



SENTURUS

TABLEAU DASHBOARDS THAT CAPTIVATE & COMMUNICATE

Characteristics of Well Designed,
Interactive Dashboards

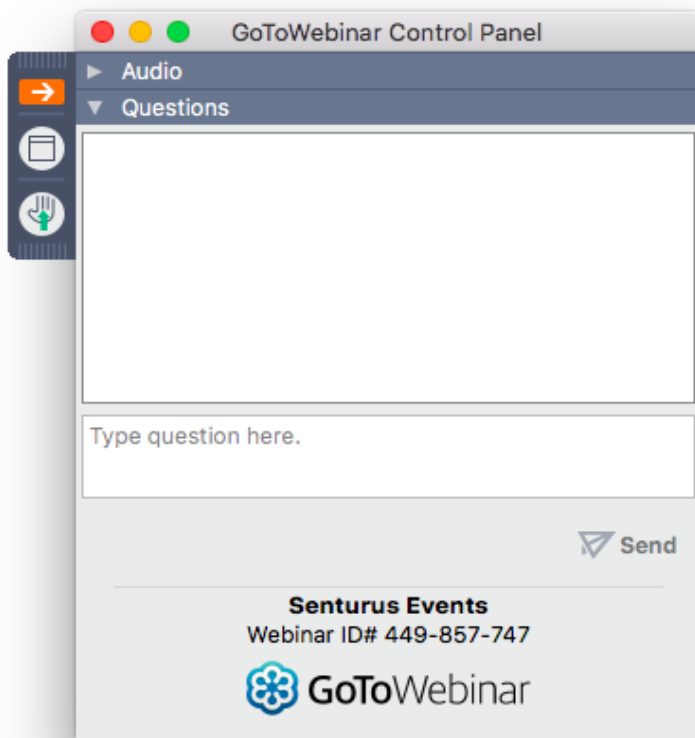


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SEARCH RESOURCES

GO

SORT BY




Popularity

Date

Title

Type



RESOURCE TITLE	TYPE	GO
SHEDDING LIGHT ON CLOUD BI OPTIONS Amazon. IBM Cognos Cloud. Microsoft Power BI Service. Tableau Online. Azure.	 BUSINESS STRATEGY	→
IBM COGNOS REPORTING TOOLS: FEATURE SET COMPARISON Visual Reference Guide	 FEATURES	→
A COMPARISON OF POWER BI, TABLEAU & COGNOS Differentiators Demo'd	 FEATURES	→

Agenda

- Introductions
- Interactive dashboards defined
- Context
- Color
- Know your audience
- Parameters
- Senturus overview
- Additional resources
- Q&A

Introducing...Today's Presenters



Kyle Biehle
Tableau Solutions Architect
Senturus, Inc.



Michael Weinbauer
Practice Area Director
/Solutions Architect
Senturus, Inc.

Poll

From where are you sourcing your data?

- Data extracts/Excel
- Directly from the source/database
- Centralized model (ex SSAS)



CHARACTERISTICS OF WELL-DESIGNED INTERACTIVE DASHBOARDS

What Is An Interactive Dashboard?

A: The visual display of information that provides the user with an initial overview of a dataset and allows the user to easily explore, interrogate, and compare the data in order to gain additional insight and understanding.

Getting to "Why?"

Characteristics of Well-Designed Interactive Dashboards

- Visual
- Intuitive
- Comprehensive
- Clean/efficient
- Consistent
- Immersive
- Inexhaustible

Most importantly: **Always Be Comparing**

Why Should We Visualize Data?

Visualization allows us to

- Make comparisons
- Identify trends



27

Everyone's First Dashboard Looks Pretty Much the Same

Select Month(s)	Year													
All														
Region	Region	Category	Sub-Category	2013			2014			2015			2016	
All	Central	Furniture	Bookcases	Sales	Profit	Profit %	Sales	Profit	Profit %	Sales	Profit	Profit %	Sales	Profit
			Chairs	\$20,754.1	\$699.26	3%	\$17,908.5	\$1,676.95	9%	\$23,349.6	\$1,504.24	6%	\$23,218.5	\$2,712.27
			Furnishings	\$2,536.1	-\$246.51	-10%	\$2,528.6	-\$757.70	-30%	\$5,115.7	-\$1,582.33	-31%	\$5,074.0	-\$1,319.68
			Tables	\$7,785.5	-\$1,424.33	-18%	\$6,857.3	-\$265.09	-4%	\$13,922.9	\$292.62	2%	\$10,589.3	-\$2,162.85
			Total	\$32,909.7	-\$1,105.22	-3%	\$35,592.0	-\$231.04	-1%	\$50,773.2	-\$253.51	0%	\$44,522.3	-\$1,281.28
		Office	Appliances	\$3,659.2	-\$509.17	-14%	\$4,974.5	-\$2,194.76	-44%	\$6,015.0	\$378.69	6%	\$8,933.3	-\$313.38
		Supplies	Art	\$822.0	\$187.84	23%	\$1,132.2	\$248.07	22%	\$1,520.0	\$261.42	17%	\$2,291.3	\$497.83
			Binders	\$15,870.9	-\$1,375.94	-9%	\$5,890.6	\$1,370.10	23%	\$14,056.4	\$2,919.34	21%	\$21,105.4	-\$3,957.14
			Envelopes	\$1,598.7	\$570.85	36%	\$870.9	\$346.95	40%	\$970.8	\$371.92	38%	\$1,196.5	\$487.80
			Fasteners	\$121.8	\$16.06	13%	\$88.6	\$25.10	28%	\$247.4	\$83.23	34%	\$320.2	\$112.23
			Labels	\$1,048.5	\$481.55	46%	\$304.5	\$126.74	42%	\$511.3	\$204.96	40%	\$587.2	\$259.83
			Paper	\$2,346.8	\$896.21	38%	\$3,544.2	\$1,398.74	39%	\$5,365.6	\$2,205.37	41%	\$6,235.3	\$2,471.58
			Storage	\$11,093.4	\$344.44	3%	\$8,331.5	\$437.42	5%	\$12,811.5	\$778.98	6%	\$13,693.7	\$409.00
			Supplies	\$440.5	\$10.46	2%	\$324.4	\$21.68	7%	\$4,294.9	-\$811.75	-19%	\$4,407.6	\$117.72
			Total	\$37,001.7	\$622.31	2%	\$25,461.4	\$1,780.04	7%	\$45,792.8	\$6,392.15	14%	\$58,770.5	\$85.48
		Technology	Accessories	\$4,439.0	\$891.26	20%	\$7,795.2	\$1,531.05	20%	\$10,802.2	\$1,888.09	17%	\$10,919.7	\$2,941.23
			Copiers	\$3,269.9	\$1,034.98	32%	\$12,809.8	\$5,159.91	40%	\$17,500.0	\$8,399.98	48%	\$3,679.9	\$1,013.98
			Machines	\$16,292.2	-\$2,384.70	-15%	\$1,851.9	\$169.60	9%	\$2,658.8	\$57.32	2%	\$5,994.6	\$671.72
			Phones	\$9,925.8	\$1,480.93	15%	\$19,363.9	\$3,307.24	17%	\$19,902.5	\$3,415.13	17%	\$23,211.2	\$4,119.72
			Total	\$33,926.8	\$1,022.47	3%	\$41,820.8	\$10,167.80	24%	\$50,863.4	\$13,760.52	27%	\$43,805.3	\$8,746.65
		Total		\$103,838.2	\$539.55	1%	\$102,874.2	\$11,716.80	11%	\$147,429.4	\$19,899.16	13%	\$147,098.1	\$7,550.84
	East	Furniture	Bookcases	\$10,863.5	-\$425.59	-4%	\$19,653.4	-\$987.42	-5%	\$5,964.2	-\$198.09	-3%	\$7,338.2	\$443.46
			Chairs	\$22,008.3	\$2,719.38	12%	\$20,009.3	\$2,478.80	12%	\$23,010.5	\$1,782.80	8%	\$31,232.7	\$2,376.78
			Furnishings	\$3,757.3	\$744.38	20%	\$5,269.9	\$737.07	14%	\$9,587.1	\$2,135.18	22%	\$10,457.0	\$2,264.78
			Tables	\$10,603.7	-\$3,537.84	-33%	\$8,884.8	-\$2,275.86	-26%	\$7,825.3	-\$2,306.78	-29%	\$11,826.0	-\$2,904.90
			Total	\$47,232.7	-\$499.66	-1%	\$53,817.4	-\$47.41	0%	\$46,387.2	\$1,413.11	3%	\$60,853.9	\$2,180.12
		Office	Appliances	\$5,779.2	\$1,411.96	24%	\$6,691.3	\$1,850.60	28%	\$9,426.6	\$2,302.61	24%	\$12,291.4	\$2,826.24
		Supplies	Art	\$1,290.2	\$332.91	26%	\$1,707.4	\$400.39	23%	\$1,882.6	\$476.92	25%	\$2,605.6	\$689.72

Every Number is available but we don't need to see all of the numbers.

How Many 9s Do You See?

4 7 1 1 8 8 4 9 0 8 3 6 0 1 8 5 5 2 2 8 5 0
8 1 5 5 1 8 4 7 3 2 2 2 5 9 4 4 1 1 7 8 2 0
6 2 0 1 5 3 5 3 8 1 2 1 2 0 3 5 4 4 7 3 3 6
0 4 5 7 1 3 8 8 0 0 5 5 7 7 6 6 1 4 2 2 5 3
1 8 7 3 5 2 0 9 5 8 8 5 1 8 8 5 4 6 3 4 6 7
8 7 2 2 3 8 5 2 2 1 6 6 5 2 0 3 2 7 8 5 6 5
6 3 7 6 8 2 5 2 3 2 1 0 3 5 2 6 8 0 8 3 1 2
4 3 0 0 6 1 8 5 1 3 5 6 9 8 1 3 6 6 8 3 0 7
2 6 1 7 4 3 6 3 6 7 5 8 5 3 2 1 5 5 3 8 3 5
0 7 6 3 8 6 6 5 6 8 0 2 7 3 0 8 1 8 8 7 4 3
4 7 4 2 5 7 0 7 8 7 8 7 7 6 4 5 6 7 7 0 4 8
2 3 1 8 8 5 3 6 1 2 6 4 7 4 3 7 4 0 6 3 0 6

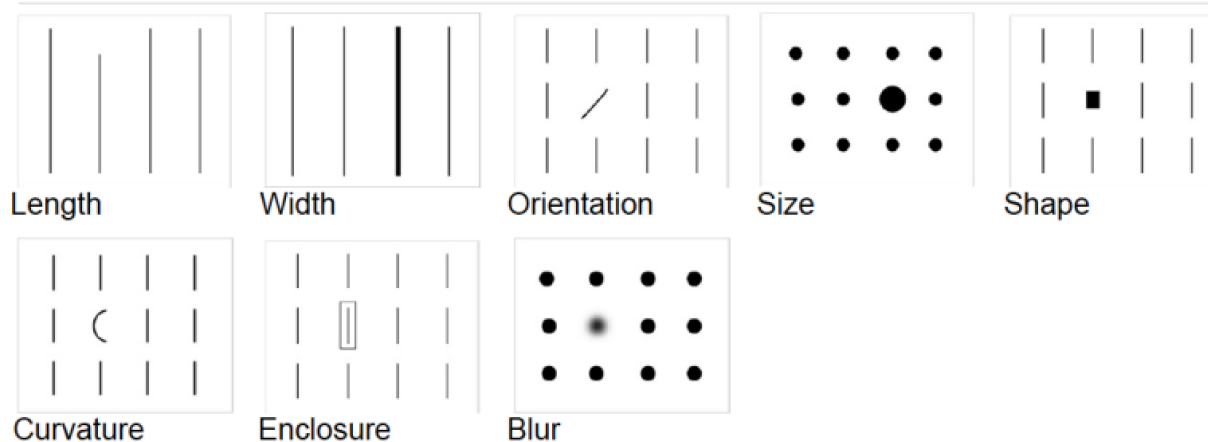
How About Now?

4	7	1	1	8	8	4	9	0	8	3	6	0	1	8	5	5	2	2	8	5	0
8	1	5	5	1	8	4	7	3	2	2	2	5	9	4	4	1	1	7	8	2	0
6	2	0	1	5	3	5	3	8	1	2	1	2	0	3	5	4	4	7	3	3	6
0	4	5	7	1	3	8	8	0	0	5	5	7	7	6	6	1	4	2	2	5	3
1	8	7	3	5	2	0	9	5	8	8	5	1	8	8	5	4	6	3	4	6	7
8	7	2	2	3	8	5	2	2	1	6	6	5	2	0	3	2	7	8	5	6	5
6	3	7	6	8	2	5	2	3	2	1	0	3	5	2	6	8	0	8	3	1	2
4	3	0	0	6	1	8	5	1	3	5	6	9	8	1	3	6	6	8	3	0	7
2	6	1	7	4	3	6	3	6	7	5	8	5	3	2	1	5	5	3	8	3	5
0	7	6	3	8	6	6	5	6	8	0	2	7	3	0	8	1	8	8	7	4	3
4	7	4	2	5	7	0	7	8	7	8	7	7	6	4	5	6	7	7	0	4	8
2	3	1	8	8	5	3	6	1	2	6	4	7	4	3	7	4	0	6	3	0	6

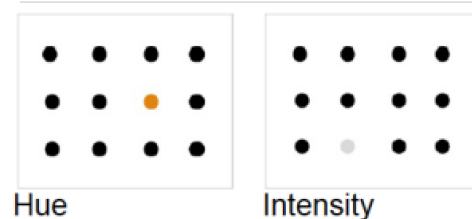
The use of a hue allows us to access our pre-attentive processing capability. We don't have to scan each number looking for a specific shape.

Preattentive Attributes of Visual Perception

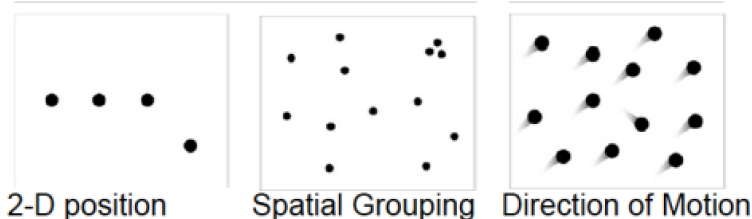
Form



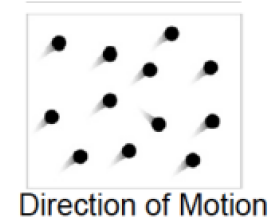
Color



Position



Motion



Colin Ware - "Information Visualization: Perception for Design"

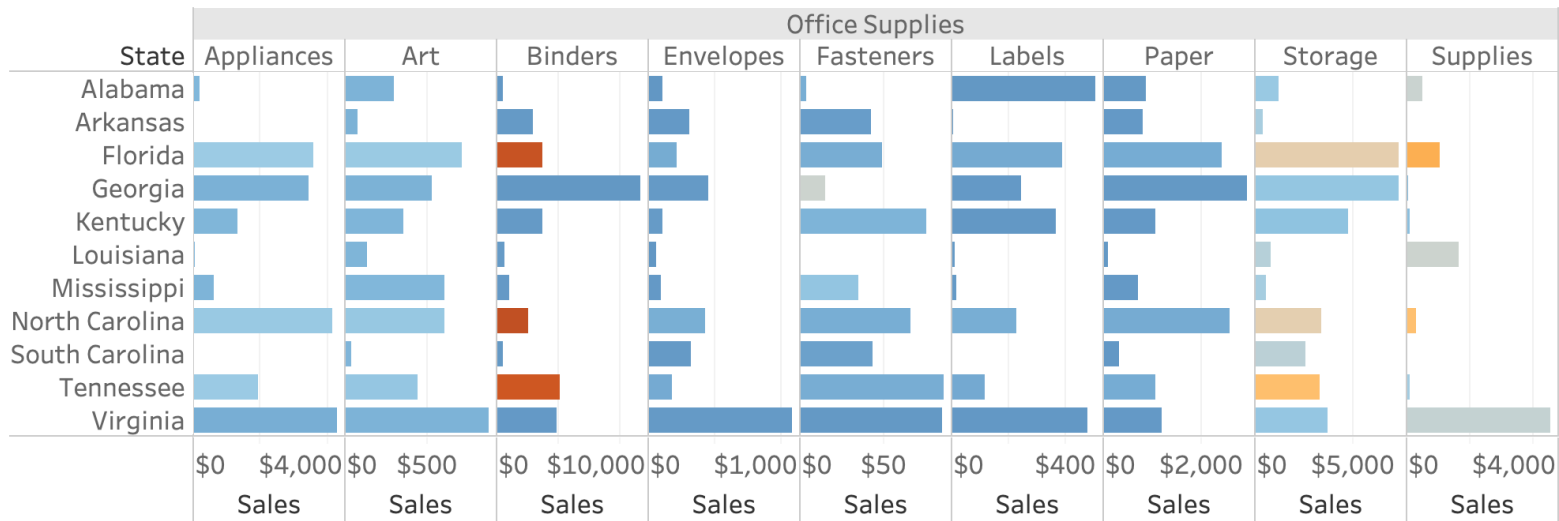
Of these, **Length** and **2-D Position** are the **best** for quantitative perception. **Intensity**, **Width**, and **Size** are limited quantitatively.

For the Category Binders, Which State Had the Highest Sales and How Many States Had a Negative Profit?

		Office Supplies								
State		Appliances	Art	Binders	Envelopes	Fasteners	Labels	Paper	Storage	Supplies
Alabama	Sales	\$208	\$301	\$467	\$106	\$4	\$506	\$883	\$1,249	\$485
	Profit %	27%	29%	49%	50%	33%	49%	48%	12%	2%
Arkansas	Sales		\$78	\$2,890	\$312	\$43	\$7	\$806	\$430	
	Profit %		30%	47%	48%	44%	47%	48%	7%	
Florida	Sales	\$3,558	\$711	\$3,690	\$211	\$49	\$386	\$2,426	\$7,419	\$1,068
	Profit %	10%	11%	-75%	34%	34%	35%	34%	-3%	-19%
Georgia	Sales	\$3,432	\$527	\$11,672	\$447	\$15	\$245	\$2,957	\$7,381	\$40
	Profit %	31%	30%	49%	47%	2%	47%	48%	15%	26%
Kentucky	Sales	\$1,336	\$351	\$3,696	\$105	\$76	\$363	\$1,059	\$4,822	\$86
	Profit %	28%	28%	47%	46%	29%	49%	47%	18%	21%
Louisiana	Sales	\$17	\$130	\$629	\$62		\$11	\$104	\$805	\$1,666
	Profit %	27%	29%	46%	49%		47%	48%	5%	2%
Mississippi	Sales	\$616	\$607	\$967	\$91	\$35	\$15	\$725	\$576	
	Profit %	29%	27%	47%	48%	16%	47%	47%	8%	
North Carolina	Sales	\$4,138	\$603	\$2,562	\$431	\$66	\$229	\$2,594	\$3,438	\$302
	Profit %	12%	13%	-78%	32%	33%	33%	35%	-3%	-9%
South Carolina	Sales		\$35	\$515	\$319	\$43		\$332	\$2,567	
	Profit %		28%	48%	47%	41%		48%	5%	
Tennessee	Sales	\$1,915	\$436	\$5,148	\$177	\$87	\$115	\$1,060	\$3,311	\$98
	Profit %	11%	14%	-71%	35%	33%	36%	34%	-10%	8%
Virginia	Sales	\$4,306	\$876	\$4,794	\$1,084	\$85	\$475	\$1,206	\$3,769	\$4,575
	Profit %	33%	30%	47%	47%	48%	49%	47%	14%	3%

Finding the answers requires conscious, attentive processing. We have to scan and process each number individually.

For the Category Binders, Which State Had the Highest Sales and How Many States Had a Negative Profit?



Length of the line and Hue (color) are both pre-attentive attributes.

Select the Right Chart(s) to Convey Your Message

Challenge: Let's try to find all possible ways to visualize a ludicrously small data set

- Just two numbers 75 and 37
- Then pick which is the best visualization

Bars



Pie Chart



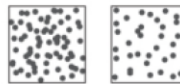
Line Chart



Square Surface



Density



Donut Chart



Circle Areas



Repeated Squares



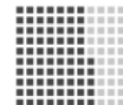
Icon Height



Spliced Bars



Squares Merged

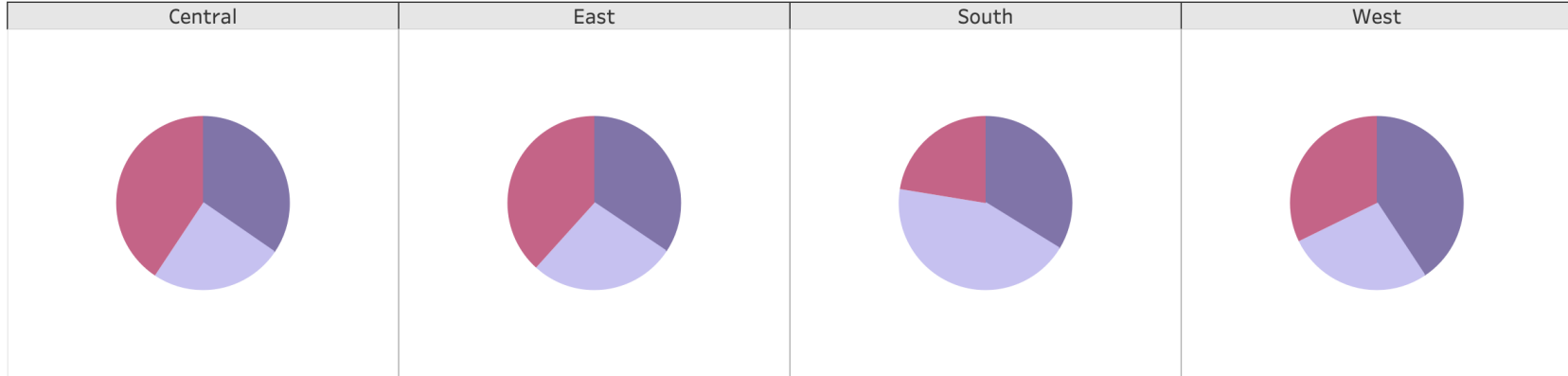


Comparison Test: Which Region Did Technology Products Represent the Highest Percentage of Sales?

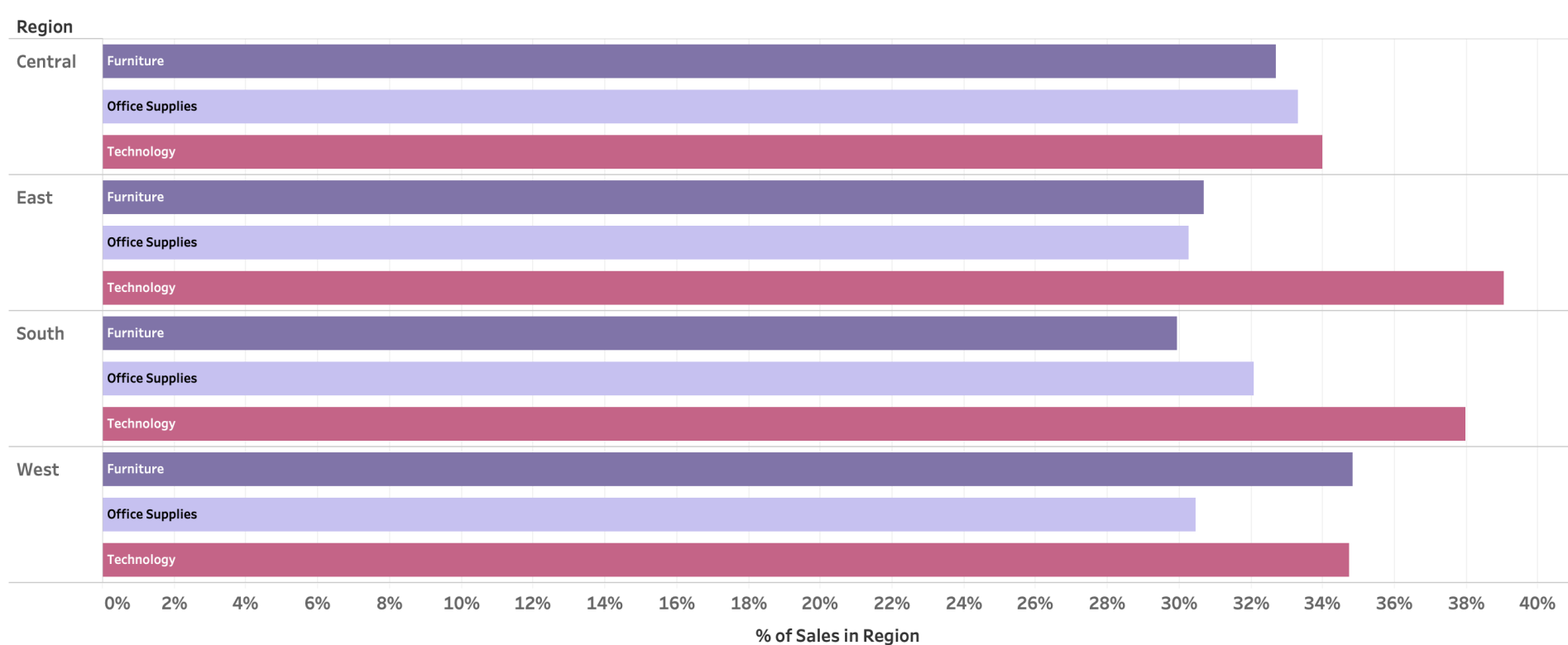
■ Furniture
■ Technology
■ Office Supplies

Select Year

- ☐ 2013
☒ 2014
☐ 2015
☐ 2016

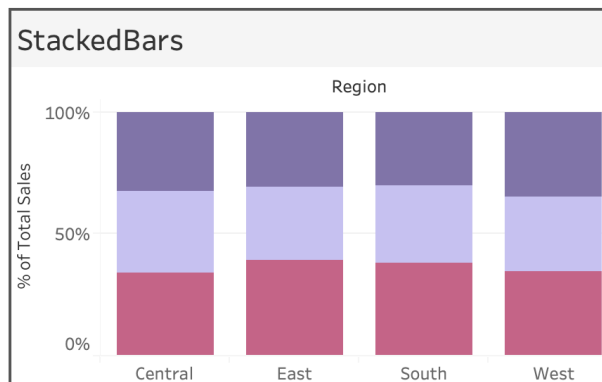
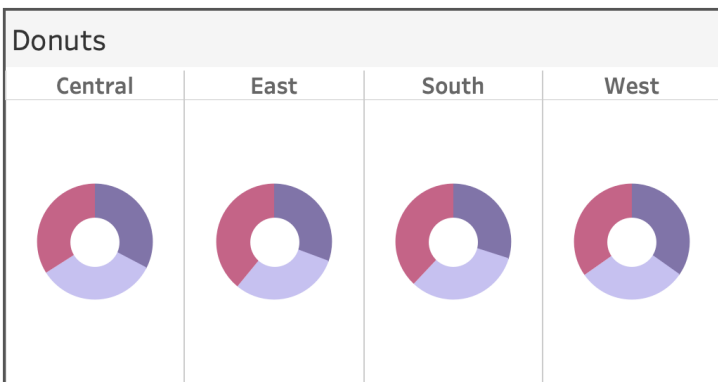
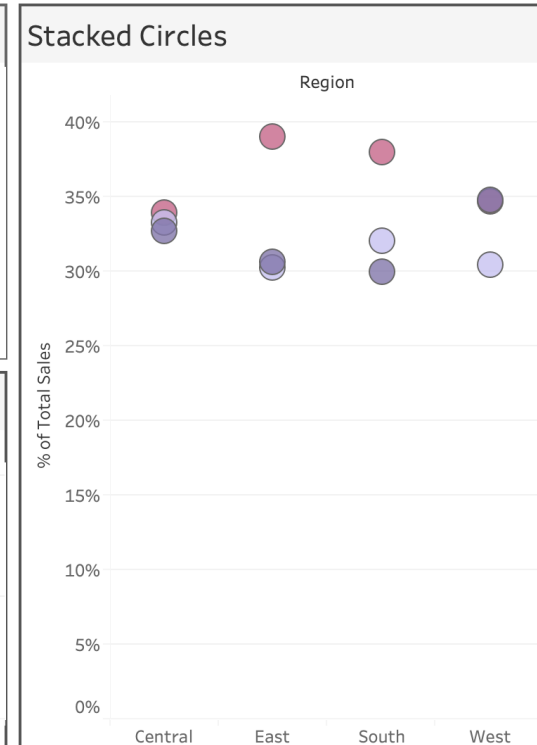
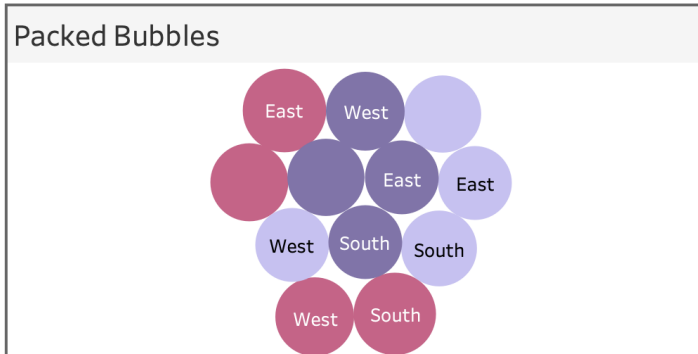
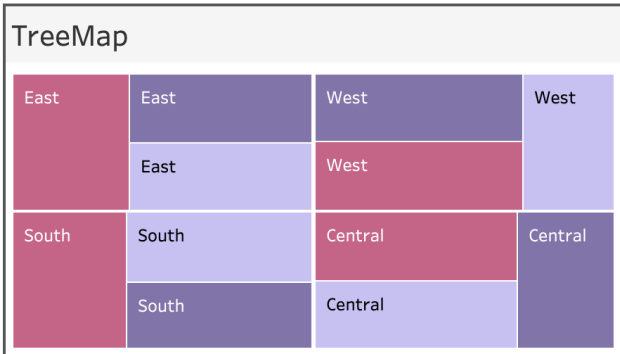


Which Region Did Technology Products Represent the Highest Percentage of Sales?



All of the Options: Which Region Did Technology Products Represent the Highest Percentage of Sales?

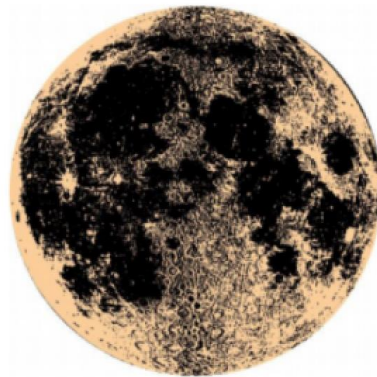
■ Furniture ■ Office Supplies ■ Technology



Variety and eye-candy can make dashboards "Pop" but there are trade-offs for understanding.

Context Is Key

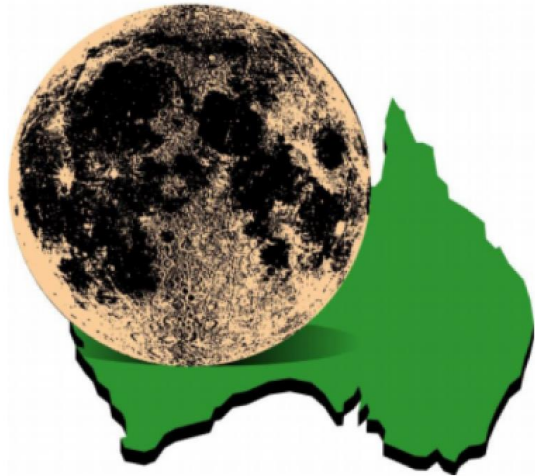
How big is the moon?



Source: Slide from Nigel Holmes Talk at the 2013 tapestry Conference

Context Is Key

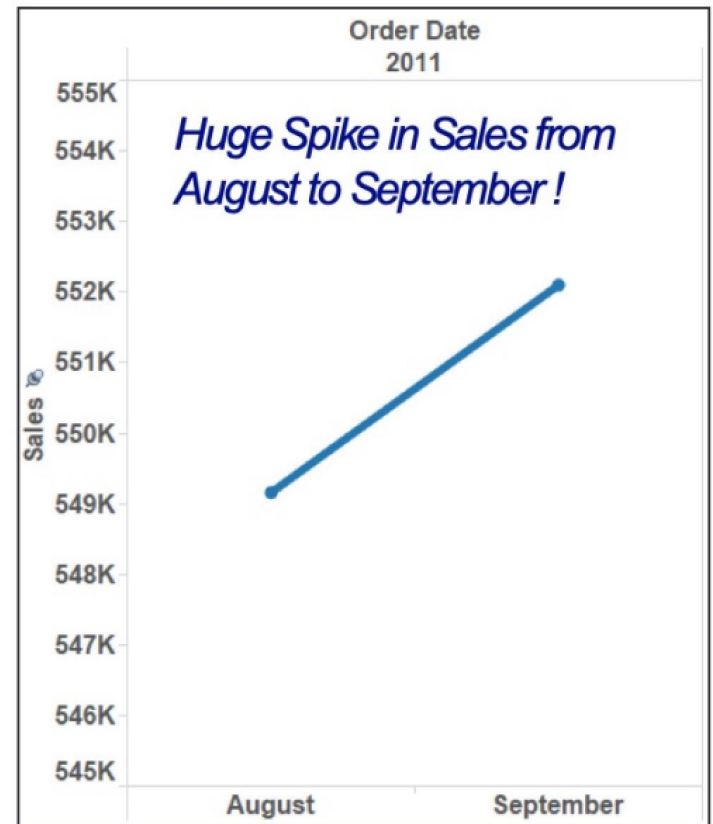
About this big...



Source: Slide from Nigel Holmes Talk at the 2013 tapestry Conference

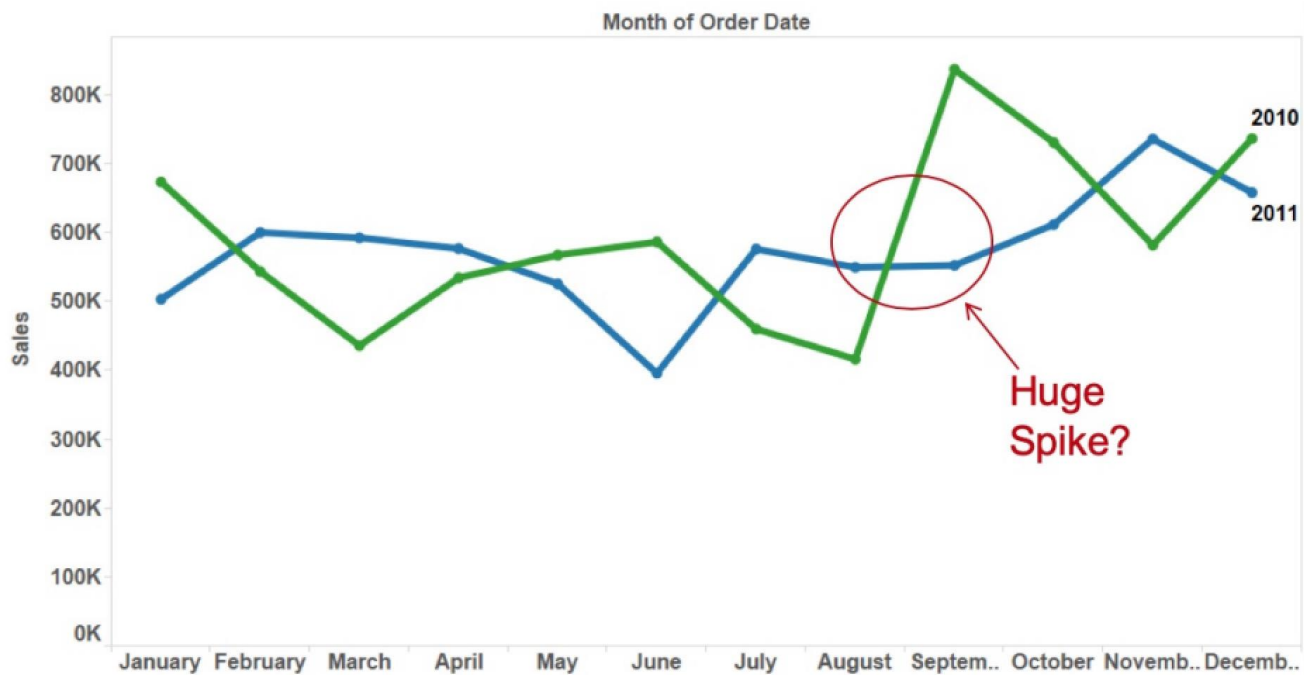
Context Is Key

- Compared to what?
- Be accurate and honest



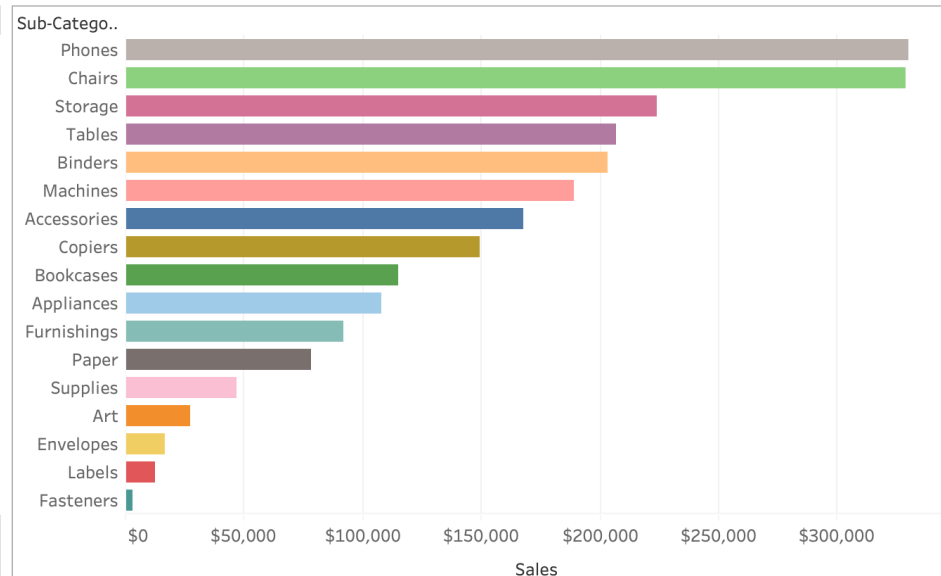
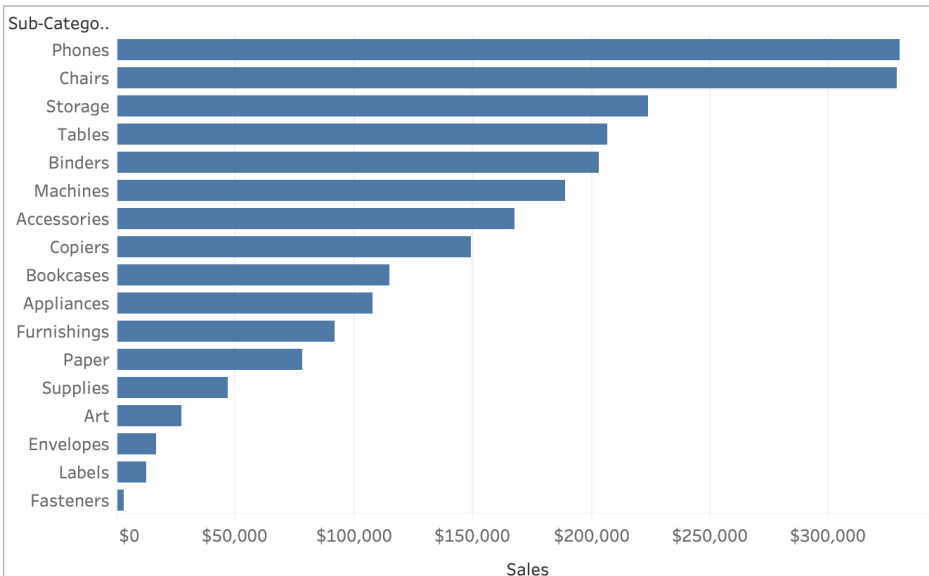
Context Is Key

A little more context



Use of Color

Avoid using color if a label will do

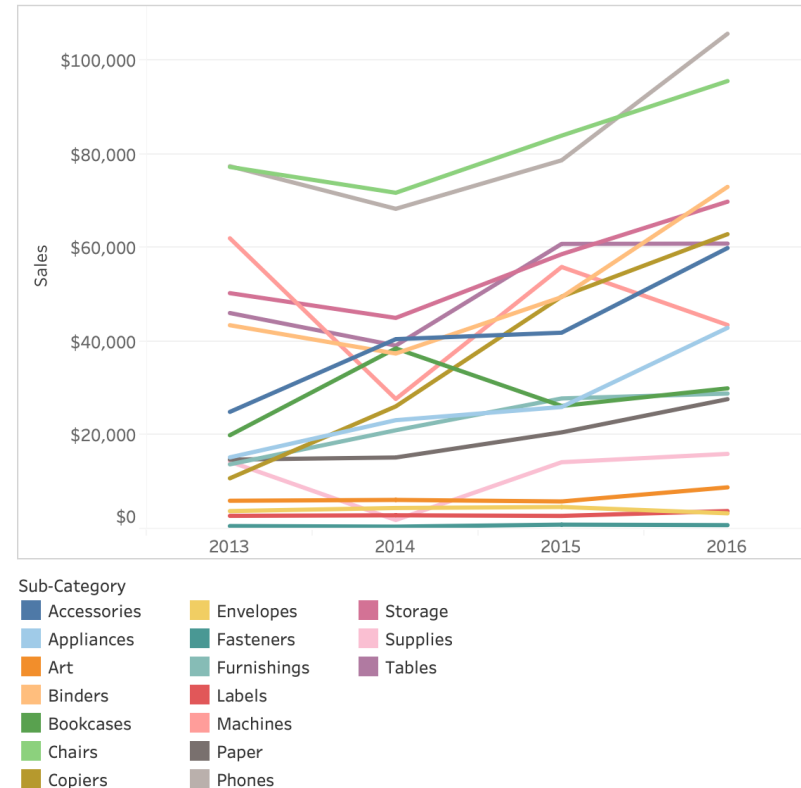
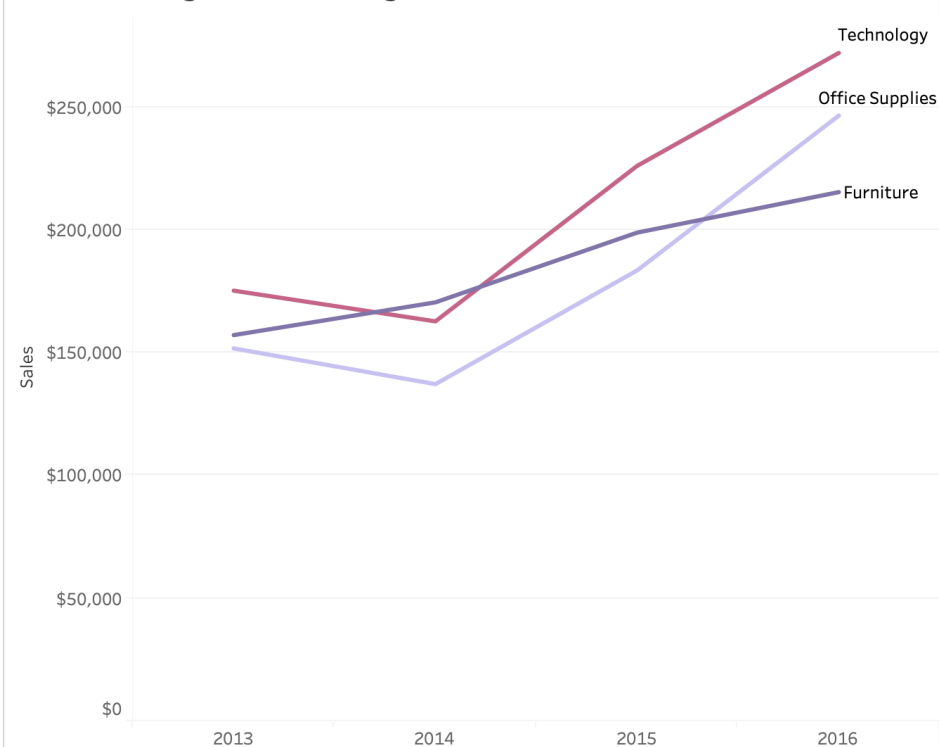


Color is only adding complexity and clutter - not clarity

Use of Color

Limit the use of color - less is more

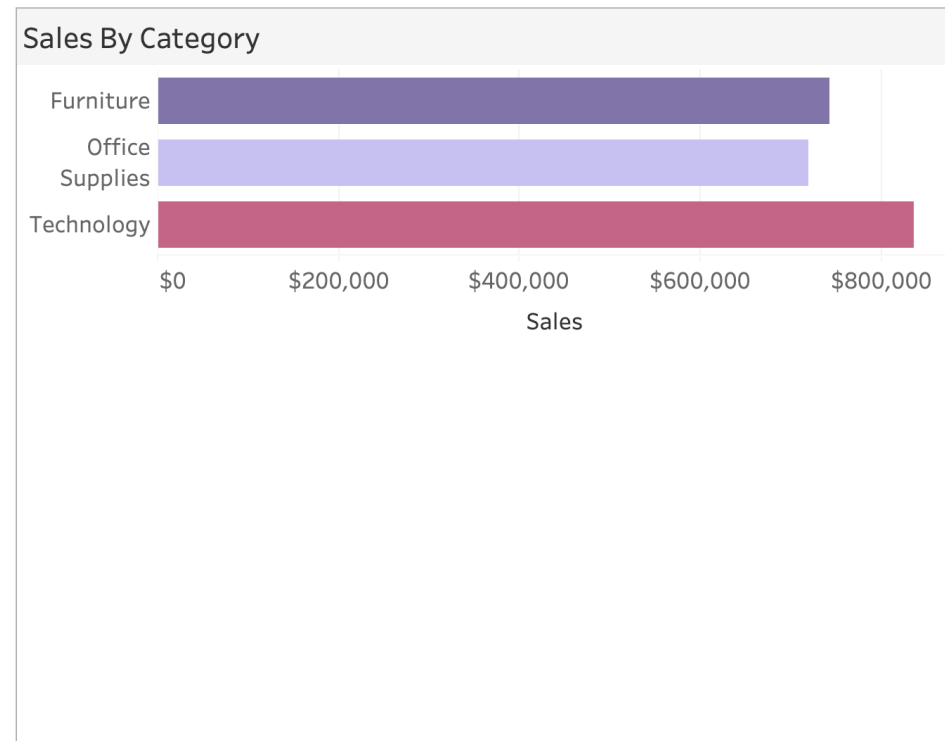
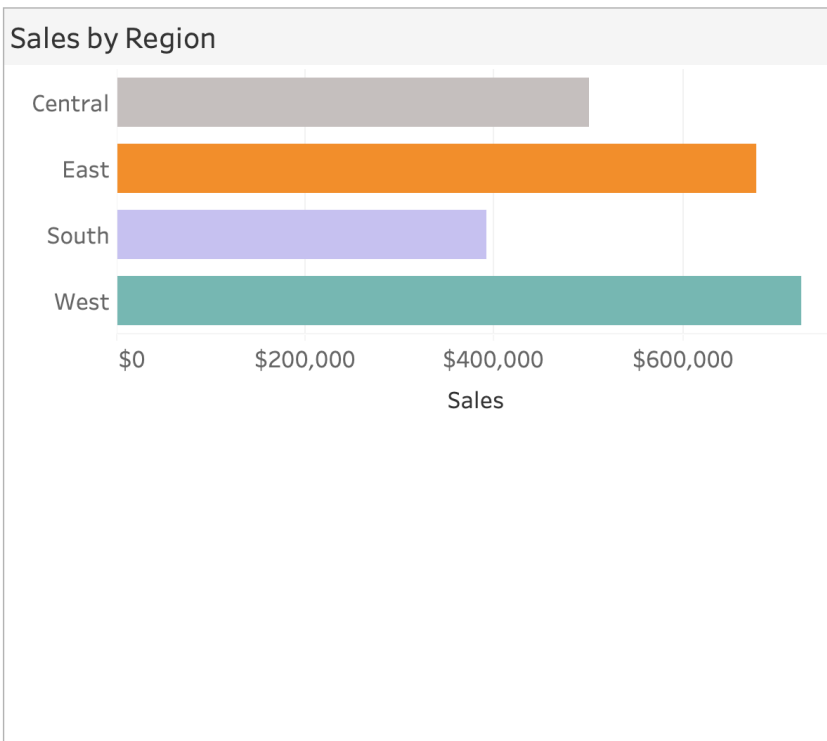
Best for Categorical encoding is Less than 5 Colors



The Eye has trouble distinguishing more than 5 colors

Use of Color

Be consistent in use of categorical color and don't re-use the same colors

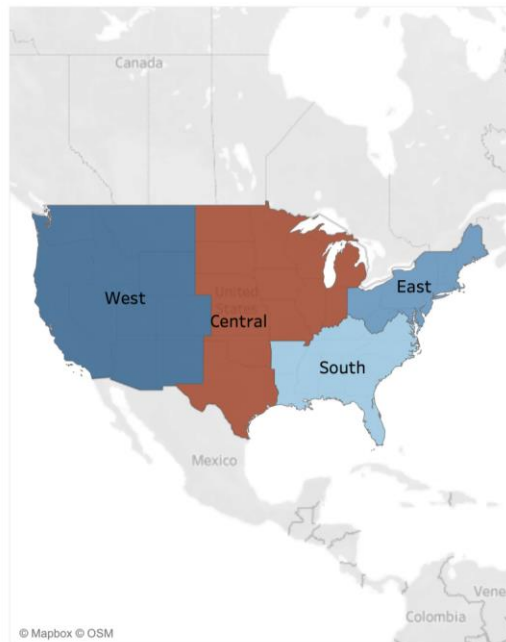


Office Supplies and South are using the same color.

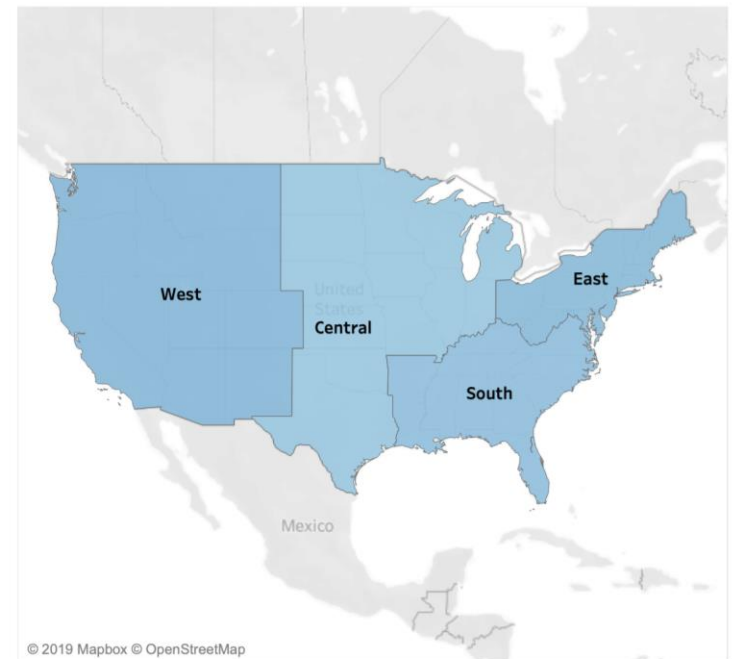
Use of Color

Be consistent in use of continuous colors based on measures - especially percentages

Sub-Category
All



Dynamic Range
8% 15%



Fixed Range -50% to 50%
-50% 50%

Beware of the dynamic Color Legend. Create a standardized gradient to use across all sheets where profit is the color attribute

Use of Color

Use bright colors sparingly - especially red

Profit by Region

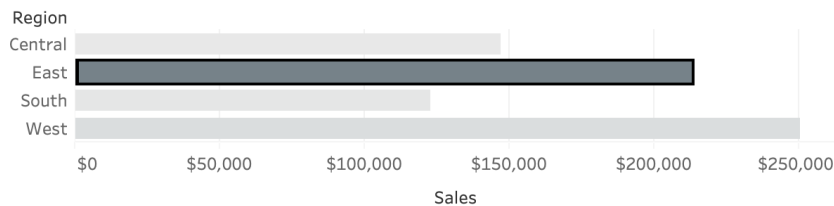
Category	Sub-Catego..	Year / Region															
		2013				2014				2015				2016			
		Central	East	South	West	Central	East	South	West	Central	East	South	West	Central	East	South	West
Furniture	Bookcases	-7%	-4%	21%	1%	-11%	-5%	9%	-11%	-6%	-3%	15%	4%	-9%	6%	10%	-9%
	Chairs	3%	12%	18%	6%	9%	12%	11%	4%	6%	8%	20%	4%	12%	8%	12%	2%
	Furnishings	-10%	20%	13%	24%	-30%	14%	22%	24%	-31%	22%	24%	27%	-26%	22%	17%	26%
	Tables	-18%	-33%	11%	4%	-4%	-26%	-29%	7%	2%	-29%	0%	-4%	-20%	-25%	-26%	2%
Office Supplies	Appliances	-14%	24%	23%	28%	-44%	28%	25%	25%	6%	24%	21%	29%	-4%	23%	19%	28%
	Art	23%	26%	24%	22%	22%	23%	22%	27%	17%	25%	25%	29%	22%	26%	21%	28%
	Binders	-9%	18%	29%	20%	23%	33%	3%	26%	21%	15%	15%	31%	-19%	18%	4%	33%
	Envelopes	36%	39%	43%	44%	40%	41%	44%	46%	38%	43%	45%	47%	41%	43%	43%	46%
	Fasteners	13%	33%	31%	29%	28%	26%	37%	36%	34%	33%	33%	24%	35%	37%	39%	34%
	Labels	46%	44%	42%	47%	42%	41%	48%	44%	40%	43%	46%	42%	44%	45%	37%	48%
	Paper	38%	45%	42%	44%	39%	46%	41%	44%	41%	43%	44%	47%	40%	45%	41%	46%
	Storage	3%	8%	7%	13%	5%	13%	-4%	10%	6%	13%	10%	12%	3%	12%	9%	14%
	Supplies	2%	-5%	2%	4%	7%	-10%	11%	20%	-19%	-1%	-13%	5%	3%	-14%	3%	-8%
Technology	Accessories	20%	31%	30%	22%	20%	26%	20%	30%	17%	20%	27%	26%	27%	23%	24%	29%
	Copiers	32%	16%	19%	38%	40%	33%	35%	37%	48%	26%	34%	34%	28%	39%	44%	41%
	Machines	-15%	33%	-12%	33%	9%	3%	45%	11%	2%	-5%	33%	-1%	11%	25%	-39%	-16%
	Phones	15%	17%	24%	10%	17%	15%	25%	10%	17%	10%	13%	9%	18%	9%	15%	8%

IF everything is important nothing is.

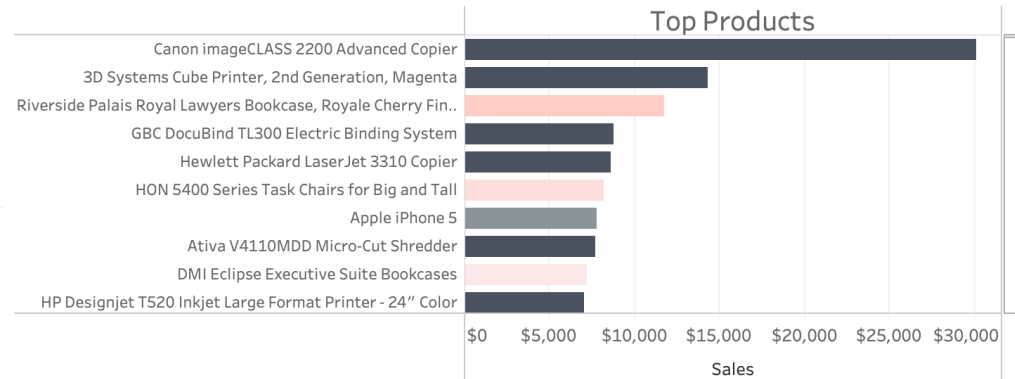
The Information Seeking Mantra

- Overview First -> Zoom and Filter -> Details on Demand

Sales By Region



Top Products



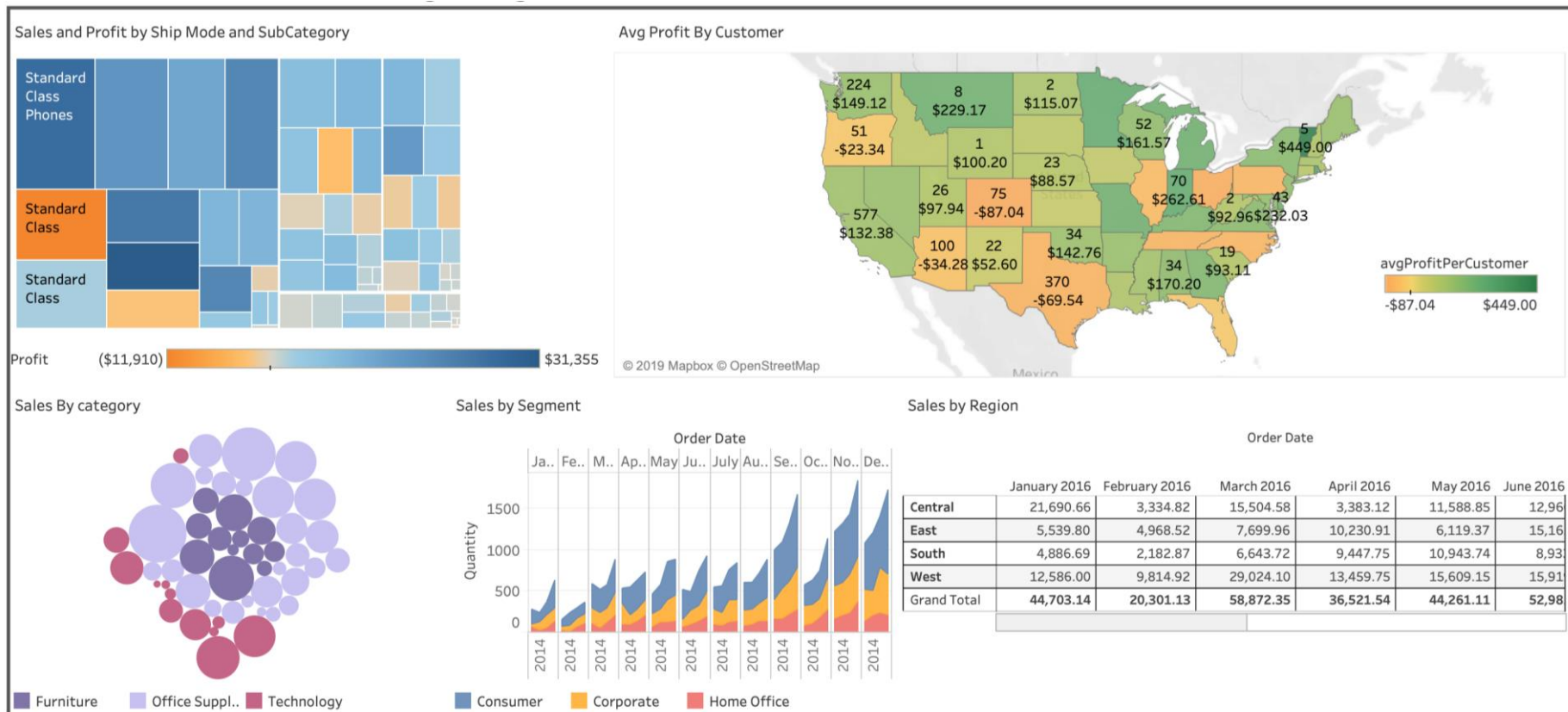
Profit % -25% 25%

Don't start with the numbers, end with them.

Everyone's Second Dashboard - Lots of Clutter

Keep it simple

- More is often less and less is often more
- Ask what each chart is contributing to insight

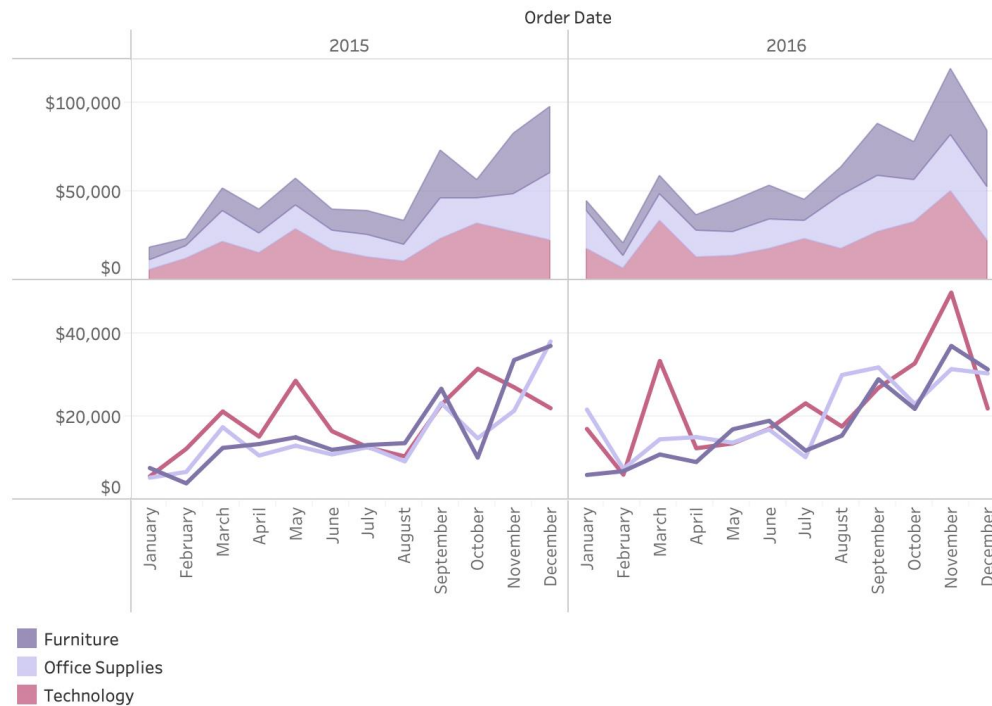


Know Your Audience

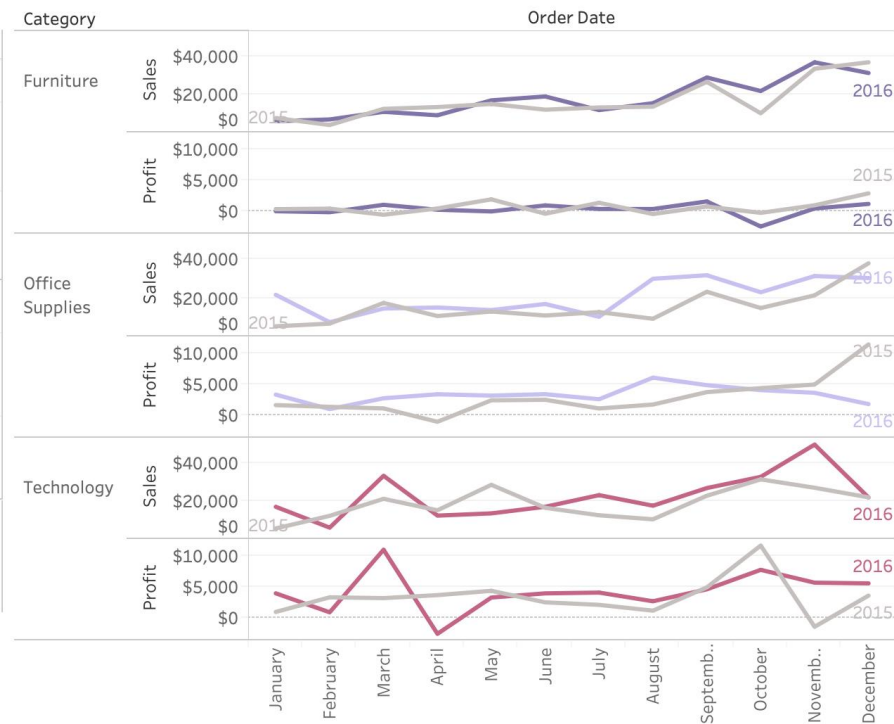
Only include the data that they need to accomplish their defining task

Q: What is the trend of Sales by Category?

Shows Monthly Trend overall (area chart) and Monthly trend by Category



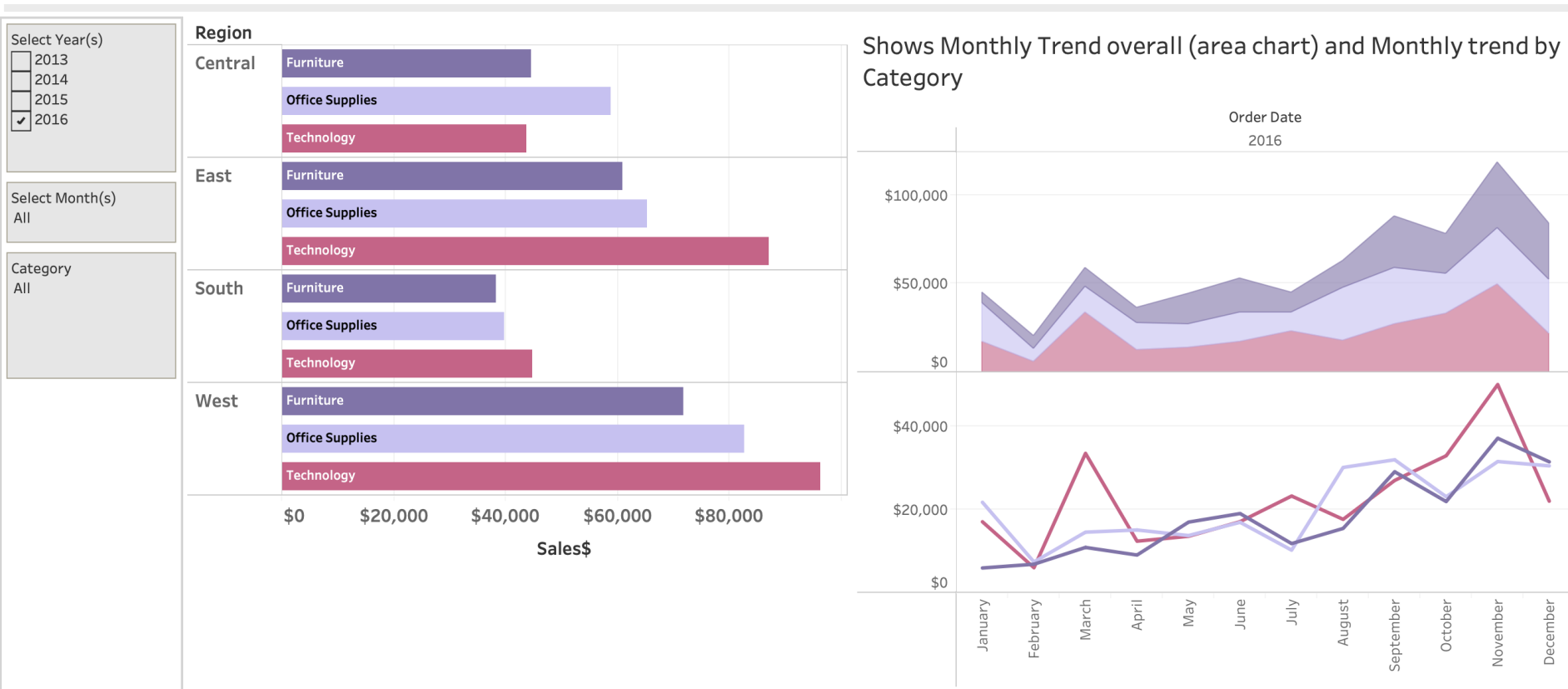
Shows Year-over-Year Sales(\$) by Category.



All of the examples show trend by Product category, but there are 4 distinct metrics being shown. Do they need them all?

Make Interactions Intuitive and Immersive

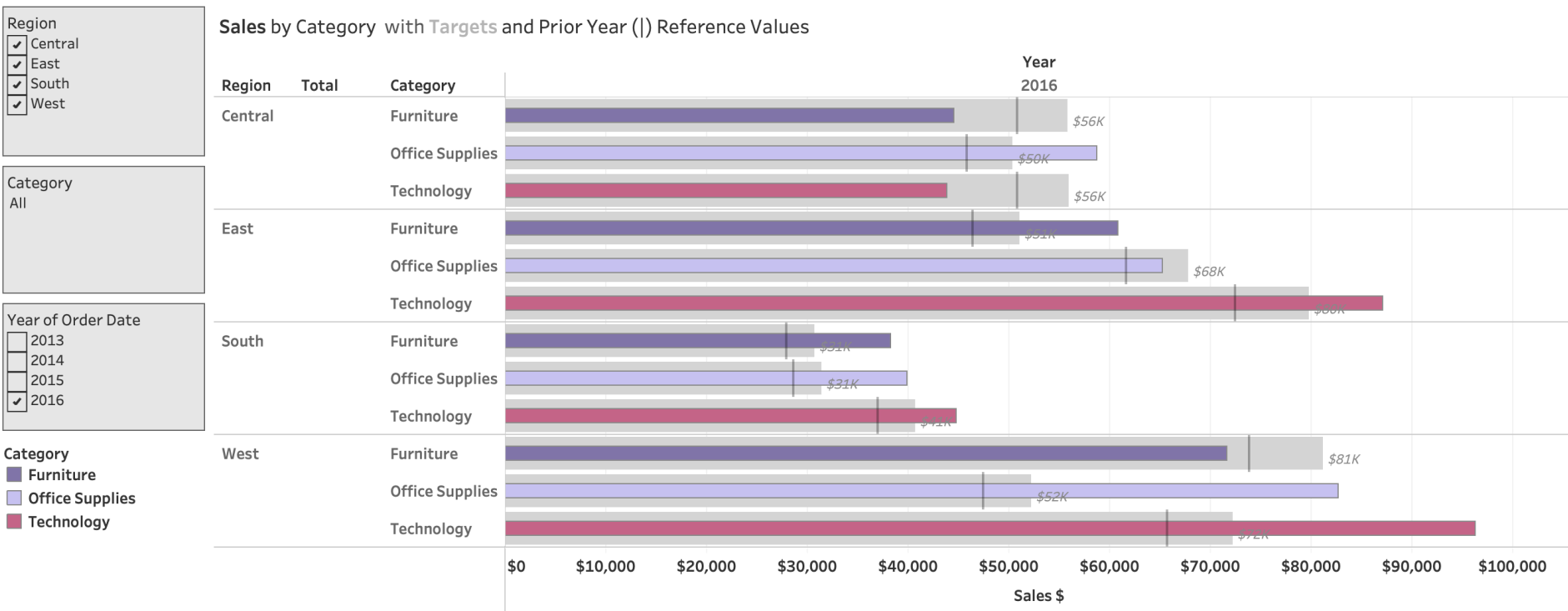
Encode your dashboard with click-actions to keep the user in the flow



We want to click on **OUTLIERS**. This is part of the immersive interaction. We Don't want to have to jump to the filters - this takes us out of the flow.

Context Is Key - How Big Is the Difference? And Do I Care?

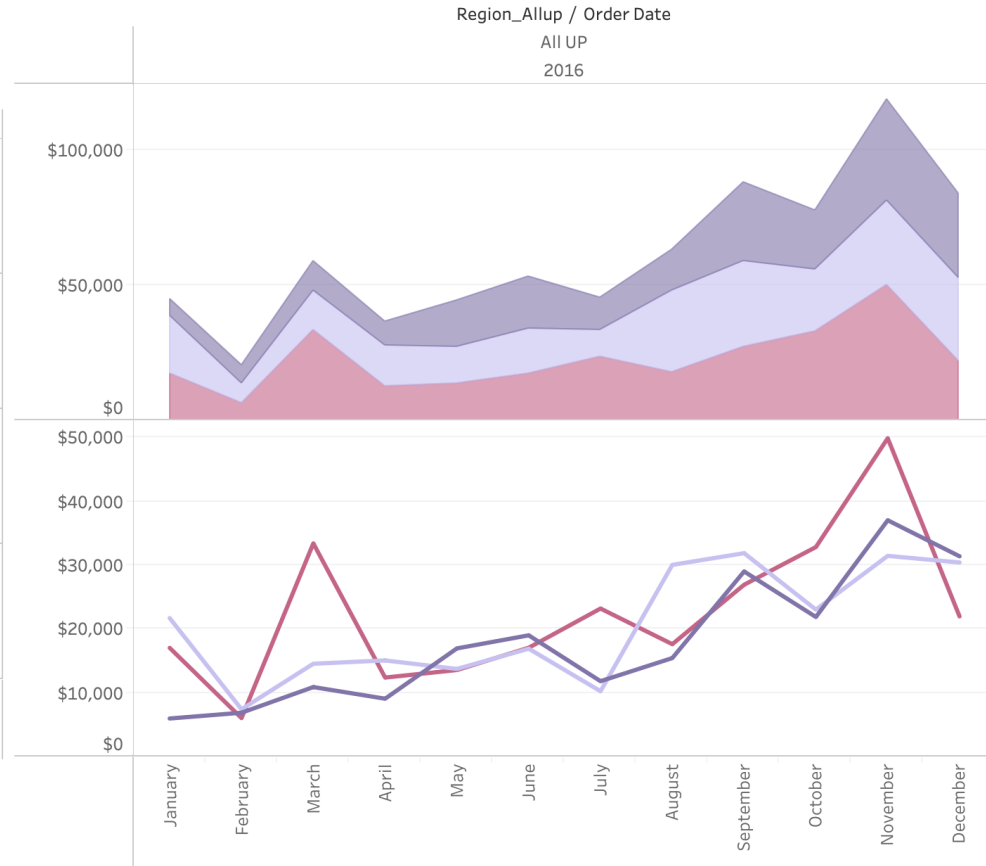
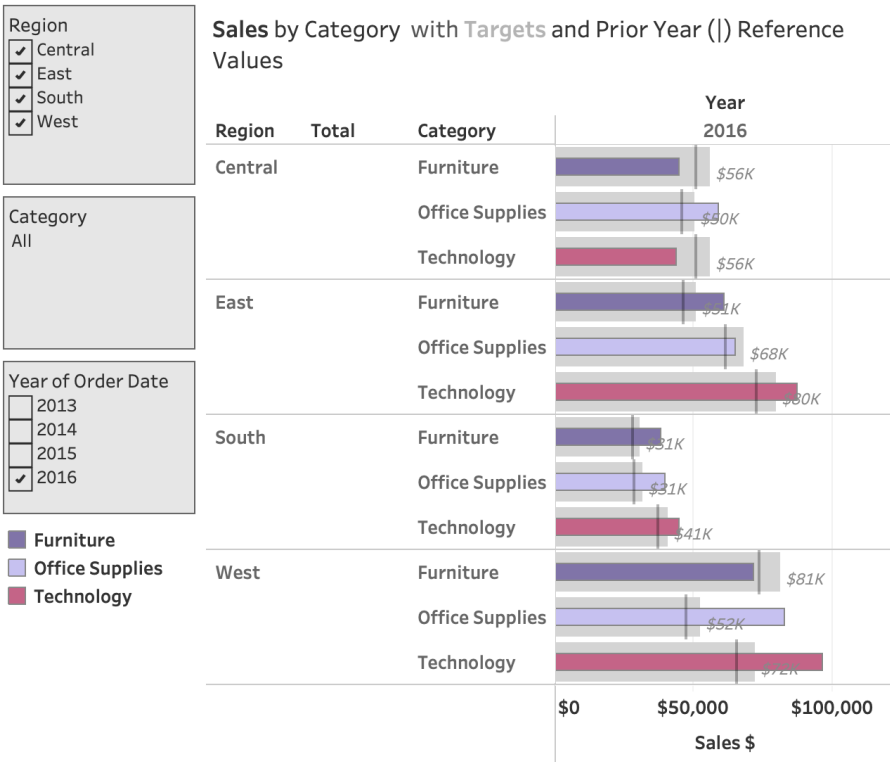
Adding sales goals and prior year values provides meaningful context and comparison values in one chart



Enhancements that Help with immersion

- * Hierarchies allow for quick additional exploration. Allows the user to stay "in the Flow"
- * Added "Chart In Tooltip" to show which products are driving Sales.
- * Use the titles to effectively describe the charts

Adding More Context and Details on Demand

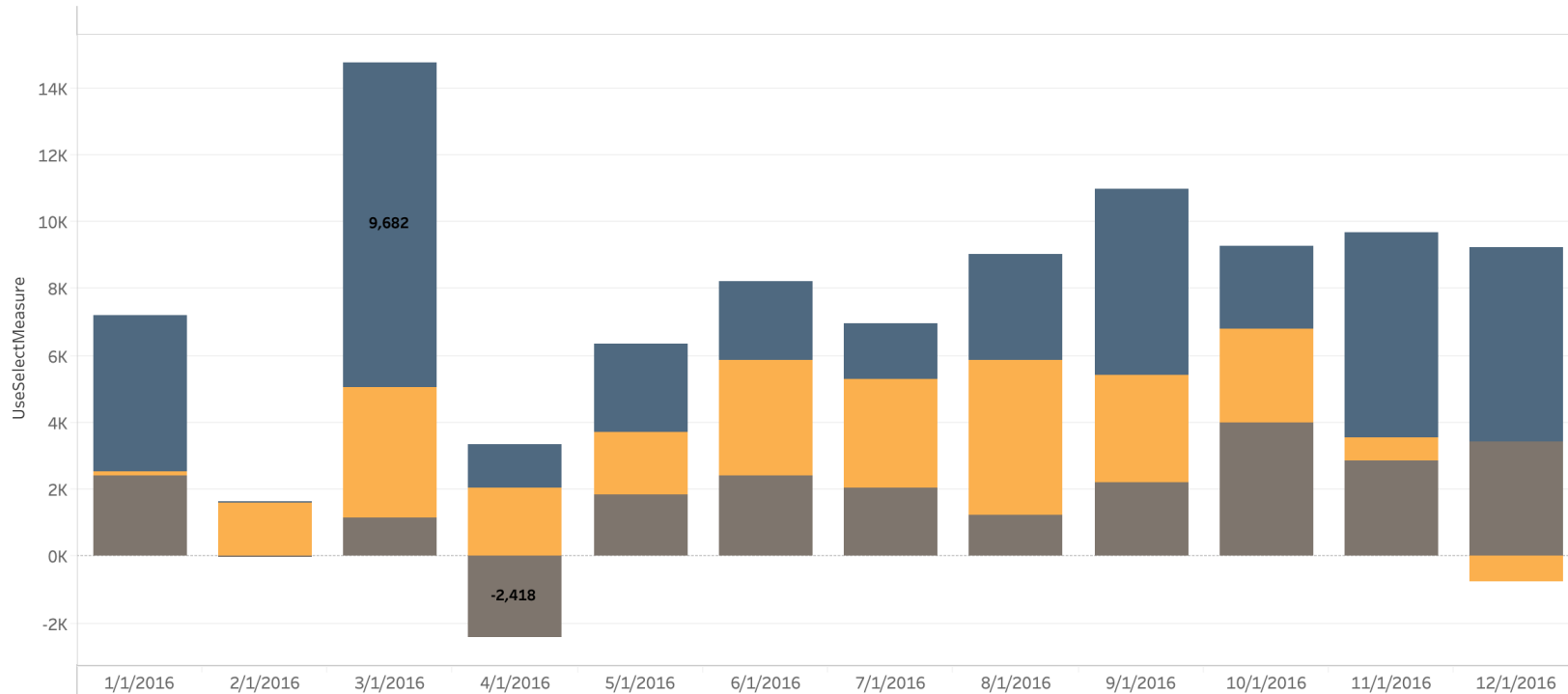


Enhancements that Help with immersion
Added a click through to Order detail on the trends chart

Use Parameters

Use Parameters to Simplify Views and Maximize Exploratory Options

Showing Profit (\$) by Month Color = Segment



	1/1/2016	2/1/2016	3/1/2016	4/1/2016	5/1/2016	6/1/2016	7/1/2016	8/1/2016	9/1/2016	10/1/2016	11/1/2016	12/1/2016	Grand Total
Consumer	\$4,693	\$13	\$9,682	\$1,301	\$2,646	\$2,370	\$1,667	\$3,181	\$5,595	\$2,465	\$6,132	\$5,836	\$45,581
Corporate	\$102	\$1,638	\$3,912	\$2,051	\$1,845	\$3,449	\$3,262	\$4,638	\$3,197	\$2,809	\$697	(\$761)	\$26,838
Home Office	\$2,414	(\$38)	\$1,158	(\$2,418)	\$1,852	\$2,404	\$2,024	\$1,223	\$2,199	\$4,001	\$2,861	\$3,408	\$21,089
Total	\$7,209	\$1,614	\$14,752	\$933	\$6,343	\$8,223	\$6,953	\$9,041	\$10,992	\$9,275	\$9,690	\$8,483	\$93,508
Grand Total	\$7,209	\$1,614	\$14,752	\$933	\$6,343	\$8,223	\$6,953	\$9,041	\$10,992	\$9,275	\$9,690	\$8,483	\$93,508

Each Element Should Contribute to the Enhancement of the Whole



- Should be aesthetically pleasing: clean, not cluttered
- Should be intuitive: you should “get” how the pieces fit together
- Each element should meet a specific need
- Each should offer something different that enhances the understanding of the whole

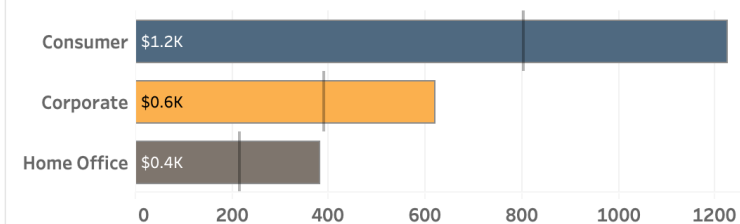
Create a Consistent Look and Feel for Your Dashboards



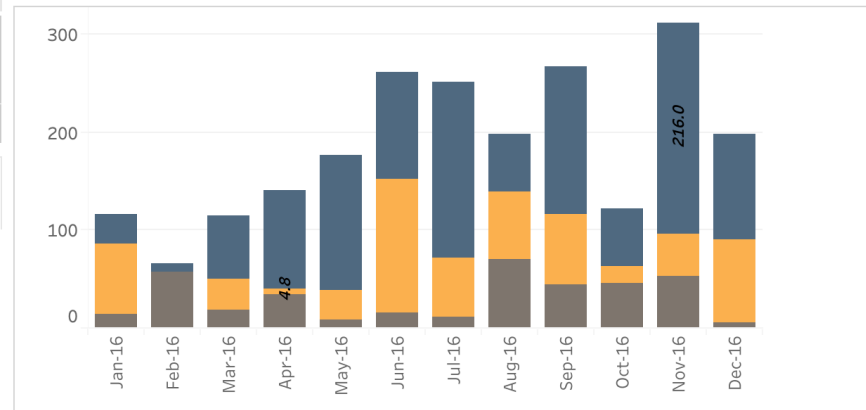
KPIs 2016 vs Prior Year

\$8,914 ↑	\$2,227 ↑	25.0% ↑	224 ↑	\$34.82 ↓
Sales (\$)	Profit (\$)	Profit %	Customers	Avg Order Size

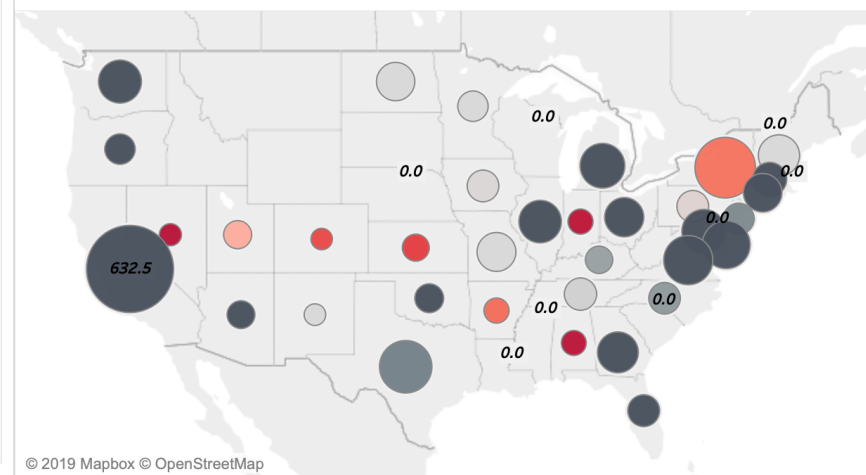
2016 Profit (\$) by Customer Segment
Prior Year (|) Reference Values



Showing Profit (\$)



Profit (\$) by State - (Better/Worse) than Last Year



© 2019 Mapbox © OpenStreetMap

Select Year
2016

Select Measure
Profit (\$)

Select Dimension
Customer Segment

Set Filters

Region
All

Category
All

Sub-Category
Art

Data As of:

12/30/2016

Get Info

IT Watermark

Remember

- Leverage chart types that your audience will understand without unnecessary explanation
- Make the interactions intuitive - anticipate the next question
- Don't over complicate with color - keep it consistent and to a minimum
- Use parameterized views to add additional analytical capability without adding clutter
- Leverage tooltips effectively to keep the user immersed
- Make sure the visuals make for easy comparisons of differences
- Always be comparing

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Contact us at: info@senturus.com or 888 601 6010 ext. 87

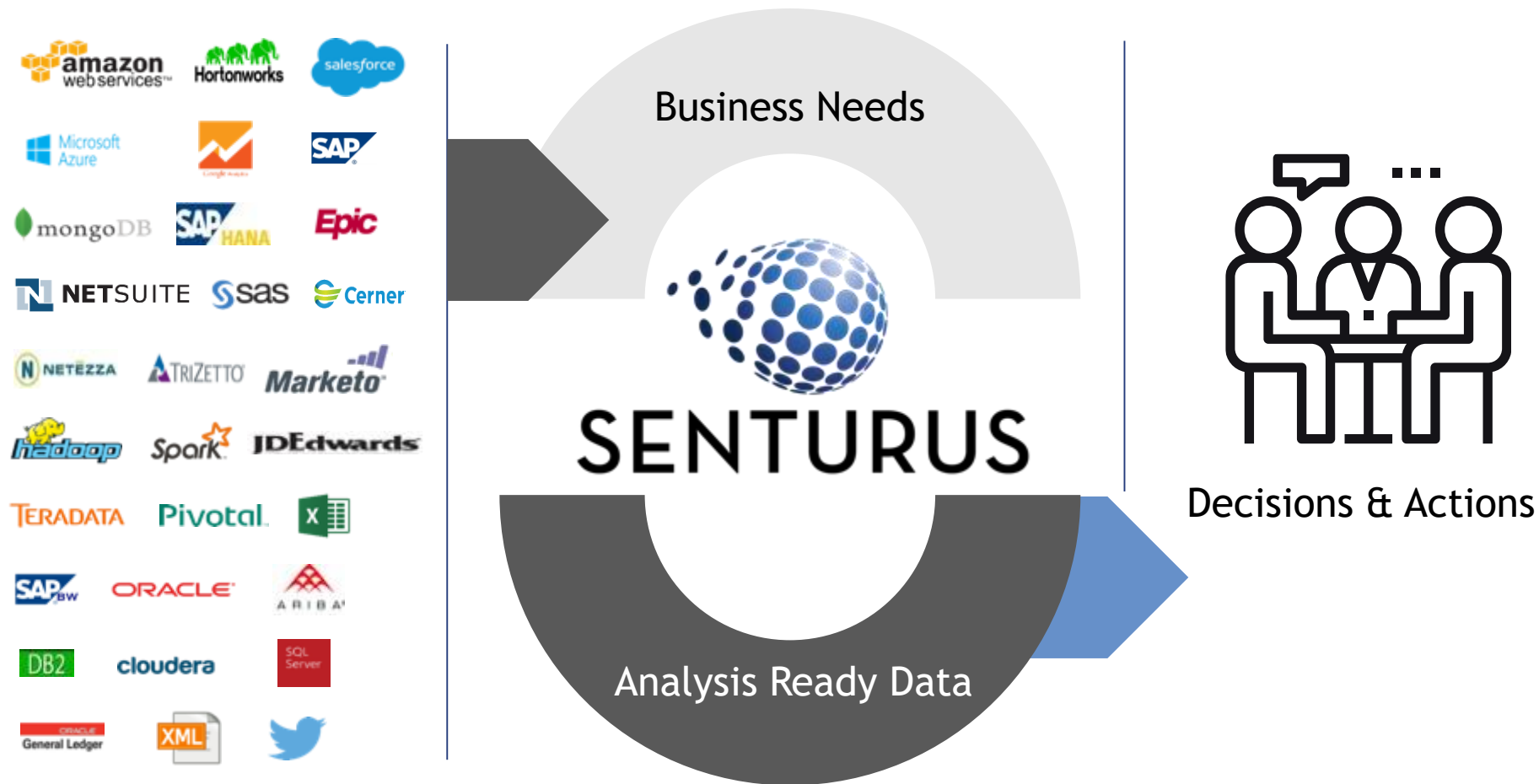


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MODAL BI

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UPCOMING EVENTS



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BLOG

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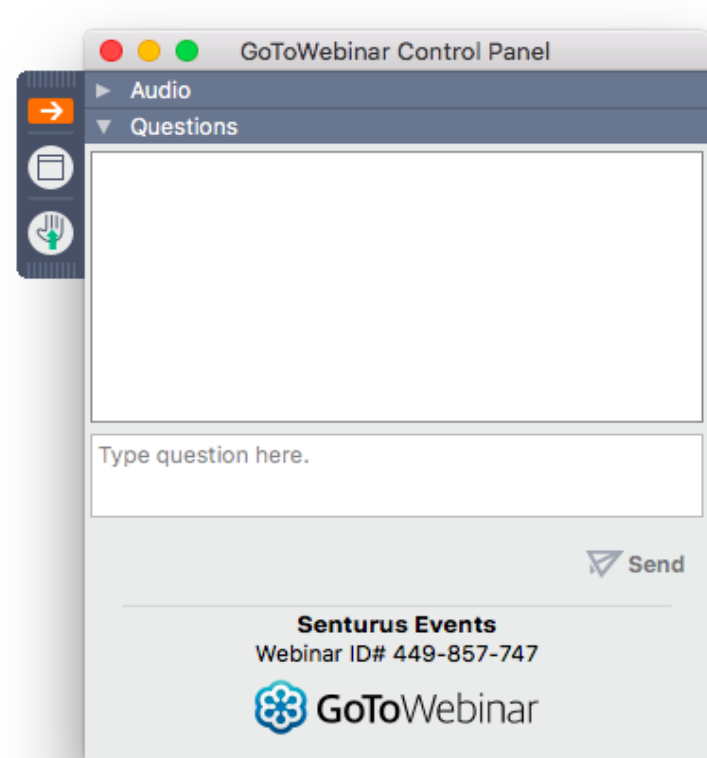
PLATFORM	VERSION	TOOL	TITLE	DATE	GO
TABLEAU	2018.3	DESKTOP	DATA VISUALIZATION AND DASHBOARDING FUNDAMENTALS	MAY 30	→
TABLEAU	2018.3	DESKTOP	EXPERT TABLEAU DEVELOPMENT	JUN 14	→
TABLEAU	2018.3	DESKTOP	TABLEAU INTERMEDIATE DATA VISUALIZATION AND DASHBOARDING	JUN 19	→
TABLEAU	2018.3	DESKTOP	TABLEAU ADVANCED DATA VISUALIZATION AND DASHBOARDING	JUN 25 - JUN 26	→
TABLEAU	2018.3	DESKTOP	EXPERT TABLEAU DEVELOPMENT	JUN 27	→
TABLEAU	2018.3	DESKTOP	DATA VISUALIZATION AND DASHBOARDING FUNDAMENTALS	JUL 02	→
TABLEAU	2018.3	DESKTOP	TABLEAU INTERMEDIATE DATA VISUALIZATION AND DASHBOARDING	JUL 23	→

Q&A

If your question or issue is broader than what can be answered today, contact us at

info@senturus.com

and we will set up a free consultation.



Thank You!

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