↳ Dual axis line chart
- ↳ Dual axis time series plot

- ↳ Needle plot
- ↳ Numeric series plot
- ↳ Parallel coordinates plot
- ↳ Pie chart
- ↳ Scatter plot
- ↳ Schedule chart
- ↳ Step plot
- ↳ Targeted bar chart
- ↳ Time series plot
- ↳ Treemap
- ↳ Vector plot
- ↳ Waterfall chart
- ↳ Word cloud



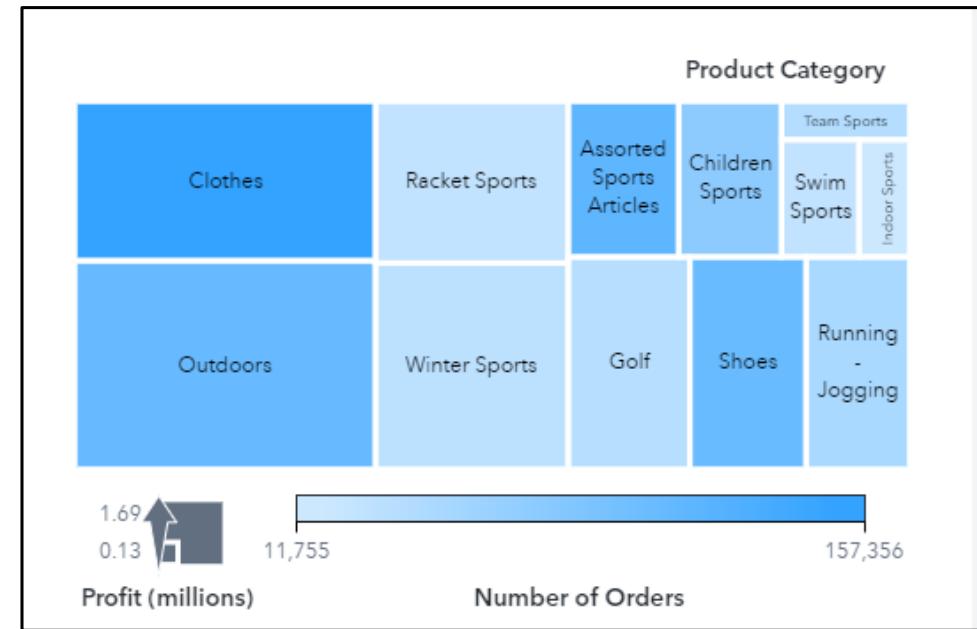
Objects in SAS VA: Analytics

The screenshot shows the SAS Visual Analytics interface with the 'Objects' panel open. The left sidebar includes icons for Data, Objects (selected), Suggest, and Outline. The main area displays a list of objects under 'Objects', with a search bar labeled 'Filter'. A list of objects is shown, with the last item, 'SAS Visual Data Mining and Machine Lear...', highlighted with a dotted border. To the right, a detailed view of the 'Analytics' object is shown in a box, listing sub-components: Automated explanation, Automated prediction, Forecasting, Network analysis, Path analysis, and Text topics.

- ...
Data
Objects (Selected)
Suggest
Outline
- Objects**
- Filter
- > Tables
- > Graphs
- > Geo maps
- > Controls
- > Analytics
- > Containers
- > Content
- > SAS Visual Statistics
- > SAS Visual Data Mining and Machine Lear...

- ▼ Analytics
 - Automated explanation
 - Automated prediction
 - Forecasting
 - Network analysis
 - Path analysis
 - Text topics

Objects: Graphs (Analysis): X, Y, Color, Size



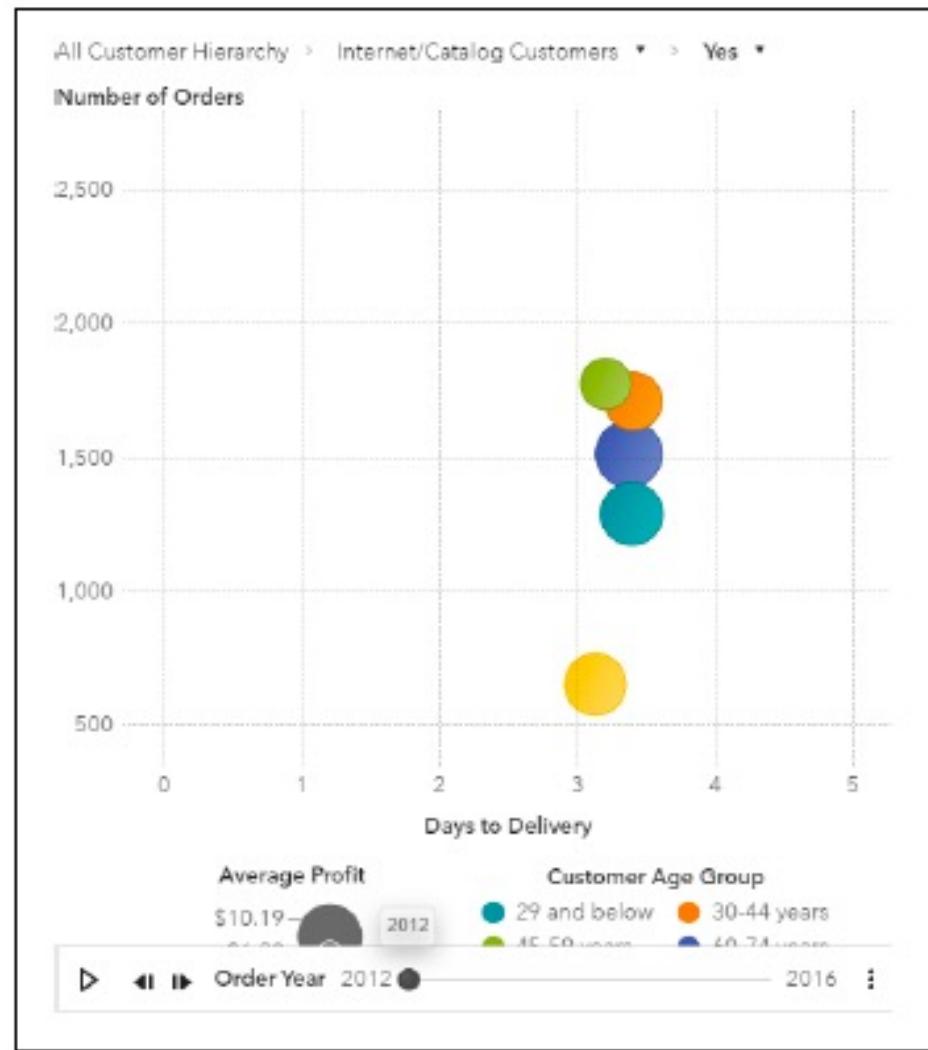
Use a *bubble plot* to display three dimensions of data (horizontal location, vertical location, size of bubble) for some group of category values.

Use a *treemap* to display a lot of information in a small amount of space. Use size and color to draw attention to specific areas of interest.

Bubble Plot with Animation Role

Data Roles

- Bubble 1
 - + Add
- ✓ Lattice rows
 - + Add
- ✓ Data tip values
 - + Add
- ✓ Animation
 - + Add
- ✓ Hidden
 - + Add





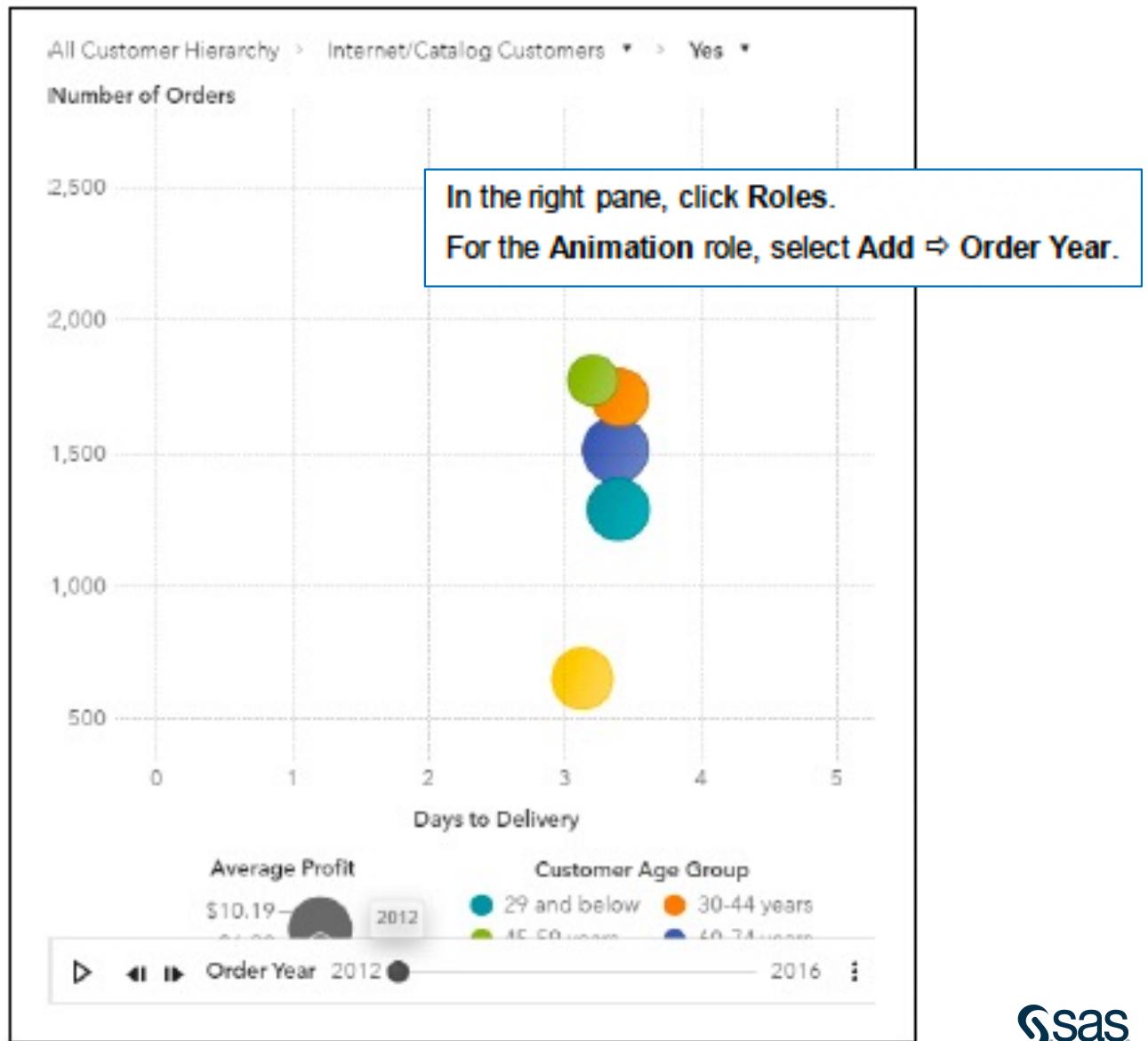
Analyzing Data

Data Roles

Bubble - Days to Delivery 1

- ✓ X axis
 - Days to Delivery
- ✓ Y axis
 - Number of Orders
- ✓ Size
 - Average Profit
- ✓ Group
 - Customer Hierarchy

- ✓ X Axis Options
 - Overview axis
 - Fixed minimum:
0
 - Fixed maximum:
5



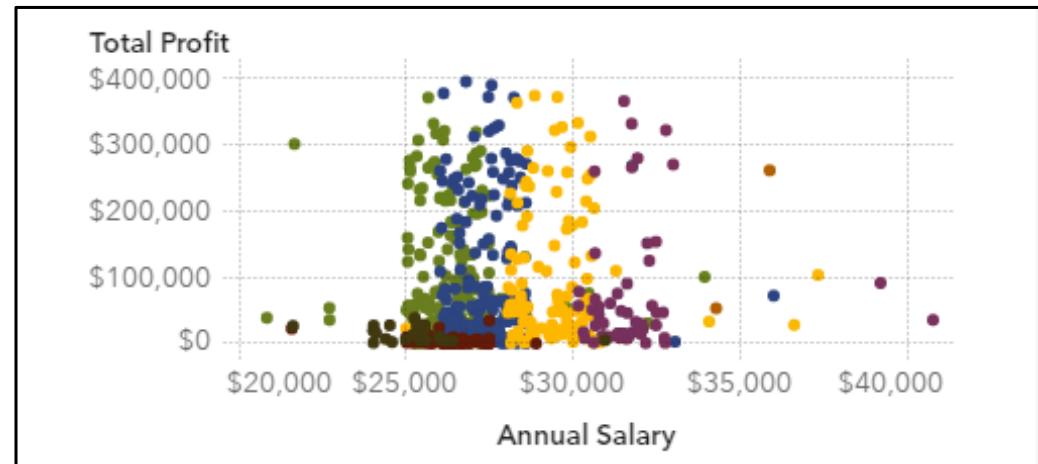
Copyright © SAS Institute Inc. All rights reserved.



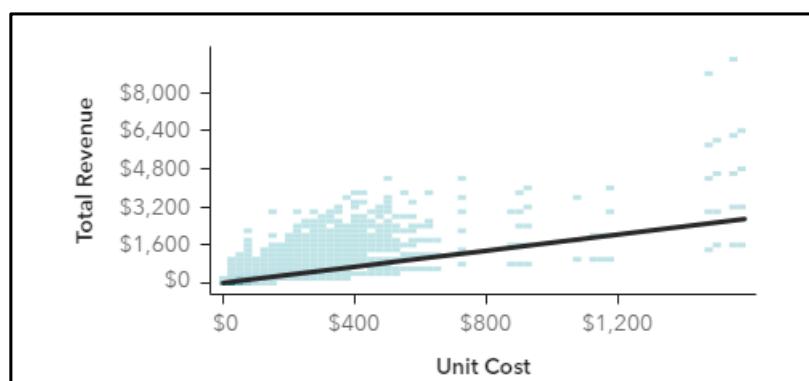
Objects: Graphs (Analysis)



Use a *correlation matrix* to evaluate the linear relationship between measures.



Use a *scatter plot* to evaluate the relationship between two measures.



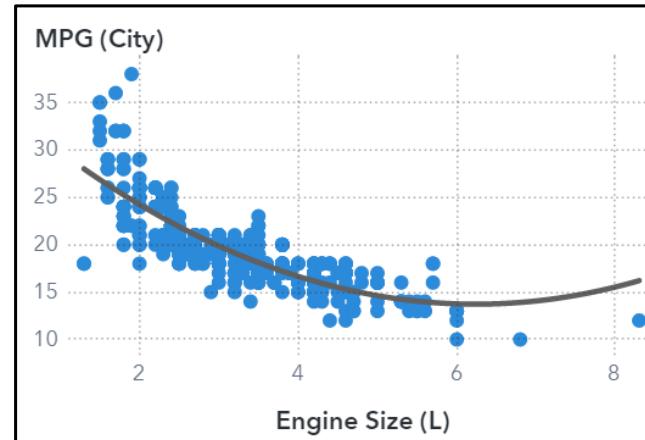
Use a *heat map* to evaluate the relationship between two high-cardinality measures, between two categories, or between a category and a measure.

Fit Lines

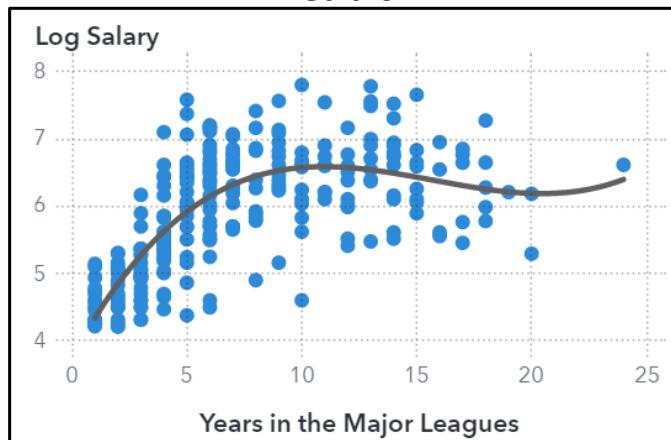
Linear



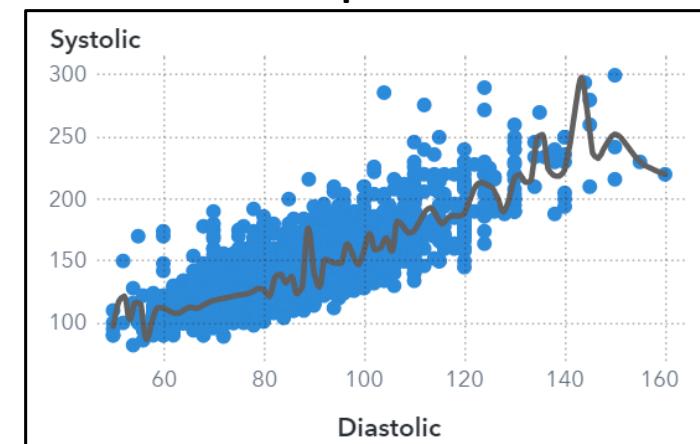
Quadratic



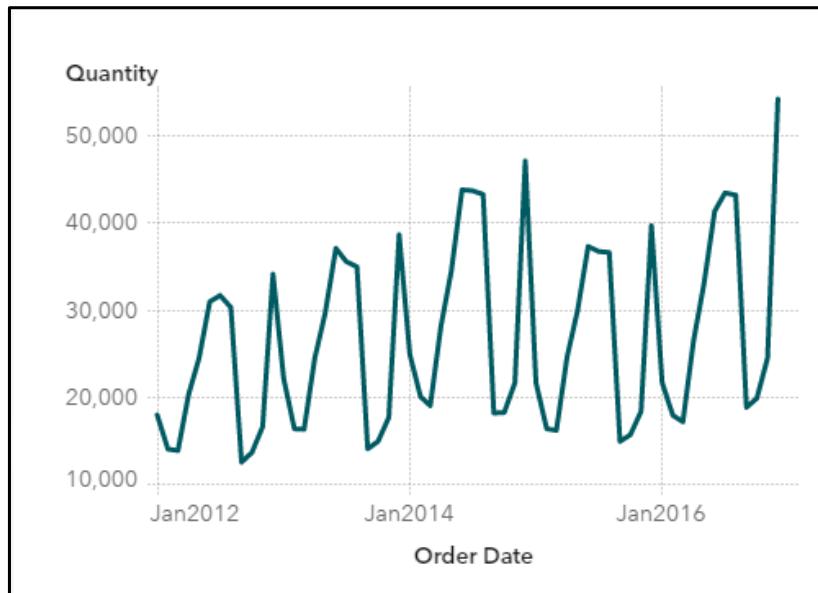
Cubic



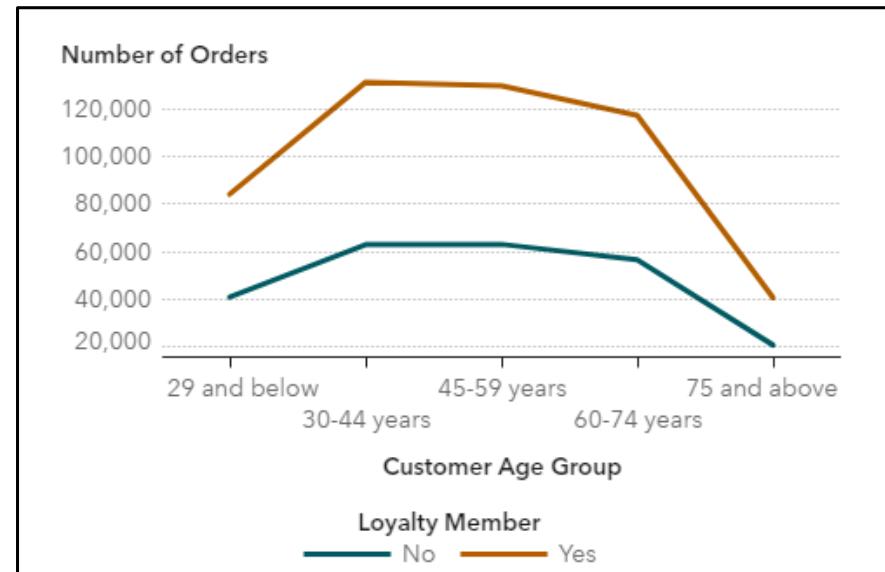
PSpline



Objects: Graphs (Time Plots)



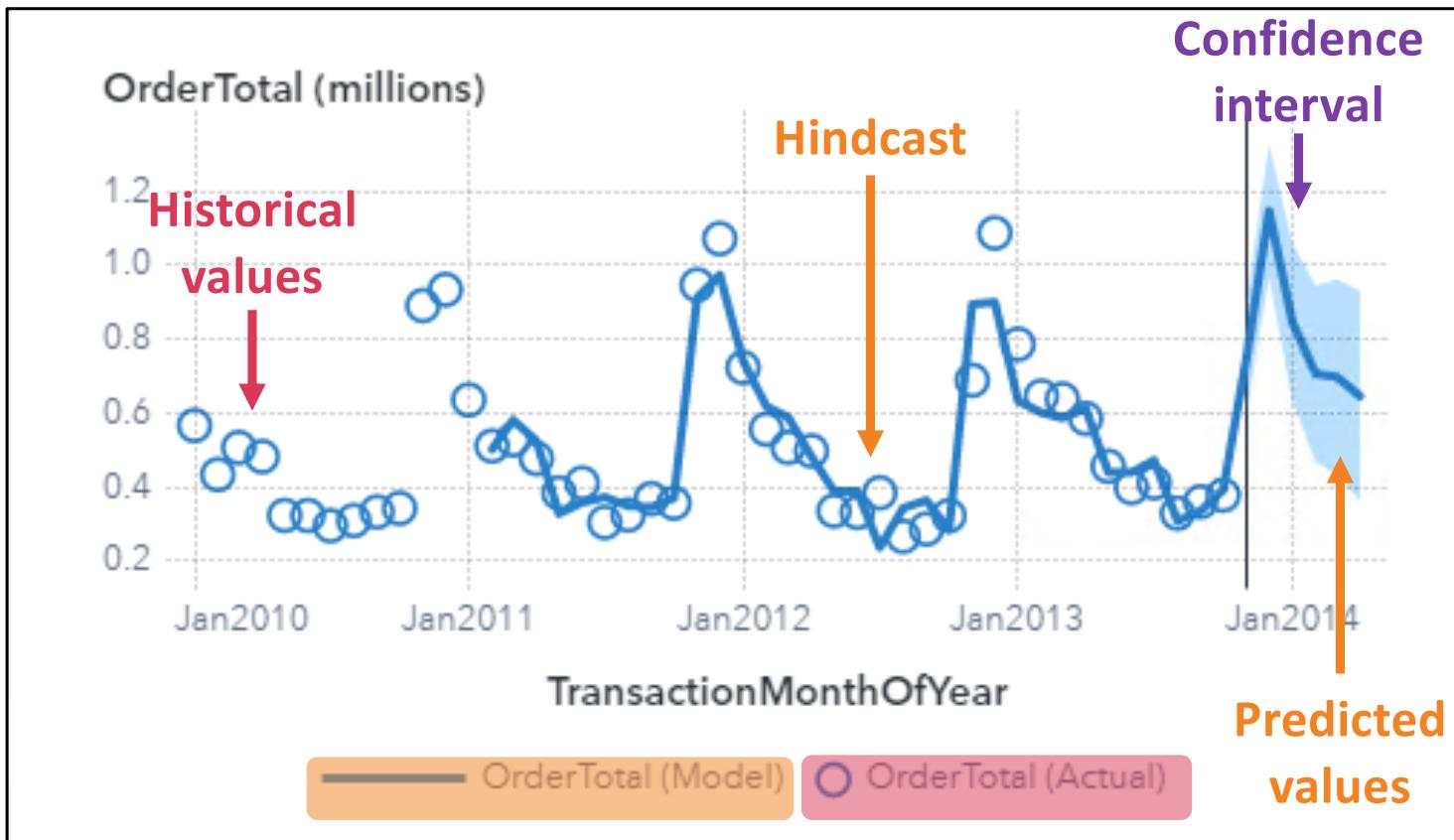
Use a *time series plot* to show trends of measures over time.



Use a *line chart* to show trends over some ordinal variable (time, age group).

Objects: Analytics (Forecasting)

- ✓ Analytics
- ☒ Automated explanation
- ☒ Automated prediction
- ☒ Forecasting
- ☒ Network analysis
- ☒ Path analysis
- ☒ Text topics



Use a *forecasting* object to show estimates of future values based on historical trends in the data.

Objects: Analytics (Automated Explanation)

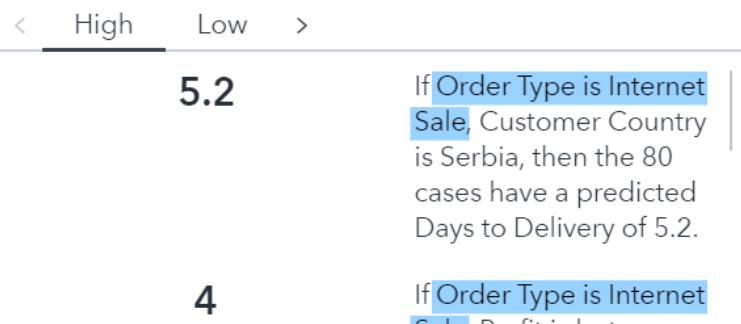
What are the characteristics of Days to Delivery?

Days to Delivery ranges from 0 to 32. Average Days to Delivery is 1.1. Most cases (761K of 952K) have a Days to Delivery between 0 and 4. Order Type best differentiates the highest (top 10%) and the lowest (bottom 10%) Days to Delivery cases. There are 181K cases that might be outliers, with Days to Delivery above 3.

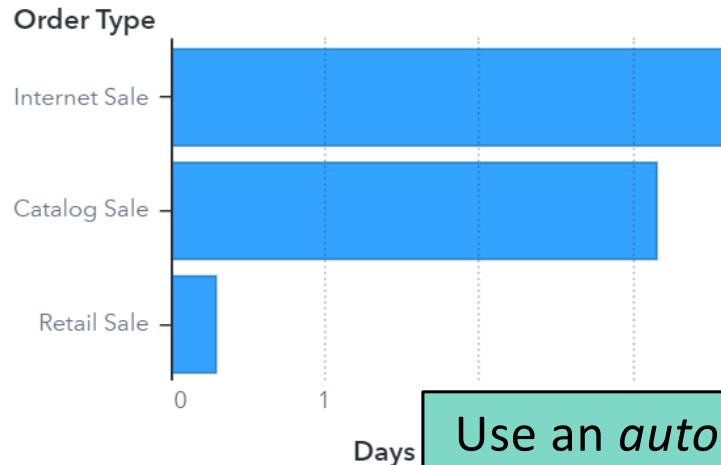
What factors are most related to Days to Delivery?



What are the groups based on Order Type by the average value of Days to Delivery?



What is the relationship between Days to Delivery and Order Type?



When Order Type is Internet Sale, the average of Days to Delivery is high.
When Order Type is Retail Sale, the average of Days to Delivery is a low value.
Order Type value is Retail Sale.

Automated explanation generates a high-level summary of the selected data item.

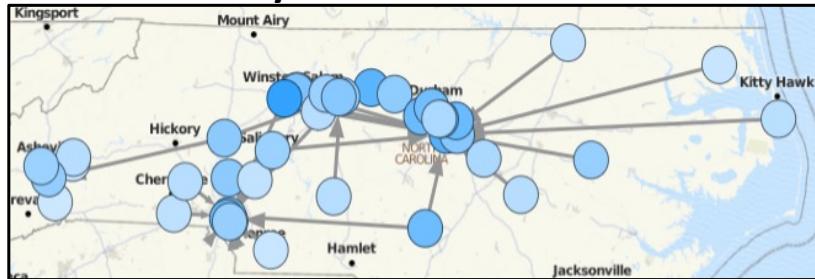
- ▼ Analytics
 - ▣ Automated explanation
 - Automated prediction
 - ▬ Forecasting
 - ✖ Network analysis
 - Path analysis
 - ▢ Text topics

Use an *automated explanation* object to determine the most important data items (factors) that explain the values of the selected data item (response).

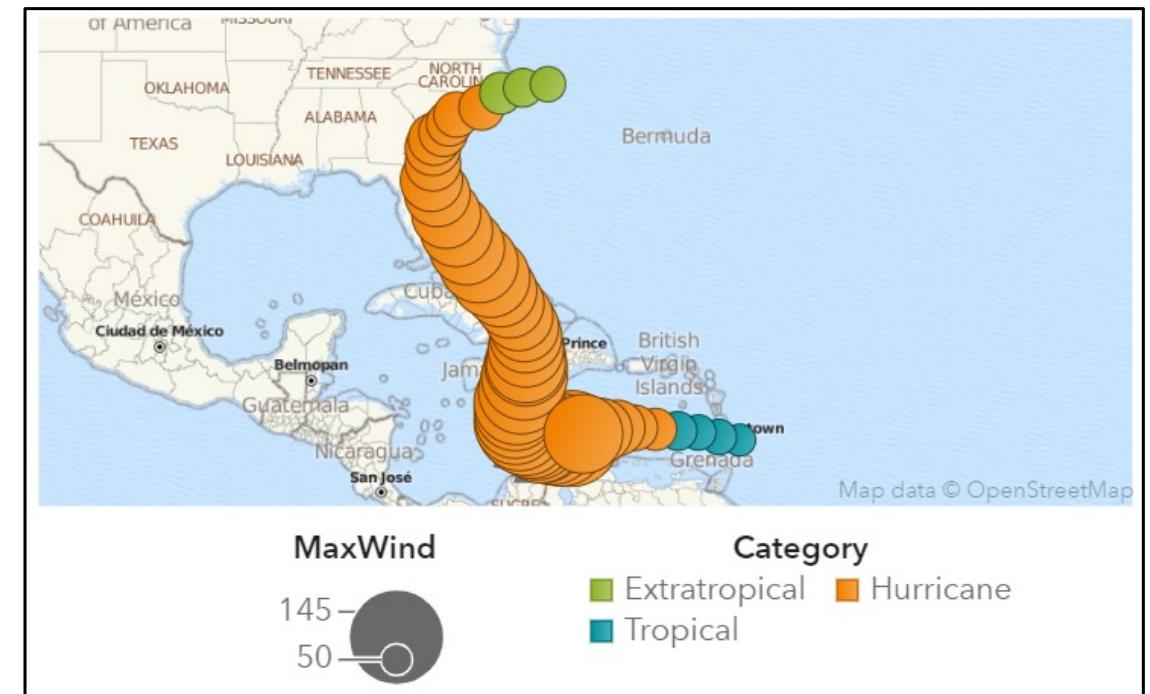
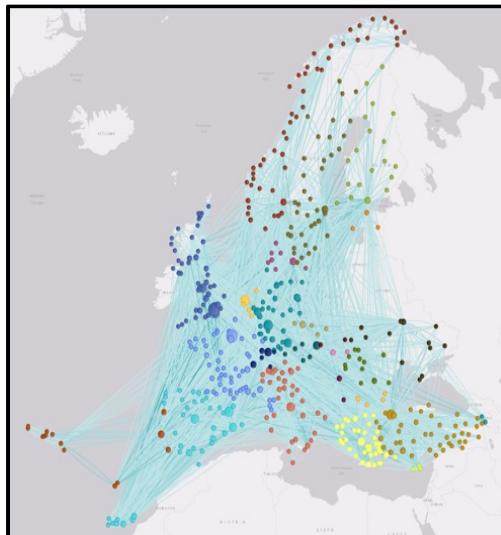
Network Analysis

- ❖ Analytics
- ❖ Automated explanation
- ❖ Automated prediction
- ❖ Forecasting
- ❖ Network analysis
- ❖ Path analysis
- ❖ Text topics

Customer analysis

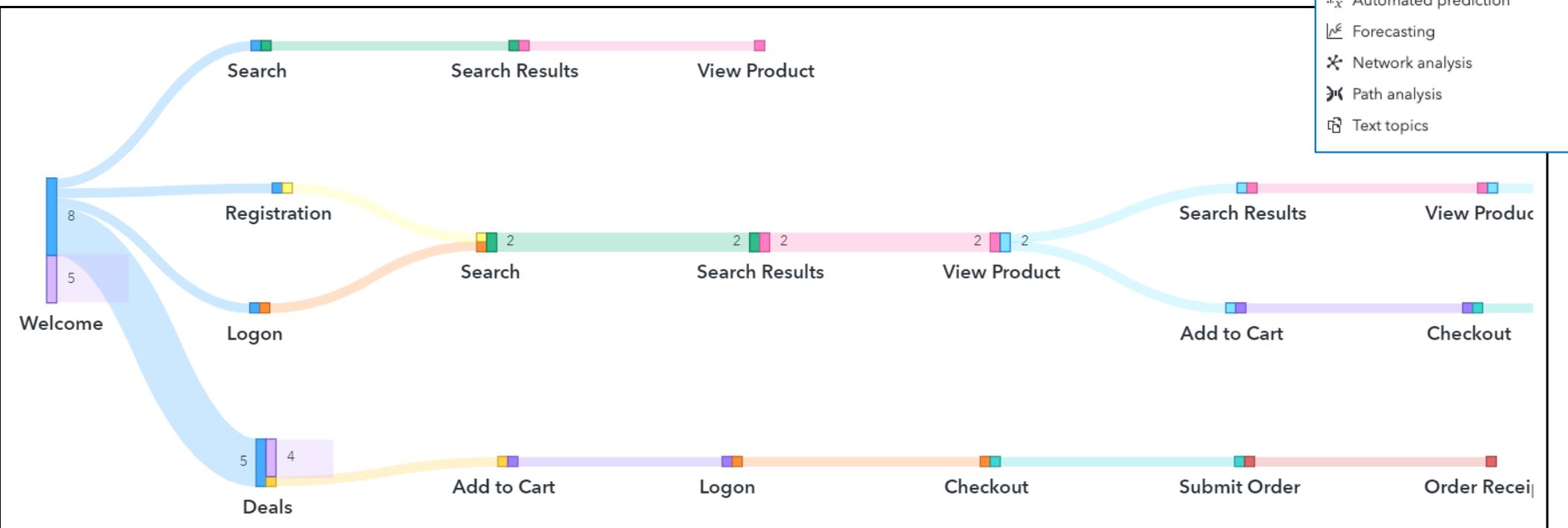


Airline connections



Path Analysis

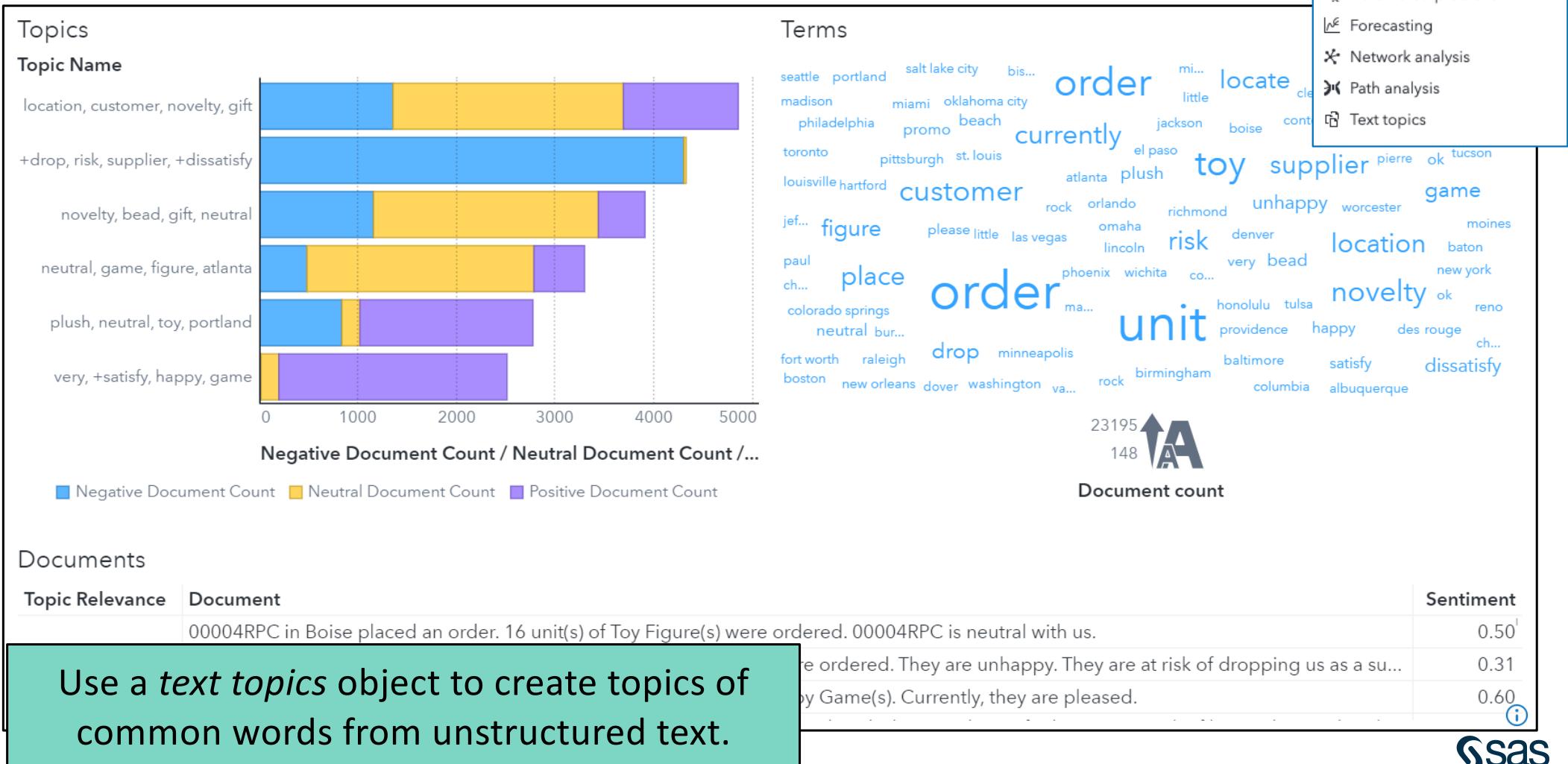
- Analytics
- Automated explanation
- Automated prediction
- Forecasting
- Network analysis
- Path analysis
- Text topics



Use a *path analysis* object to show flows of data from one event to another as a series of paths.

Event			
Add to Cart	Checkout	Deals	Drop Off
Logon	Registration	Search	Search Results
Submit Order	View Product	Welcome	

Text topics



- ▼ Analytics
- Automated explanation
- Automated prediction
- ▶ Forecasting
- ✖ Network analysis
- ☒ Path analysis
- ▣ Text topics



Adding Data Analysis

Data Roles

Correlation - Days to Delivery 1

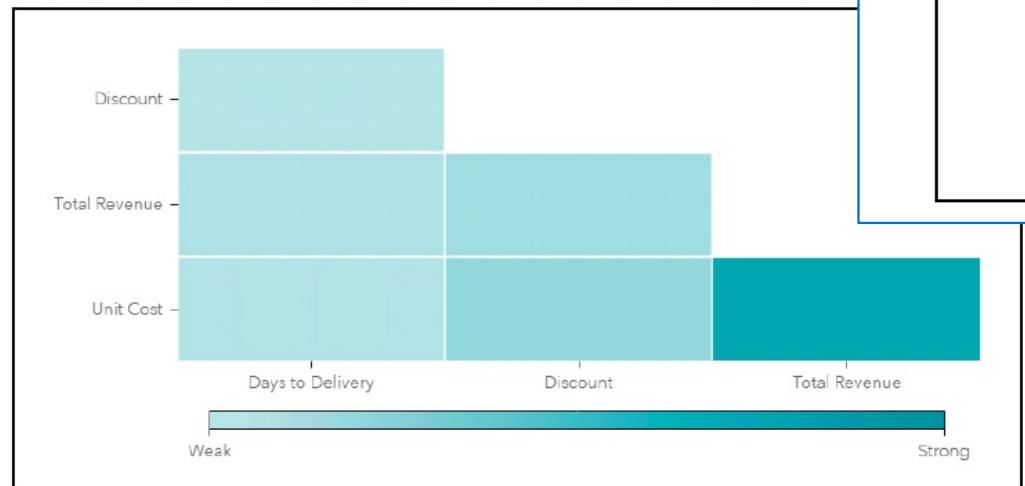
Show correlations:

Within one set of measures

Measures

- Days to Delivery
- Discount
- Total Revenue
- Unit Cost
-

The correlation matrix should resemble the following:

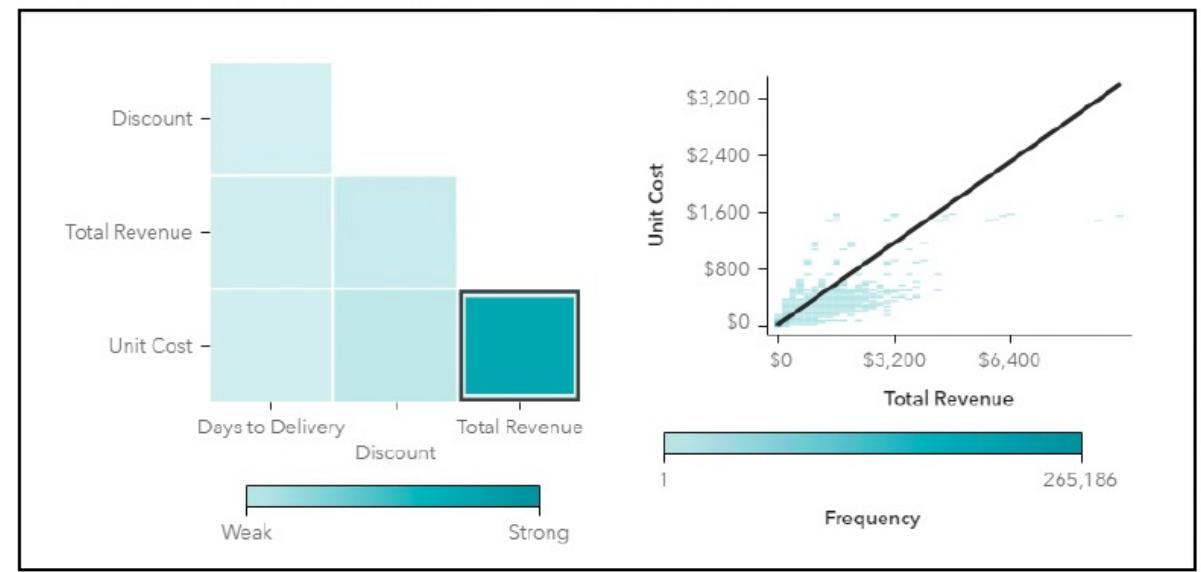


g. Select the cell for **Unit Cost** and **Total Revenue**.

h. Right-click the correlation matrix and select **New object from selection** \Rightarrow **Heat map**.

A heat map is created below the correlation matrix.

i. Drag the heat map to the right of the correlation matrix.





Lesson 4: Design Dashboard Using SAS® Data Visual Analytics

Outline

- Creating interactive reports
- Working with display rules
- Working with parameters

ANALYTICS LIFE CYCLE

- Manage Data
- Prepare Data
- Explore and Visualize
- Build Models
- Manage Models
- Build Decisions
- Share and Collaborate
- Develop SAS Code

ADMINISTRATION

- Build Custom Graphs
- Explore Lineage
- Manage Environment
- Manage Workflows

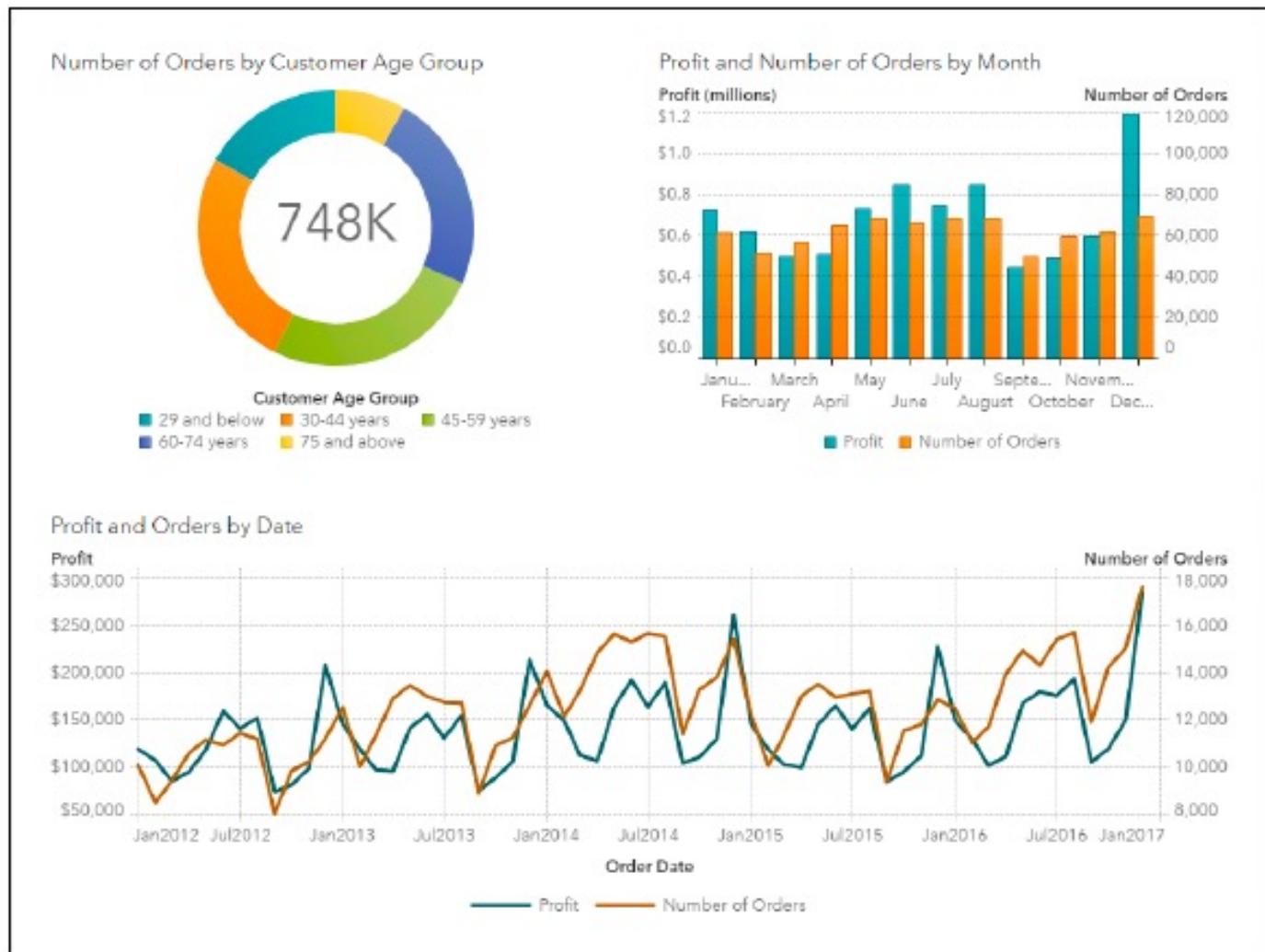


Creating interactive reports



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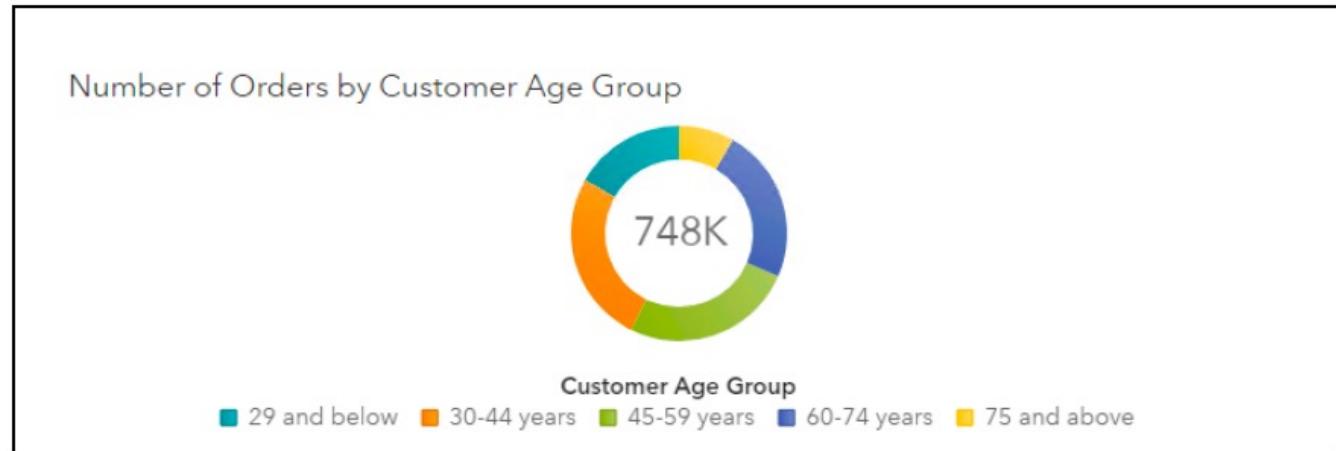
Dashboard



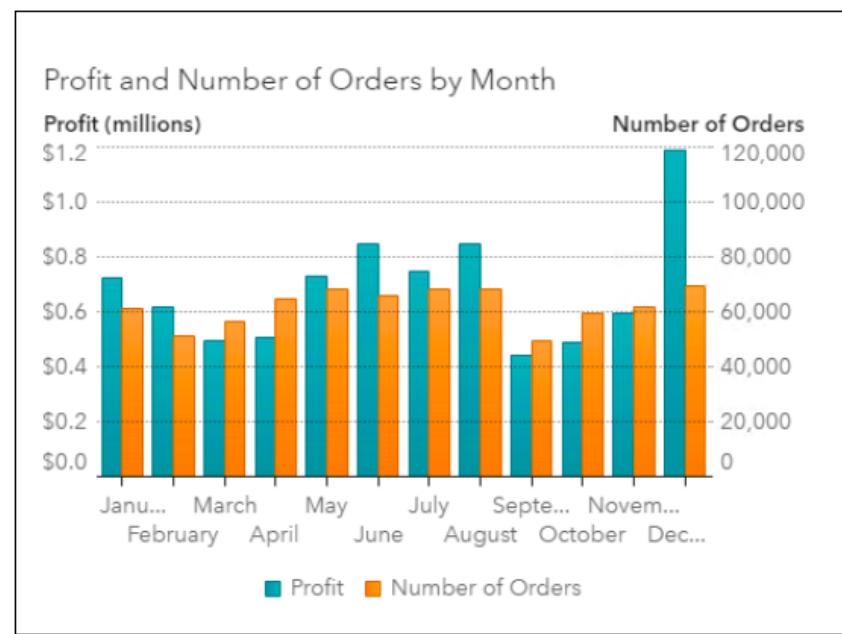


Creating a Simple Report

- b. In the upper right corner of the Data pane, click  (Actions) and select **Show or hide data items**.



The updated dual axis bar chart should resemble the following:



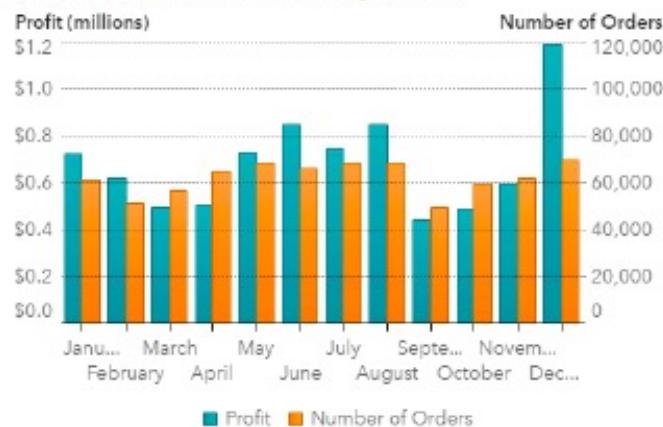
Number of Orders by Customer Age Group



Customer Age Group

- 29 and below
- 30-44 years
- 45-59 years
- 60-74 years
- 75 and above

Profit and Number of Orders by Month



Profit and Orders by Date



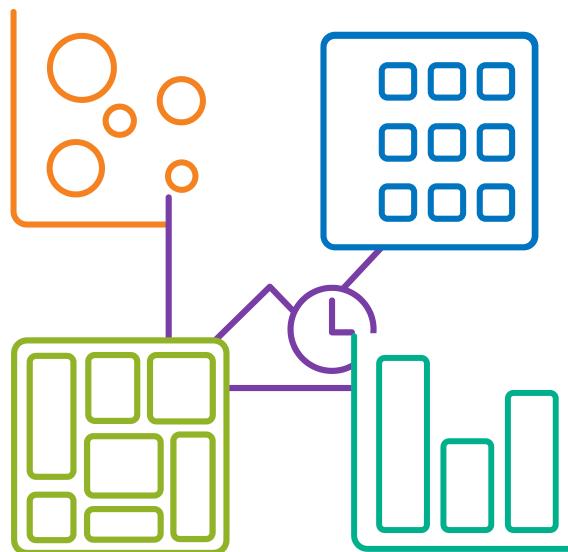


Creating Reports with Multiple Pages

Focus on a single idea



Limit the number of objects



Stand on its own



Use hidden pages
to provide details



Limit the number of pages





Working with Pages and Ranks

Working with Pages and Ranks

....



Options



Roles



Actions



Rules



Filters



Ranks

Options

Page 1

VA1- Demo4.2a

Page 1

[Orders by Age Group](#)

[Profit and Orders](#)

[Profit and Orders by Loyalty Member](#)

[Profit and Orders by Date](#)

Ranks

Top 10 Cities by Number of Orders

+ New rank

▼ City Name

Top count

Count:

10

By:

Number of Orders

Include:

Ties

All Other

Options

Page 1

VA1- Demo4.2a

Page 1

Orders by Age Group

Profit and Orders

Profit and Orders by Loyalty Member

Profit and Orders by Date

▼ Viewer Customization

Capability level: ⓘ

Data edits

Comprehensive edits

Simple edits

Allows changes to the data for the objects in the report. Users who view the report can change data assignments, filters, ranks, and so on.

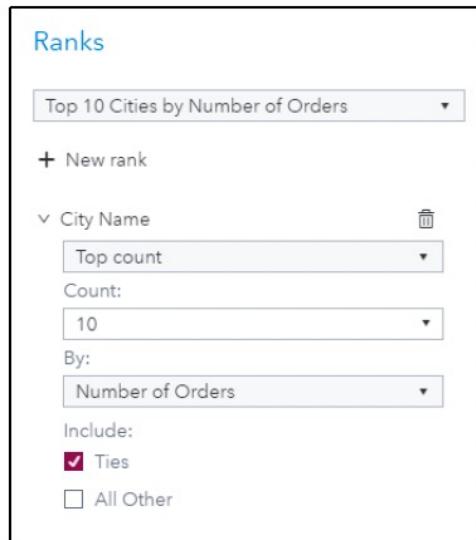
9. Create a bubble plot.
 - a. Click the **Delivery Analysis** tab to make it active.
 - b. In the left pane, click **Objects**.
 - c. Drag the **Bubble plot** object, from the **Groups** group, to the left side of the canvas.
 - d. In the right pane, click **Roles**.
 - e. For the **Group** role, select **Add** \Rightarrow **City Name**.
 - f. For the **X axis** role, select **Add** \Rightarrow **Days to Delivery**.
 - g. For the **Y axis** role, select **Add** \Rightarrow **Number of Orders**.
 - h. For the **Size** role, select **Frequency** \Rightarrow **Profit**.

A warning appears in the lower right corner of the bubble plot.

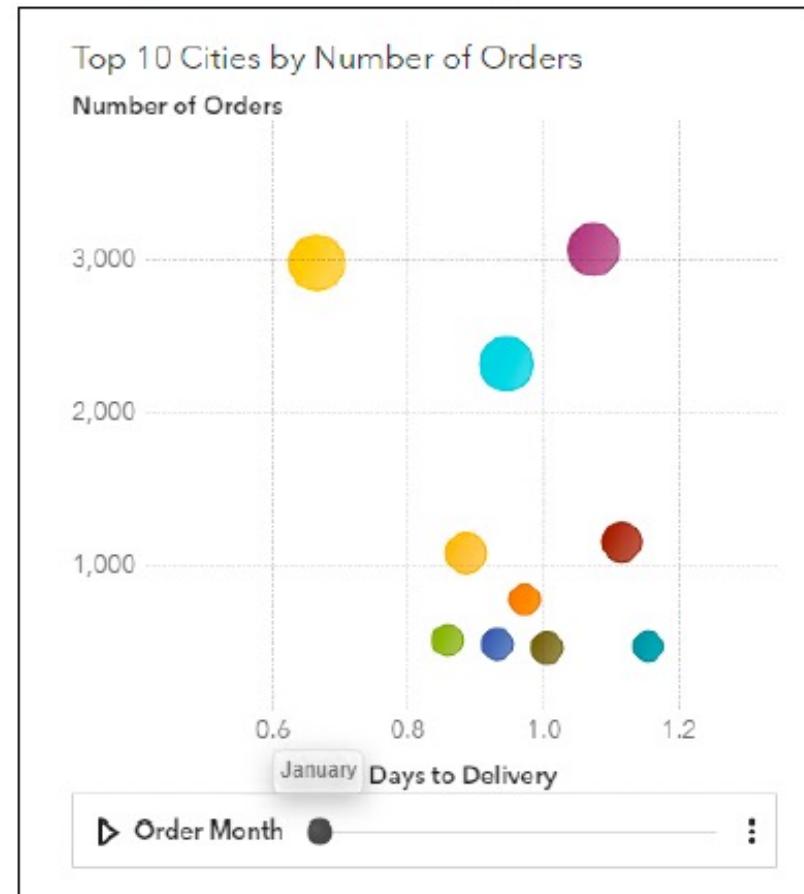
No data appears because too many values were returned from the query. Filter your data to reduce the number of values.

There are too many distinct values of **City Name** to display as bubbles in the plot. Later, you add a rank to reduce the number of bubbles.

- i. For the **Animation** role, select **Add** \Rightarrow **Order Month**.



The bubble plot should resemble the following:



Filtering Data



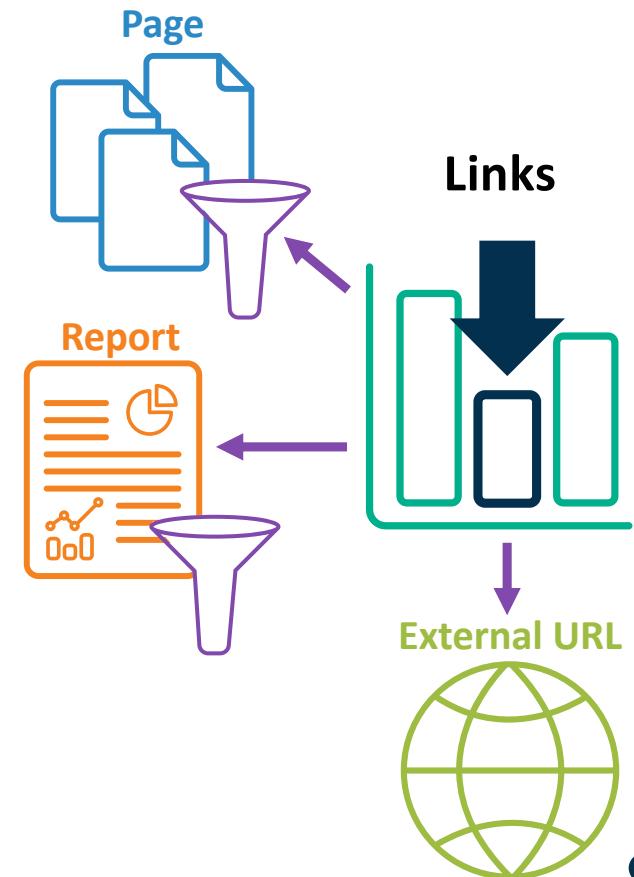
Prompts



Actions



Page



sas

Objects in SAS VA: Control

The screenshot shows the SAS Visual Analytics interface with the 'Objects' palette open. The palette has sections for Data, Objects, Suggest, and Outline. Under Objects, there is a search bar labeled 'Filter'. Below it is a list of object types: Tables, Graphs, Geo maps, Controls, Analytics, Containers, Content, SAS Visual Statistics, and SAS Visual Data Mining and Machine Lear... (with an ellipsis). A blue dashed box highlights the 'Controls' section, which contains icons and labels for Button bar, Drop-down list, List, Slider, and Text input.

Objects

Filter

Tables

Graphs

Geo maps

Controls

Analytics

Containers

Content

SAS Visual Statistics

SAS Visual Data Mining and Machine Lear...

Controls

- Button bar
- Drop-down list
- List
- Slider
- Text input

Objects: Controls

- Assorted Sports Articles
- Children Sports
- Clothes
- Golf
- Indoor Sports
- Outdoors
- Racket Sports
- Running - Jogging
- Shoes
- Swim Sports
- Team Sports
- Winter Sports

Use a *list control* to enable viewers to select multiple values.

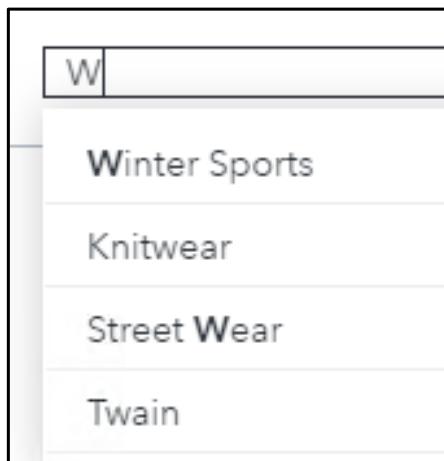


Use a *slider control* to enable viewers to select a range of values.

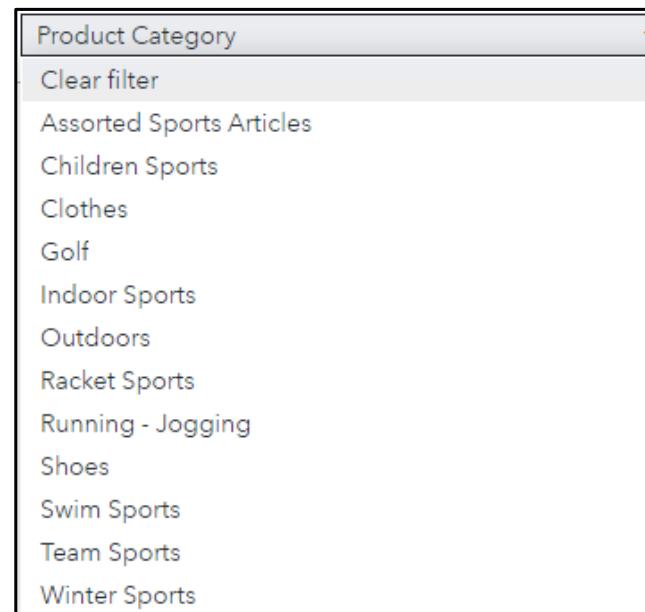
Objects: Controls



On a *button bar*, use a category with few distinct values.



In a *text input*, use a category with a lot of distinct values.



In a *drop-down list*, use a category with a moderate number of distinct values.



Report and Page Prompts

Africa Asia Europe North America Oceania South America Plush ▾

Page 1 :

Select the Customer Satisfaction Range:

23% to 50%

23% 81%

Denmark
 France
 Germany
 Italy
 Norway
 Spain
 Sweden
 United Kingdom

Dog ()
Dog (m)
Dog (s)

D

Product Quality

91.5%
91.0%
90.5%
90.0%
89.5%
89.0%
88.5%

Jan2017 May2017 Sep2017

Product Sale

\$40,000
\$35,000
\$30,000
\$25,000
\$20,000
\$15,000
\$10,000

Transaction Month

Product Quality Product Sale

Product Style

Lepoard	Yorkshire Terriers	Miniature Schnauzer	Paint	Shorthaired Persian
Appaloosa	Birman	Tiger	Gorilla	Orangutan
Tennessee Walking	Panther	American Quarter	Shih Tzus	
American Shorthair	Welsh Pony	Boxers	Brown	German Shepherds
Golden Retrievers	Andalusian	Cheeta	Arabian	Labrador Retrievers
Lion			Tonkinese	Black
Siamese	Morgan	Maine Coon	African	Lioness
Oriental	Ragdoll	Dachshunds	Monkey	Asian
			Ape	Beagles

91% ↑ \$1,577.61 ↑ \$19,801.16

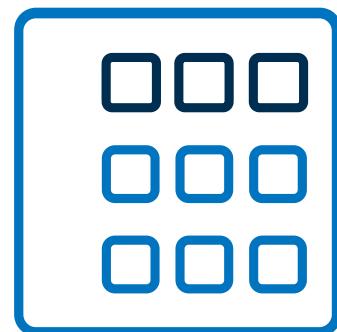
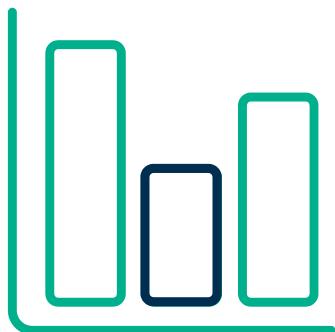
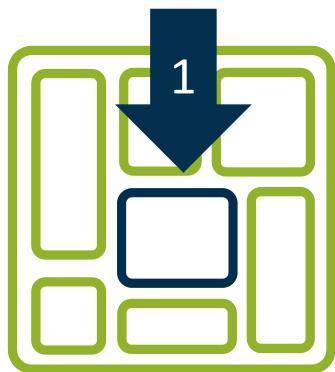
Product Quality Product Sale



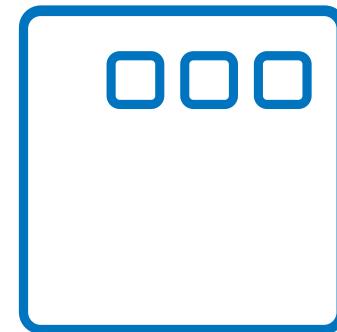
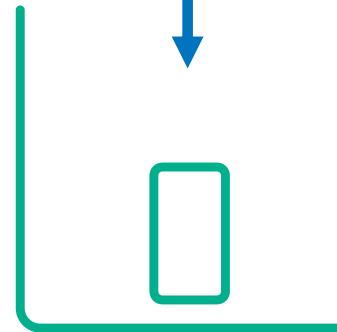
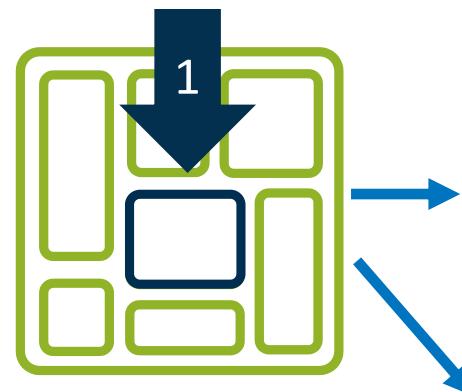
Report

Actions

Linked selection



Filter

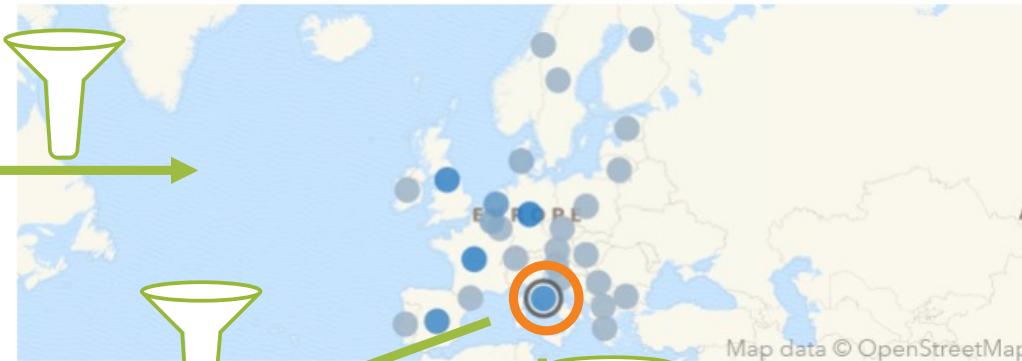




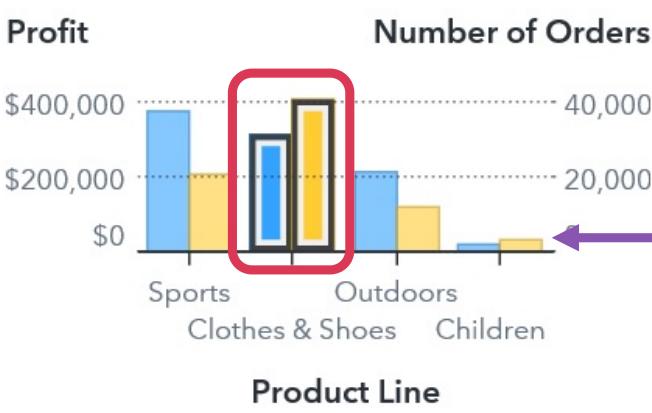
Report

Adding Actions to a Page

<input type="checkbox"/> Africa	(\$127.68)
<input type="checkbox"/> Asia	\$15,503.70
<input checked="" type="checkbox"/> Europe	\$5,659,450.59
<input type="checkbox"/> North America	\$2,121,645.57
<input type="checkbox"/> Oceania	\$462,934.63



Map data © OpenStreetMap



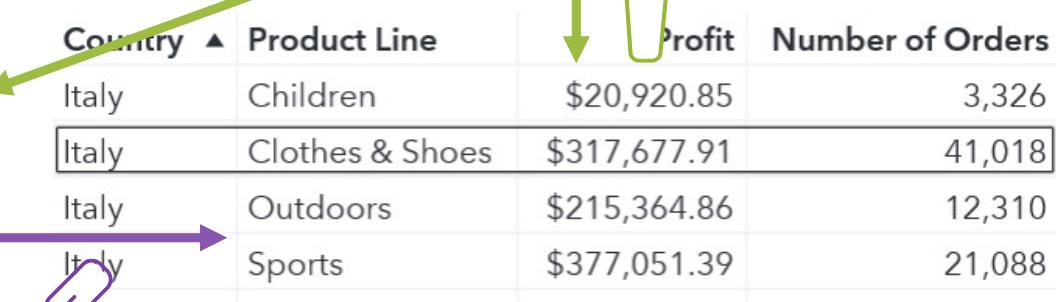
Profit

Number of Orders

Product Line

Legend: Profit (Blue), Number of Orders (Yellow)

Product Line	Profit	Number of Orders
Sports	\$380,000	25,000
Outdoors	\$250,000	35,000
Clothes & Shoes	\$200,000	15,000
Children	\$10,000	5,000

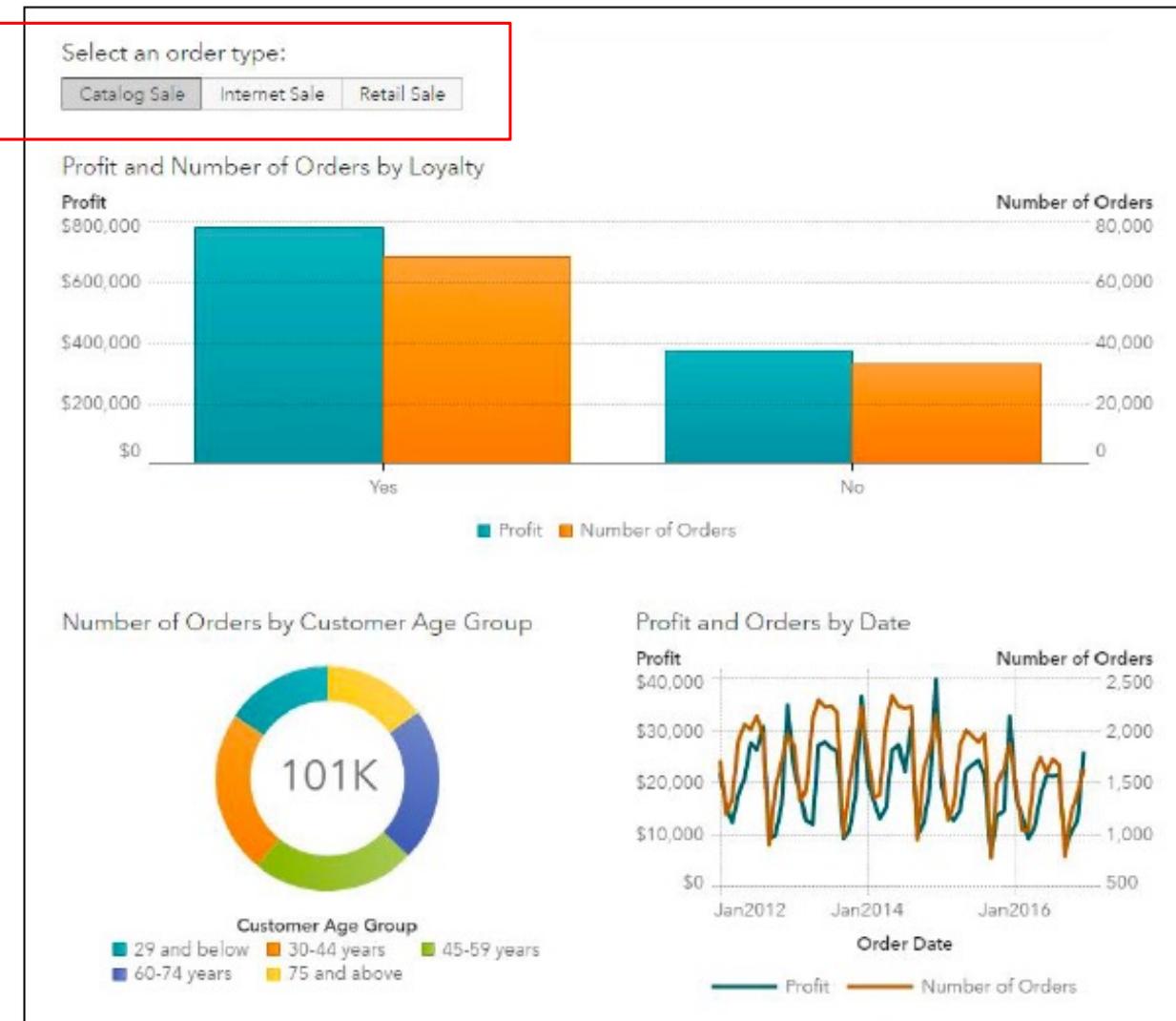


Country ▲ Product Line

Country	Product Line	Profit	Number of Orders
Italy	Children	\$20,920.85	3,326
Italy	Clothes & Shoes	\$317,677.91	41,018
Italy	Outdoors	\$215,364.86	12,310
Italy	Sports	\$377,051.39	21,088



Working with Prompts & Actions



The Actions pane should resemble the following:

Actions [View Diagram](#)

Automatic actions on all objects

▼ Object Links

Order Information by Month

Profit and Orders



Working with Hidden Pages and Page Links

Hide Page “Customer Details”

Options

Customer Details

General

Name: *

Hide and link to page as pop-up window

Window width (percentage):

Window height (percentage):

Periodically reload page data

“Customer Analyis” Page - Pie chart → Action

Actions [View Diagram](#)

Orders by Age Group

Automatic actions on all objects

Object Links

Profit and Orders by Date

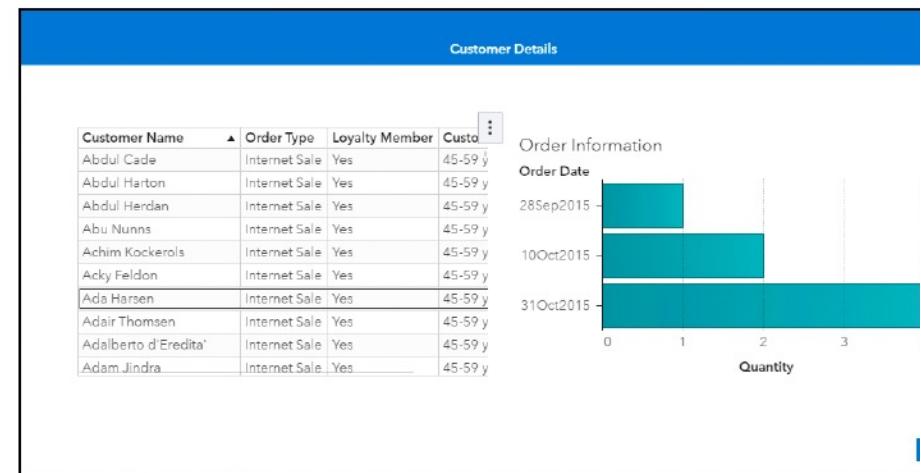
Page Links

Delivery Analysis

Customer Details

Report Links

URL Links





Working with display rules





Report



Graph-Level Display Rules

Product Category

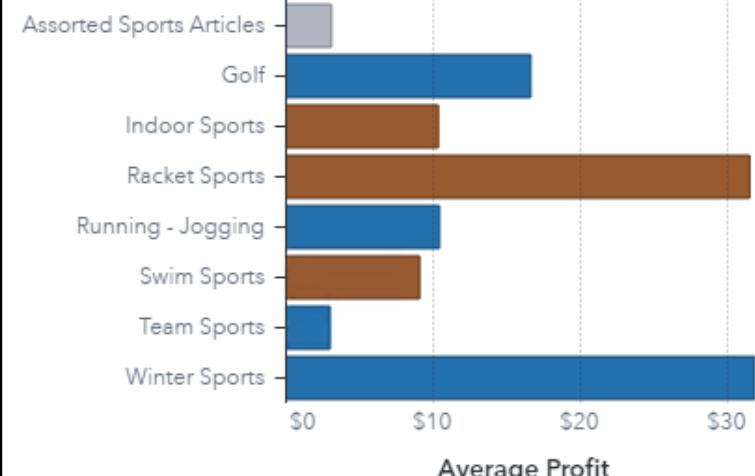


Average Profit

Color-mapped values



Product Category



Average Profit



Report

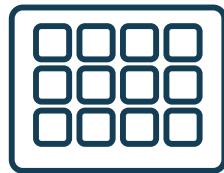


Table-Level Display Rules

Color-mapped values



Product Line	Order Type	Profit	Number of Orders
Outdoors	Catalog Sale	\$240,285	17,405
Outdoors	Internet Sale	\$219,350	14,746
Outdoors	Retail Sale	\$1,227,450	75,465
Sports	Catalog Sale	\$623,088	44,946
Sports	Internet Sale	\$518,276	38,605
Sports	Retail Sale	\$3,049,267	221,875

Expression



Gauge



Product Line	Order Type	Profit	Number of Orders
Outdoors	Catalog Sale	\$240,285	17,405
Outdoors	Internet Sale	\$219,350	14,746
Outdoors	Retail Sale	\$1,227,450	75,465
Sports	Catalog Sale	\$623,088	44,946
Sports	Internet Sale	\$518,276	38,605
Sports	Retail Sale	\$3,049,267	221,875



Report

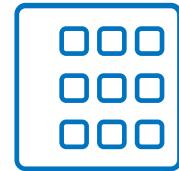
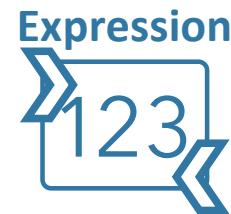


Table-Level Display Rules

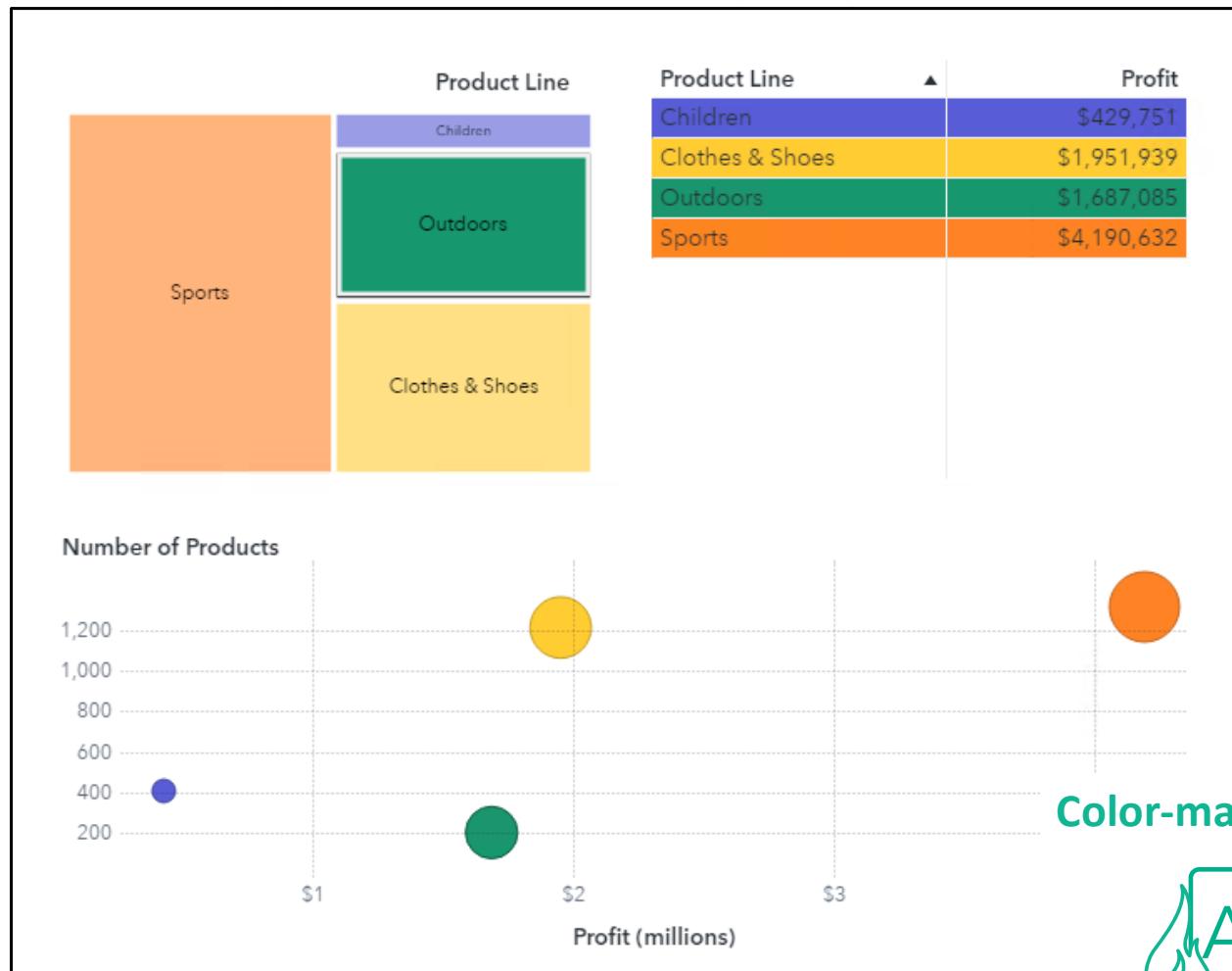


Order Type ▲	Catalog Sale	Internet Sale	Retail Sale
Order Year ▲	Profit	Profit	Profit
2012	\$243,135	\$161,115	\$1,031,902
2013	\$248,295	\$150,650	\$1,120,474
2014	\$252,771	\$223,730	\$1,368,497
2015	\$219,530	\$199,257	\$1,177,101
2016	\$189,651	\$246,418	\$1,426,881



Report

Report-Level Display Rules



Color-mapped values





Working with Graph-Level Display Rules

- b. Right-click **Order Type** and select **Custom sort**.

The Add Custom Sort window appears.

- Double-click the following values, in order, to add them to the Sorted Items list:

Retail Sale

Catalog Sale

Internet Sale

Sorted Items (3):

Retail Sale

Catalog Sale

Internet Sale

- Click **OK**.

The button bar, in the page prompt area, is updated to reflect the custom sort.

Select an order type:

Retail Sale Catalog Sale Internet Sale

The button bar should resemble the following:

Select an order type:

Retail Sale Catalog Sale Internet Sale

Display Rules

Customer Information ▾

+ New rule

Table Rows

Profit

 Profit < 0

Customer Name	▲ Order Type	Loyalty Member	Customer Age Group
©ime Rituper	Catalog Sale	Yes	60-74 years
©tefka Tertnik	Internet Sale	No	60-74 years
A Amanda Mitchell	Retail Sale	Yes	60-74 years
A R J Swart Rc	Catalog Sale	Yes	29 and below
A R J Swart Rc	Internet Sale	Yes	29 and below
A.A. Broekhuisen	Catalog Sale	No	75 and above
A.A. Broekhuisen	Retail Sale	No	75 and above
A.A. Busselaar	Internet Sale	Yes	29 and below
A.A. Busselaar	Retail Sale	Yes	29 and below
A.A. Duim	Internet Sale	No	30-44 years
A.A. Duim	Catalog Sale	No	30-44 years
A.A. Duim	Retail Sale	No	30-44 years
A.A. Hautvast	Retail Sale	No	75 and above
A.A. Hilhorst	Retail Sale	Yes	60-74 years