



Introduction to Visual Data Discovery and Self-Service Analytics Using SAS[®]

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Introduction to Visual Data Discovery and Self-Service Analytics Using SAS®

Agenda

- SAS® Visual Analytics
- SAS® Visual Statistics
- SAS® Enterprise Guide
- SAS® Studio



SAS® Visual Analytics

Getting Started

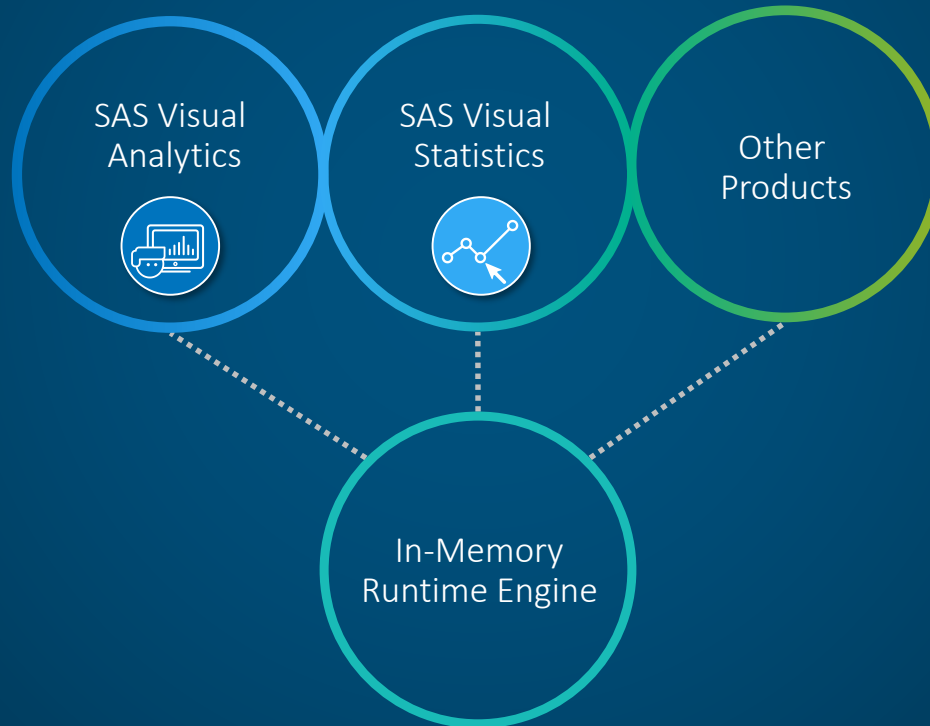
Before we start...

- What version of SAS Visual Analytics are you currently using?
- How many VA users does your organization have?
- What is one thing you'd really like to see in SAS Visual Analytics?

“In the new world, it is not the big fish which eats the small fish, it's the fast fish which eats the slow fish.”

Klaus Schwab
Founder and Executive Chairman
World Economic Forum

In-Memory “Visual” Product Suite



SAS® Visual Analytics

Main Components

Home Page



Manage
Environment



Prepare
Data



Explore and
Visualize Data

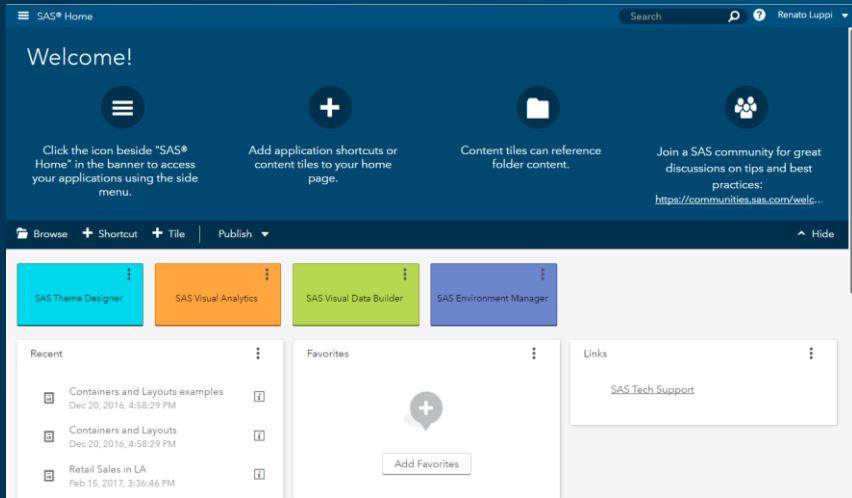


View
Reports





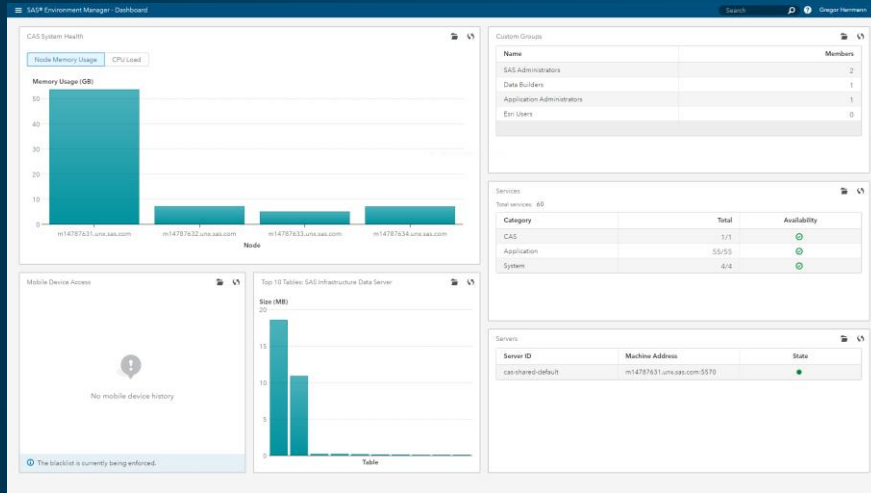
Home Page



- Customizable landing page to access all VA components
- Add application shortcuts or content tiles
- Quick access to recent and favorites
- Search



Manage Environment



- Allows execution of administrative tasks:
 - Manage authorization for users and groups
 - Manage data sources
 - Manage content
 - Post-Deployment configuration steps
 - Monitor system health



Prepare Data

SAS Visual Data Builder - Plan 1*

Join Tables

Select tables to join

ADDITIONALBUDGET*

Partner

GAME DATA

Inner

Left

Right

Full

Partner	Addtl_Marketing	Release Date	Launch-to-Date	Genre	Franchise Code	Platform	Timed Platform...
NDIV	10,000,000	18MAR2016	166	Action	38A	Multi	No
ADM/IT	6,000,000	31JAN2016	213	Action	E11	Multi	No
NDIV	10,000,000	06OCT2012	1,425	Action	38A	Multi	No
NDIV	10,000,000	09MAY2011	1,941	Action		Multi	Yes
NDIV	10,000,000	26MAR2013	1,254	Action		Multi	No

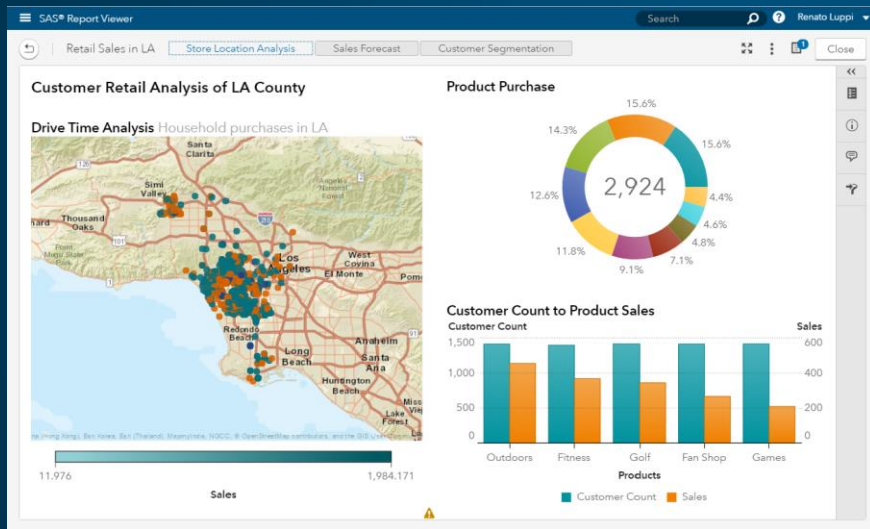
Accept Preview Cancel

- Access to different data sources
- Table and column profiling
- Filter data and column transformations
- Visual joins
- Record modification history with undo/redo capability





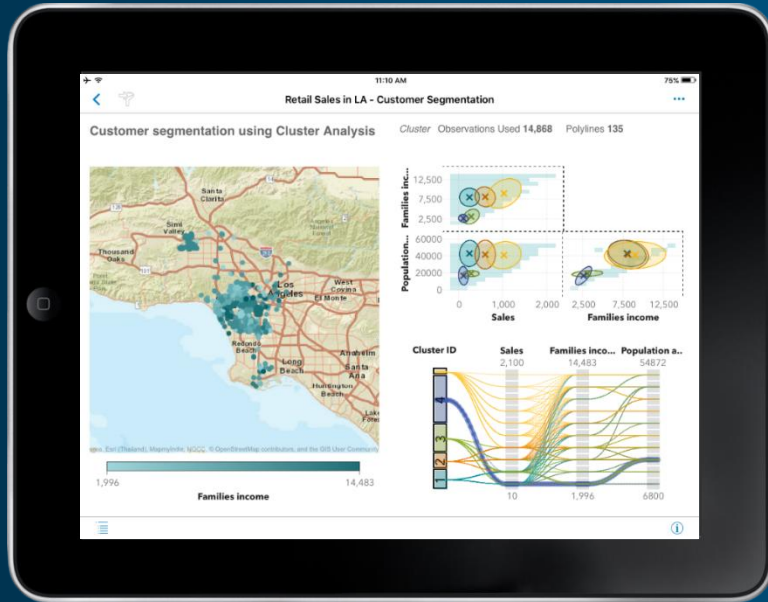
View Reports



- Consume and interact with reports and dashboards via browser
- Comment and collaborate
- Export data and visualizations
- Print, share via e-mail
- Leverage security for controlled access



View Reports



- Consume and interact with reports and dashboards via native mobile apps
- Comment and collaborate
- Present screen, annotate, share
- Online and offline
- Leverage security for controlled access
- Android, iOS, and Windows 10 tablets and smartphones

Unified User Experience



Common Interface



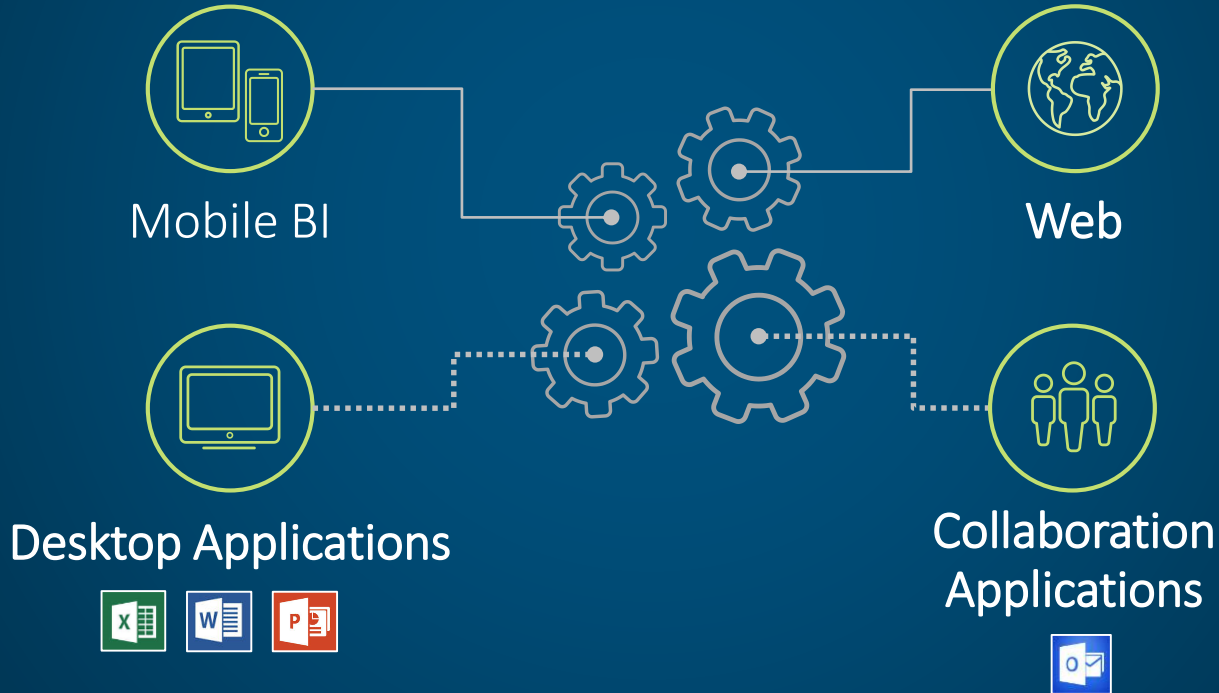
Common look-and-feel
for varied user needs
and skills



Ease-of-use +
Analytics = Smarter
Organization



Collaboration and Information Sharing





SAS® Visual Analytics Demo



Learn More

www.sas.com/va

Free Trial

Demos

Collateral



SAS® Visual Statistics

Getting Started

SAS® Visual Statistics

What does it do?

- Provides a highly interactive and visual environment for Descriptive and Predictive Analytics to quickly identify relationships in large, diverse data
- Offers environment to build and refine models on-the-fly
- Build numerous models by segments/groups to find new opportunities and make well-qualified decisions
- Persists and analyzes data in-memory for fast response times

Applications

Show me the money

Credit Risk



Fraud



Predictive Asset
Maintenance



Customer Segmentation

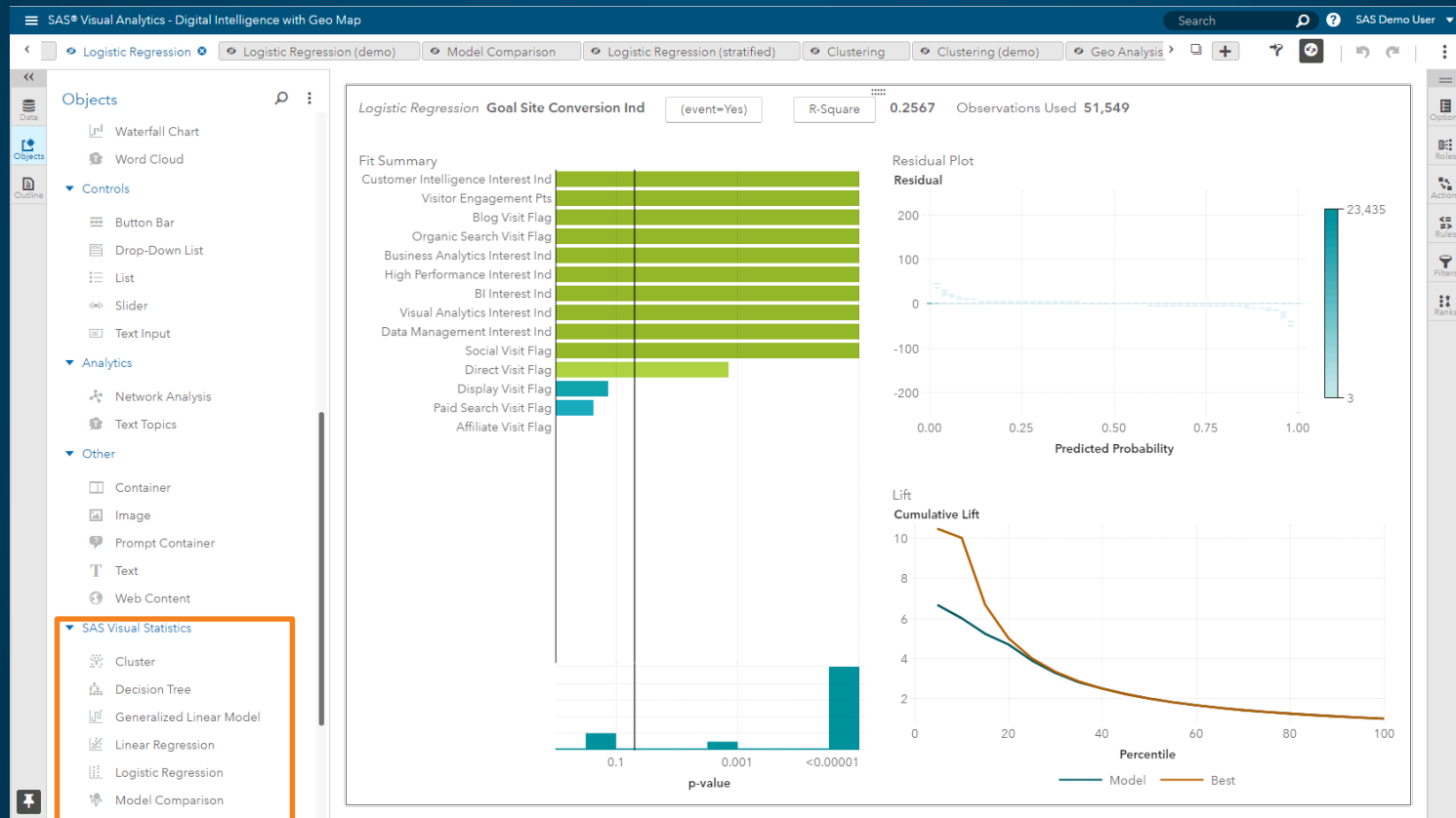


Targeted Acquisition /
Retention / Attrition



SAS® Visual Statistics

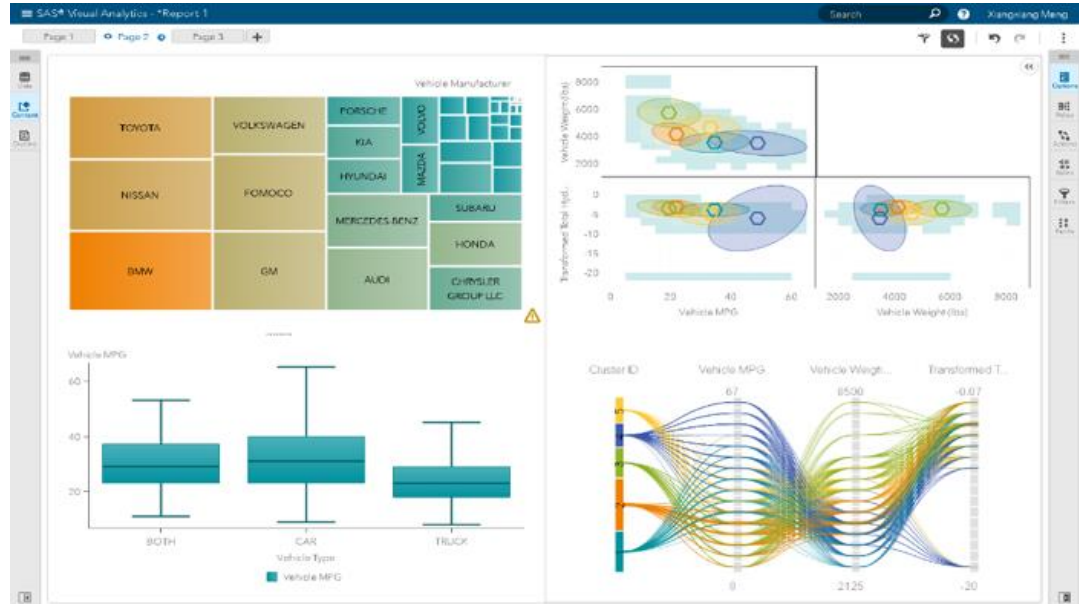
Extending SAS Visual Analytics for more analytic control and targeted actions



SAS® Visual Statistics

Key Features

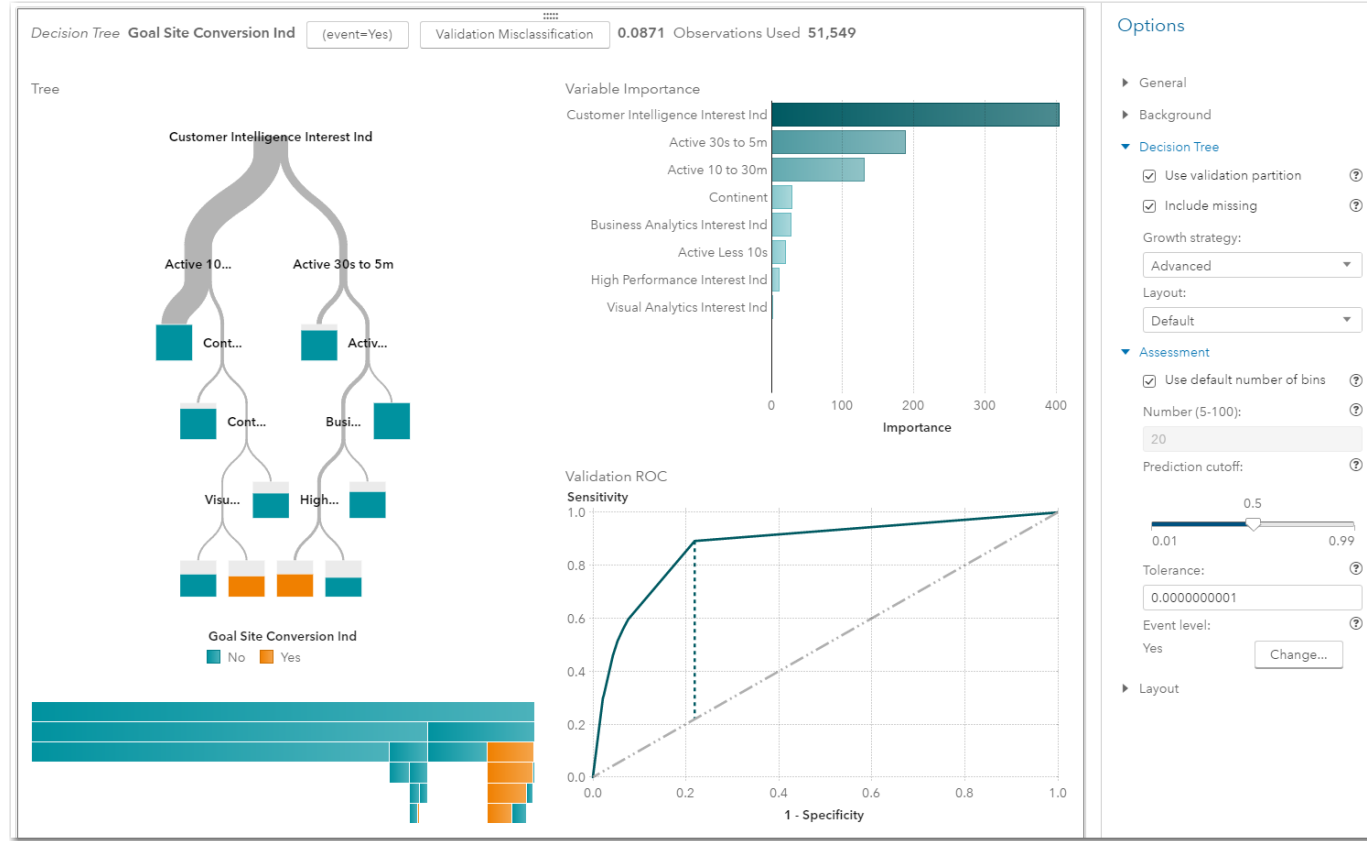
- Modeling Techniques
 - Decision Tree
 - Linear Regression
 - Logistic Regression
 - Generalized Linear Model
 - Clustering (k-means)
- Common Features
 - Training-validation partitioning
 - Variable Importance / Profile
 - Model Assessment
 - Score Code
 - Model comparison
 - Ability to export model statistics into Excel



SAS® Visual Statistics

Decision Tree

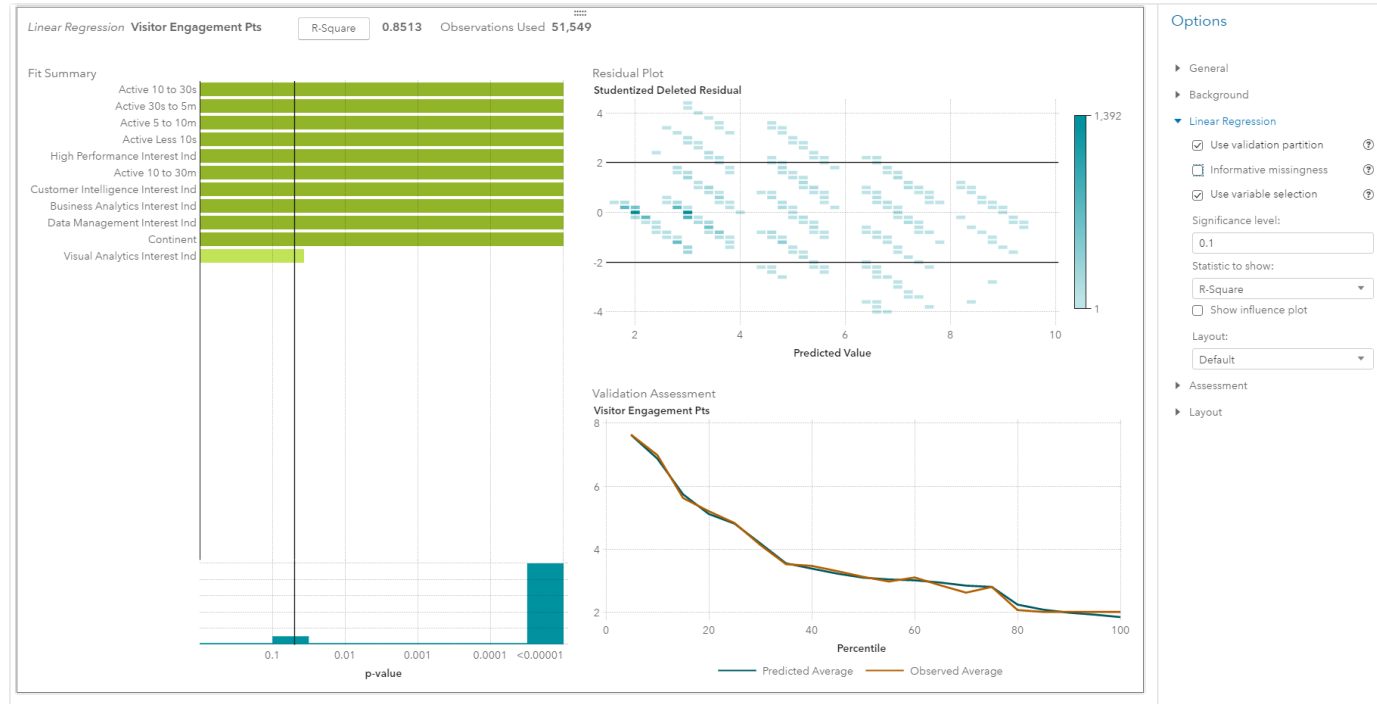
- Allows for validation partition.
- Ability to decide if you want to reuse predictors.
- No ability to decide splitting criterion (CHAID, Entropy, Gini, etc.).
- 4 different growth strategies.
- Variable Importance plot.
- Derive Leaf ID variable.
- Prune tree with Interactive Mode.
- Develop score code.



SAS® Visual Statistics

Linear Regression

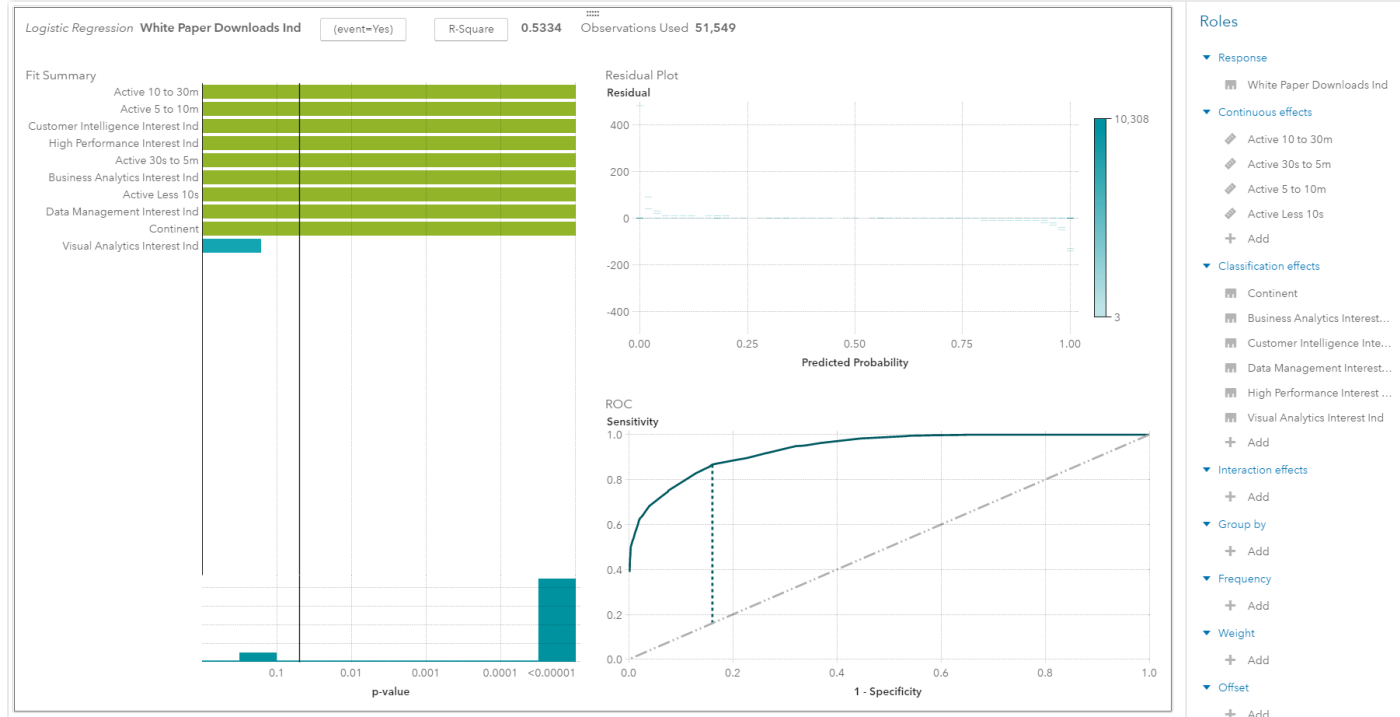
- Allows for validation partition.
- Ability to use informative missingness.
- Ability to use variable selection.
- 10 model statistics to choose from.
- Variable Importance plot.
- Derive predicted probabilities.
- Export score code.
- Export model fit statistics.



SAS® Visual Statistics

Logistic Regression

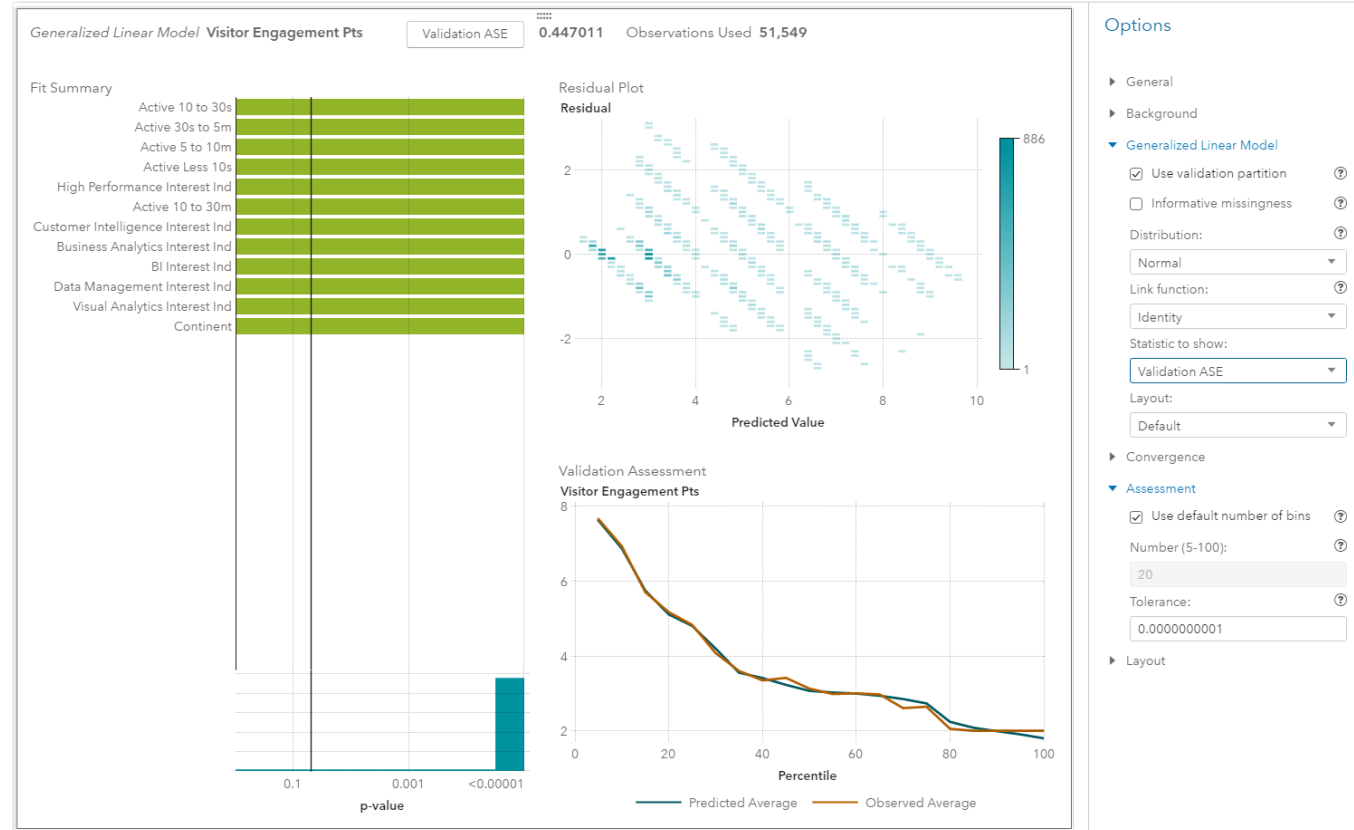
- Allows for validation partition.
- Ability to use informative missingness.
- Ability to use variable selection.
- 2 link functions (logit, probit)
- 7 model statistics to choose from.
- Variable Importance plot.
- Derive predicted probabilities.
- Export score code.
- Export model fit statistics.



SAS® Visual Statistics

Generalized Linear Models

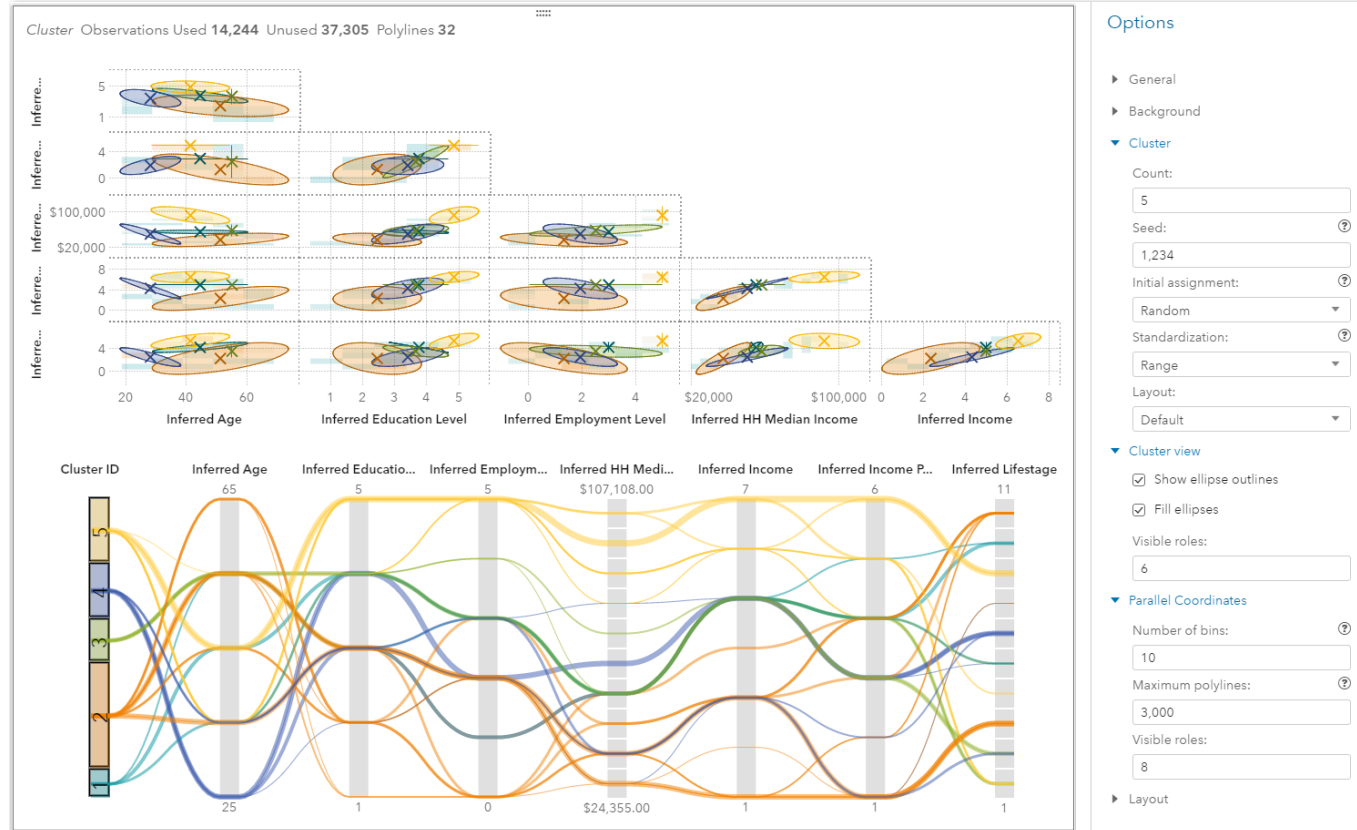
- Task included.
- Allows for validation partition.
- Ability to use informative missingness.
- 9 distributions to choose from.
- Limited selection of link functions.
- 5 model statistics to choose from.
- Variable Importance plot.
- Derive predicted probabilities.
- Export score code.
- Export model fit statistics.



SAS® Visual Statistics

Clustering

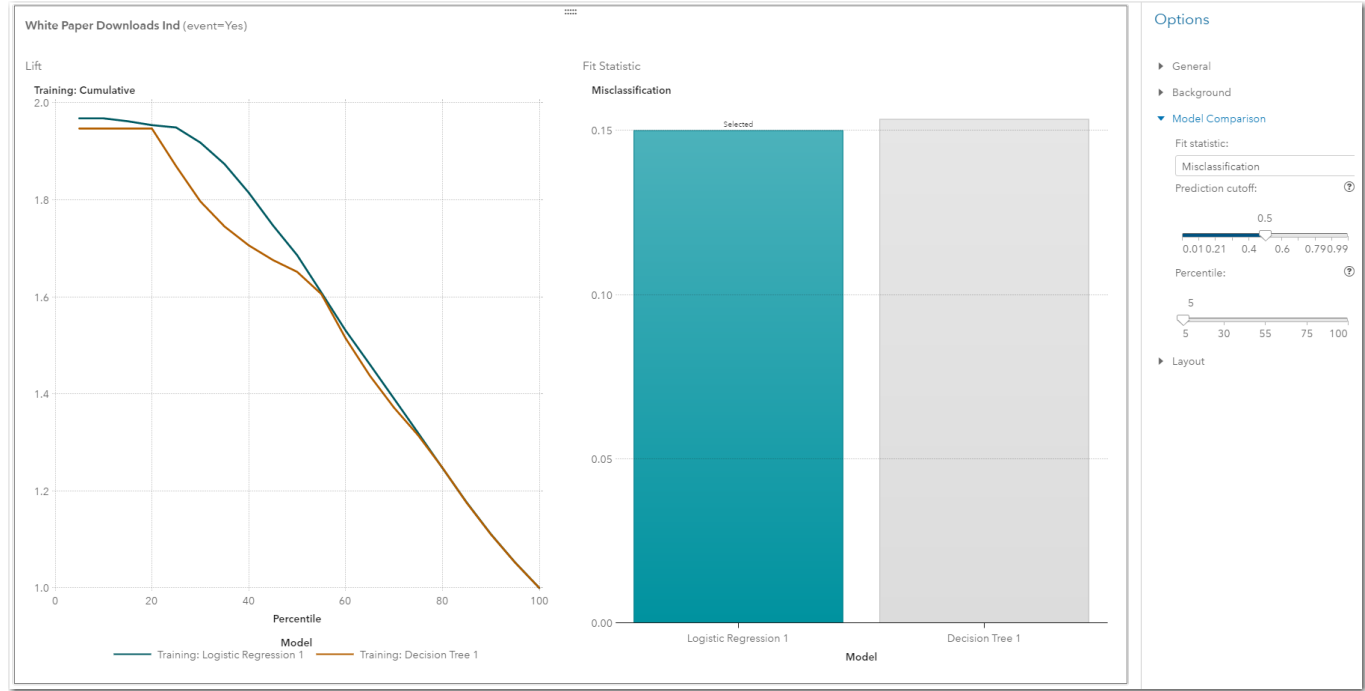
- Only allows for interval values (k-means).
- New defaults on number of bins (10).
- Ability to change standardization method.
- Allows for up to 8 visible roles in the Parallel Coordinates plot.
- Export score code.
- Export cluster summary and centroids to Excel.



SAS® Visual Statistics

Model Comparison

- Choose from 14 different Fit Statistics.



SAS Visual Statistics 8.1

New Features (SAS® Studio Programmatic Interface)

PROC CAS + Common Procedures

ASSESS (Assess Supervised Models)
BINNING (Variable Binning)
CARDINALITY (Cardinality Analysis)
PARTITION (Sampling and Partitioning)
VARIMPUTE (Missing Value Imputation)
VARREDUCE (Variable Reduction)



Analytical Procedures

GENSELECT (Generalized Linear Model)
KCLUS (Kmeans and Kmodes Clustering)
LOGSELECT (Logistic Regression)
NLMOD (Non-linear Regression)
PCA (Principle Component Analysis)
REGSELECT (Linear Regression)
TREESPLIT (Decision Trees)
PLSMOD (Partial Least Square)
QTRSELECT (Quantile Regression)



SAS® Visual Statistics Demo

SAS® Visual Statistics

Key takeaways

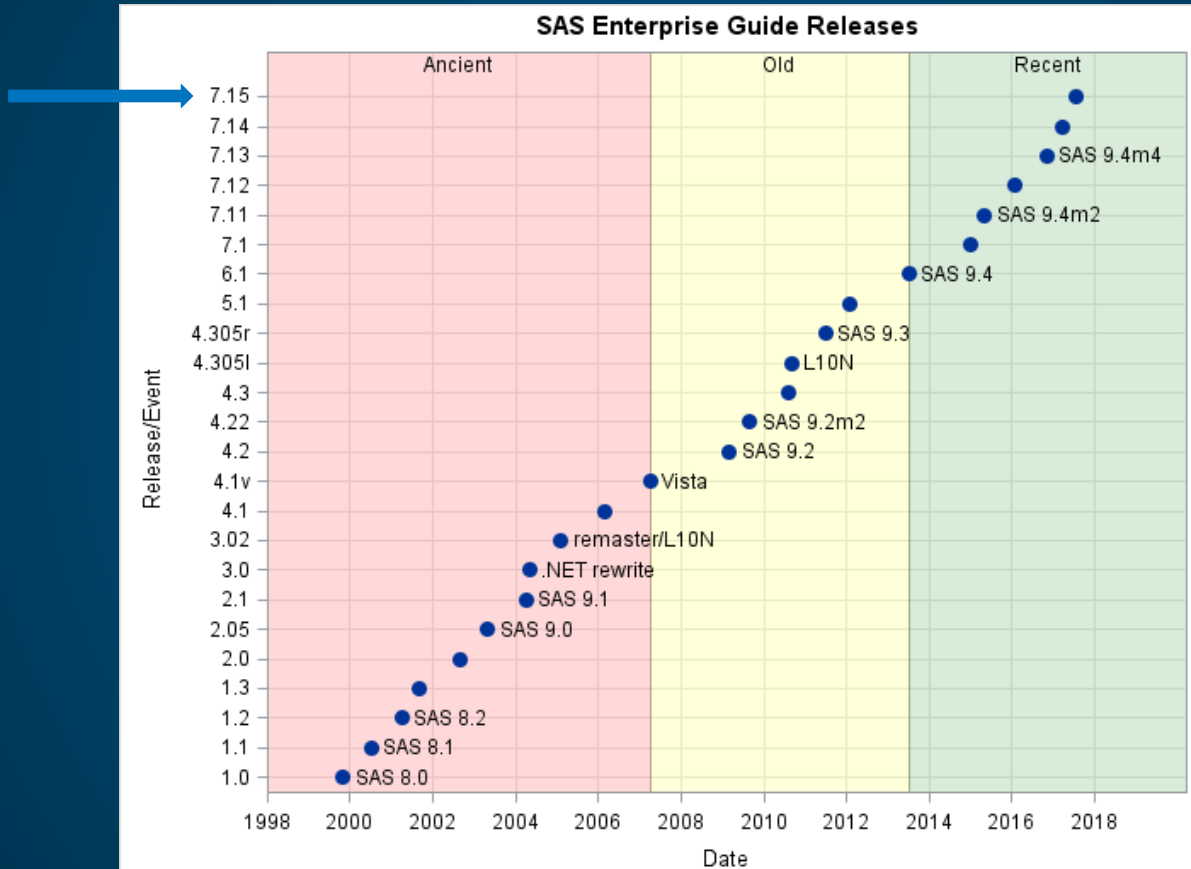
- Interactively build, run and refine predictive models for instantaneous results
- Compare your models and create score code for the best model
- Segment your data through clustering and use new segments to build multiple models rapidly



SAS[®] Enterprise Guide[™]

Getting Started

SAS® Enterprise Guide™



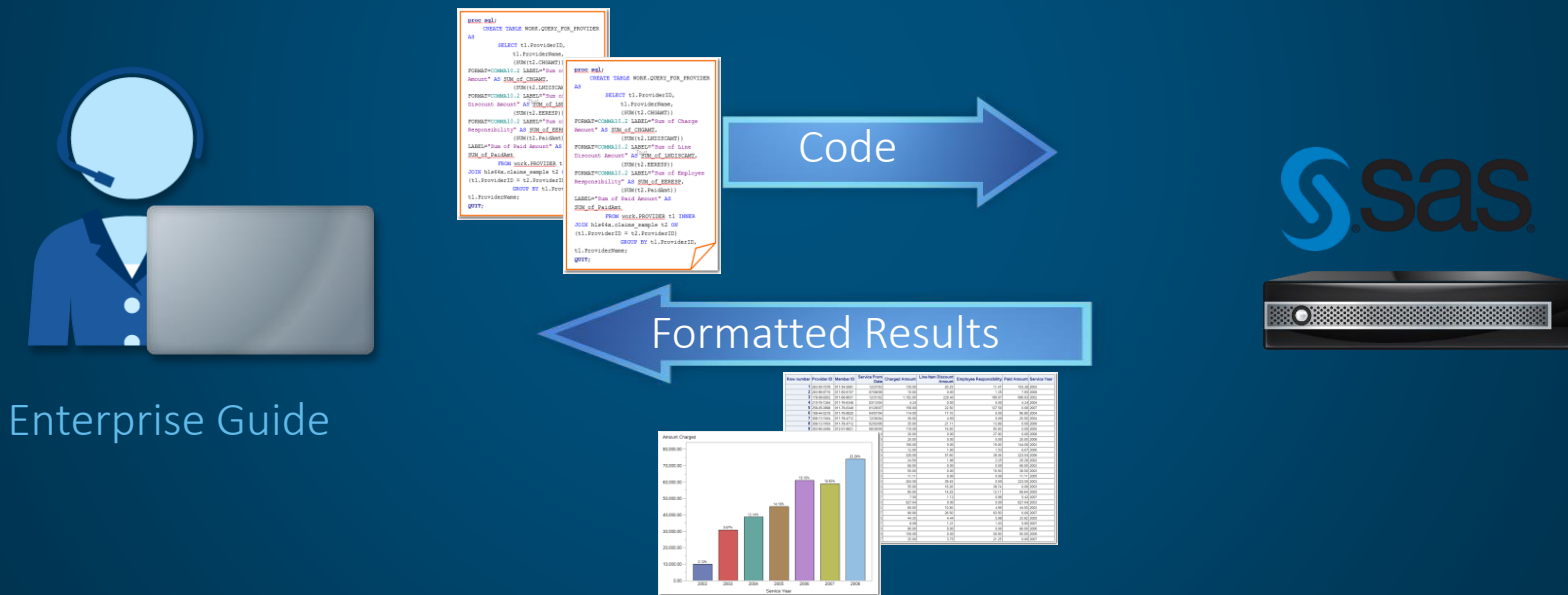
SAS® Enterprise Guide™

SAS Enterprise Guide is an easy-to-use, project-oriented Windows application that provides access to the power of SAS. It provides the following:

- An intuitive, visual interface
- Transparent access to data
- Ready-to-use tasks for data management, analysis and reporting
- Easy exporting of data and results
- A point-and-click interface for managing data and generating reports
- A full programming interface that can be used to write, edit, and submit SAS code

SAS® Enterprise Guide™

When you use SAS Enterprise Guide, you are using SAS software behind the scenes. SAS Enterprise Guide can connect to SAS on your local computer, or it can connect to SAS on a server.





SAS[®] Enterprise Guide Demo

SAS® Enterprise Guide™

Resources

- Main Enterprise Guide documentation page:
<http://support.sas.com/documentation/onlinedoc/guide/index.html>
- Enterprise Guide Training path:
<http://support.sas.com/training/us/paths/eg.html>
- Enterprise Community:
https://communities.sas.com/t5/SAS-Enterprise-Guide/bd-p/sas_eg



SAS[®] Studio

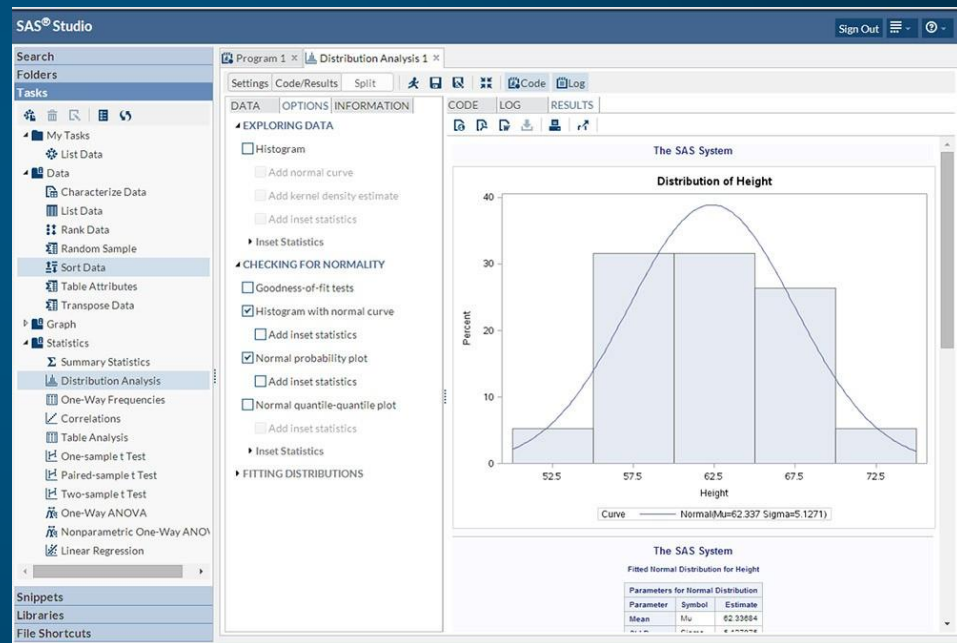
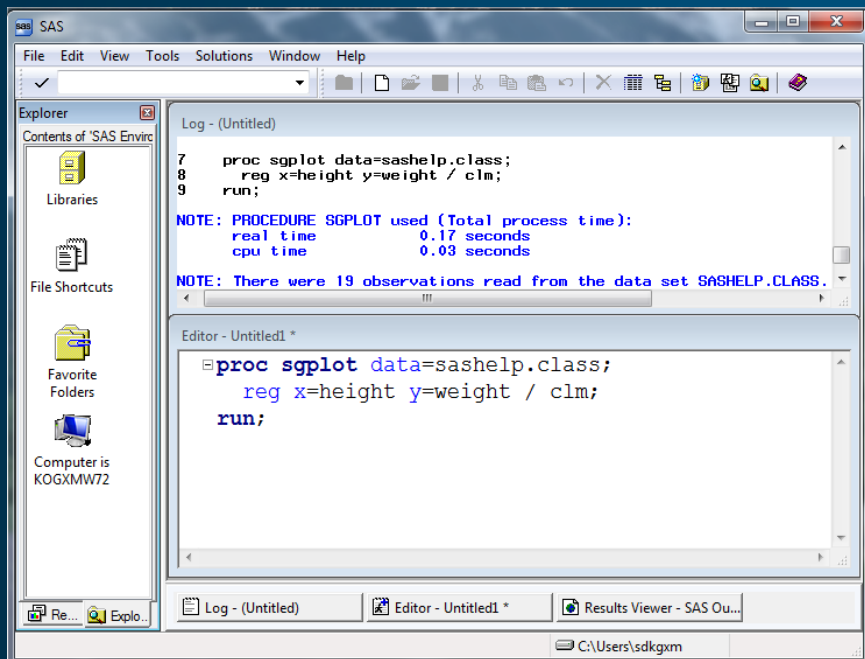
Getting Started

SAS® Studio

Yesterday & today - SAS® programming interfaces

1985, 1995, 2005, 2015

2017



SAS® Studio

- SAS® Studio is a browser-based, broadly available, consistent SAS programming interface
- Available via a browser on any device that connects to your SAS server
- Easier administration - update once and gain latest updates/versions across the tiers of your configuration

SAS® Studio

How is SAS Studio licensed?

- All SAS customers as of 9.4M2 – if you have Base SAS, you have SAS Studio
- You don't necessarily need a mid-tier or SAS Integration Technologies
- SAS® Studio is part of the *University Edition* of SAS®

SAS[®] Studio

How is SAS Studio configured?

- Single-User / PC
- Multi-User / Server*
- Multi-User / Enterprise*

* can be a hosted server in a cloud environment or in your own environment



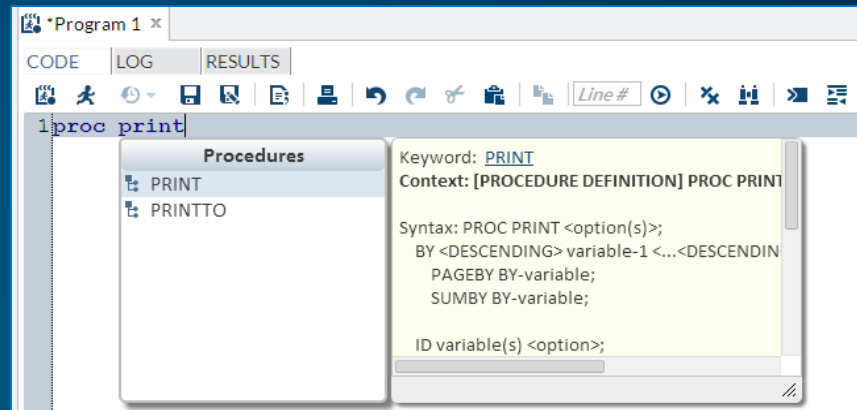
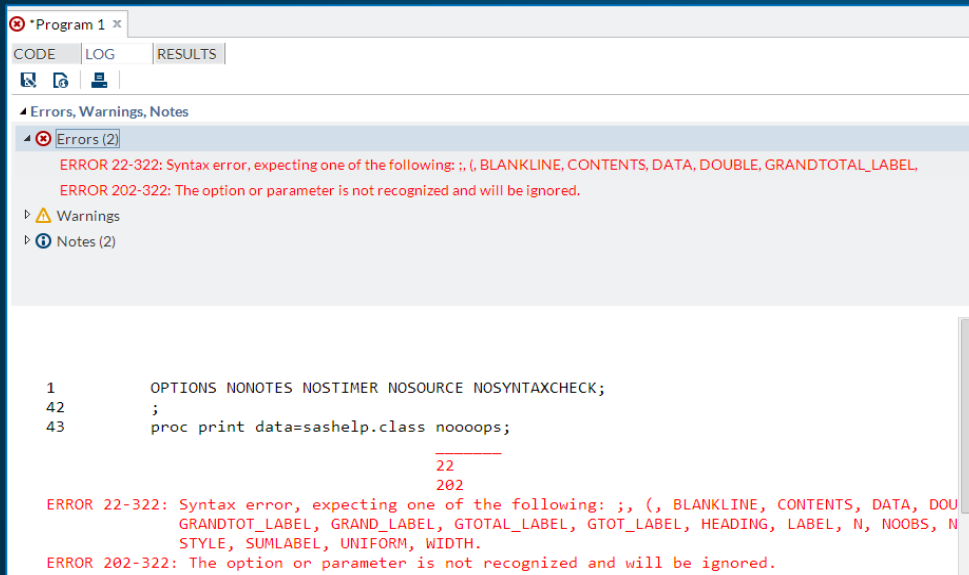
Programming Interface

SAS® Studio - Development Environment

SAS® Studio

Programming interface

- Color-coded editor
- Auto-complete
- Pop-up syntax help



- Color-coded log navigator
- Categorized alerts:
 - Errors
 - Warnings
 - Notes
- Easily save or share logs

SAS® Studio

Table viewer

- Sort or filter a table
- View or copy the generated SQL



SAS® Studio

Search

Folders

Tasks

Snippets

Libraries

My Libraries

SASHELP

- AACOMP
- AARFM
- ADSMMSG
- AFMSG
- ASSCMGR
- BASEBALL
- BMT
- CARS
- CLASS
- CLASSFIT
- CLNMSG

SASHELP.CLASS x

View: Column names

Filter: Age=11 OR Age=12 OR Age=13

Columns

- Select all
- Name
- Sex
- Age
- Height
- Weight

Total rows: 19 Total columns: 5 Filtered rows: 10 Rows 1-10

	Name	Sex	Age	Height
1	Thomas	M	11	57.5
2	Robert	M	12	64.8
3	Louise	F	12	56.3
4	Joyce	F	11	51.3
5	John	M	12	59
6	Jeffrey	M	13	62.5
7	Jane	F	12	59.8
8	James	M	12	57.3
9	Barbara	F	13	65.3
10	Alice	F	13	56.5

Property Value

Label	Name
Name	Name
Length	8
Type	Char
Format	
Informat	

```
PROC SQL ;
    CREATE TABLE WORK.query AS SELECT "Name"n, "Sex"n, "Age"n, "Height"n FROM
        SASHELP.CLASS WHERE Age=11 OR Age=12 OR Age=13 ORDER BY Name DESCENDING;
RUN;
QUIT;
```

SAS® Studio

Customizing the interface

The screenshot displays the SAS Studio interface with the following components:

- Top Bar:** SAS® Studio logo, Sign Out button, and menu icons.
- Left Pane:** Search and Folders sections. The Folders section shows a tree structure: Folder Shortcuts, My Folders, sasuser.v94, shared, and MySASFiles.
- LOG Pane:** Contains a LOG tab, a toolbar with icons for opening, saving, and printing, and a list of Errors, Warnings, and Notes (3). Below this is a scrollable area showing SAS code and a note.
- CODE Pane:** Contains a CODE tab, a toolbar with icons for running, stepping through, and other code actions, and a scrollable area showing SAS code.
- RESULTS Pane:** Contains a RESULTS tab, a toolbar with icons for opening, saving, and printing, and a table titled "The SAS System".

CODE Pane Content:

```
1      OPTIONS NONOTES NOSTIMER NOSOURCE  
42     ;  
43     proc print data=sashelp.class;  
44     run;
```

RESULTS Pane Content:

Obs	Name	Sex	Age	Height	Weight
1	Alfred	M	14	69.0	112.5
2	Alice	F	13	56.5	84.0
3	Barbara	F	13	65.3	98.0
4	Carol	F	14	62.8	102.5
5	Henry	M	14	63.5	102.5
6	James	M	12	57.3	83.0
7	Jane	F	12	59.8	84.5
8	Janet	F	15	62.5	112.5
9	Jeffrey	M	13	62.5	84.0
10	John	M	12	59.0	99.5
11	Joyce	F	11	51.3	50.5
12	Judy	F	14	64.3	90.0
13	Louise	F	12	56.3	77.0
14	Mary	F	15	66.5	112.0
15	Philip	M	16	72.0	150.0
16	Robert	M	12	64.8	128.0
17	Ronald	M	15	67.0	133.0
18	Thomas	M	11	57.5	85.0
19	William	M	15	66.5	112.0



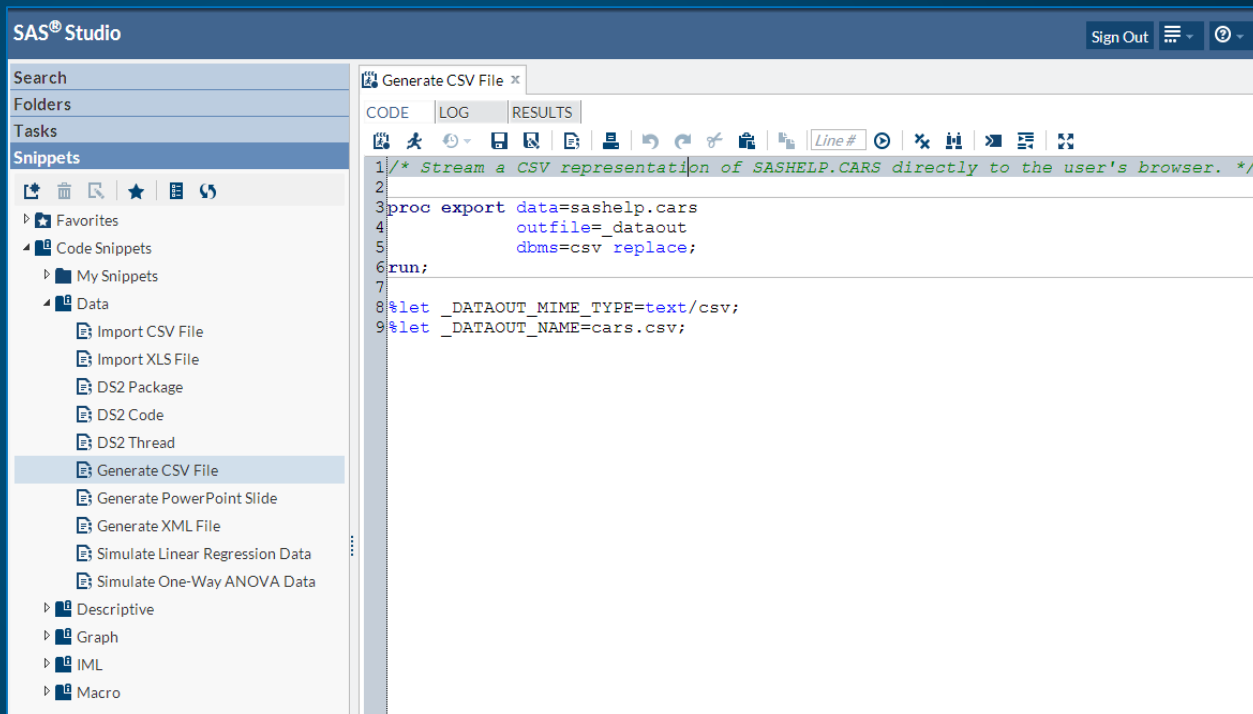
Code Snippets & Tasks

Ease of use

Code Snippets

Overview

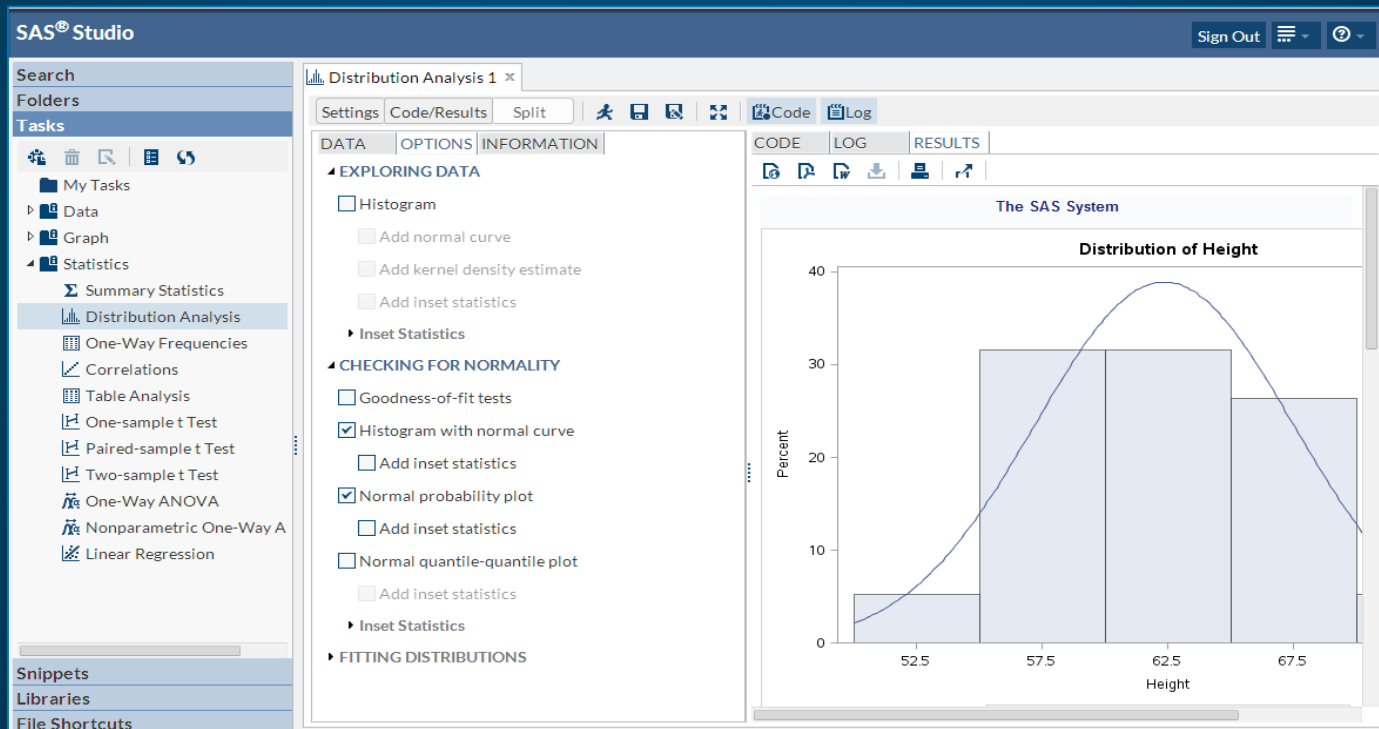
- Frequently used code snippets are provided in SAS® Studio
- Quickly insert SAS® Code
- Once inserted, you can modify the snippet code to meet your needs
- Easily create your own snippets
- Specify My snippets for easy access



Tasks

Overview

Tasks are point-and-click user interfaces which guide users through an analytical or other processes. Behind the scenes, SAS® code is generated.

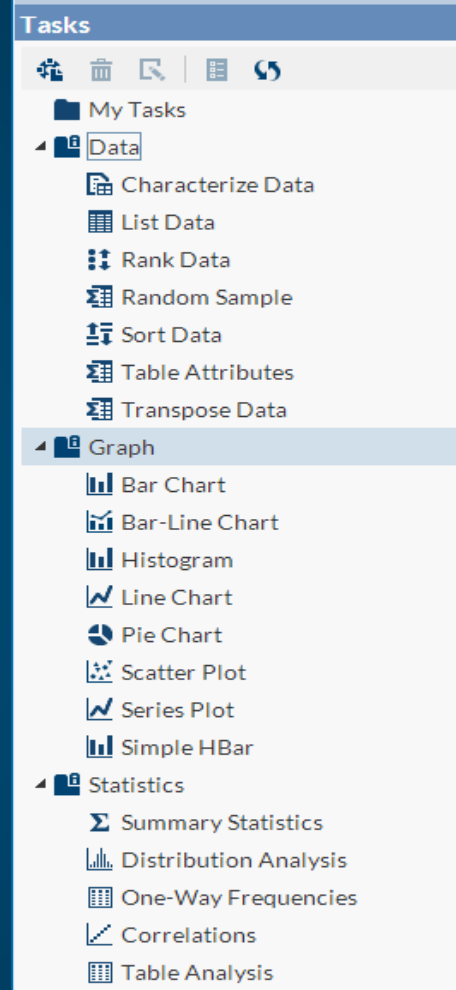


Tasks

Authoring

SAS® Studio provides a flexible task framework where both internal and external customers can create tasks

- SAS® R&D groups can add tasks
- Customers and consultants can easily create their own tasks without java coding or action-script coding
- Customers and consultants can copy delivered tasks and modify them





SAS® Studio Demo

SAS® Studio

Key Take-aways

- SAS® Studio offers another option for programmers
 - Web-based – can be added to PC SAS®
 - Server - update once, all connecting get latest version of SAS® Studio PLUS backend SAS®
 - HTML5 so nothing is added to browser
 - More coming including LOTS of Tasks and Snippets

SAS® Studio

Resources

Benefits, Features, Fact Sheet

http://www.sas.com/en_us/software/foundation/studio.html

Overview, Documentation, Training, Samples and Tips

<http://support.sas.com/software/products/sasstudio/index.html#s1=2>



Questions?

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Thank you for using SAS!

sas.com