Don't Forget To

ODTUG

Kscope22

grapevine, tx   june 19 – 23

Fill Out Your Evals

# Data Visualization: Color Strategies and Graph Design

Tim Vlamis

June 22, 2022

www.vlamis.com

Vlamis Software Solutions

- Founded in 1992 in Kansas City, Missouri
- 400+ Enterprise Clients
- Consults in :
  - Enterprise Business Intelligence & Analytics
  - Analytic Warehousing
  - Machine Learning and Predictive Analytics
  - Data Visualization
  - ETL and data integration
- Vlamis consultants average 15+ years
- www.vlamis.com (blog, papers, newsletters, services)
- Co-authors of book "Data Visualization for OBI 11g"
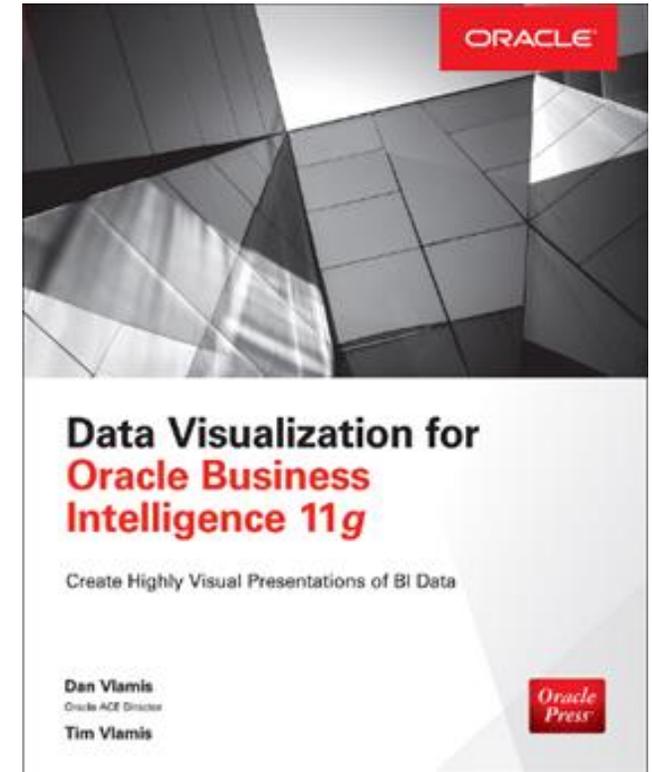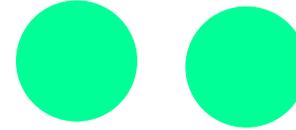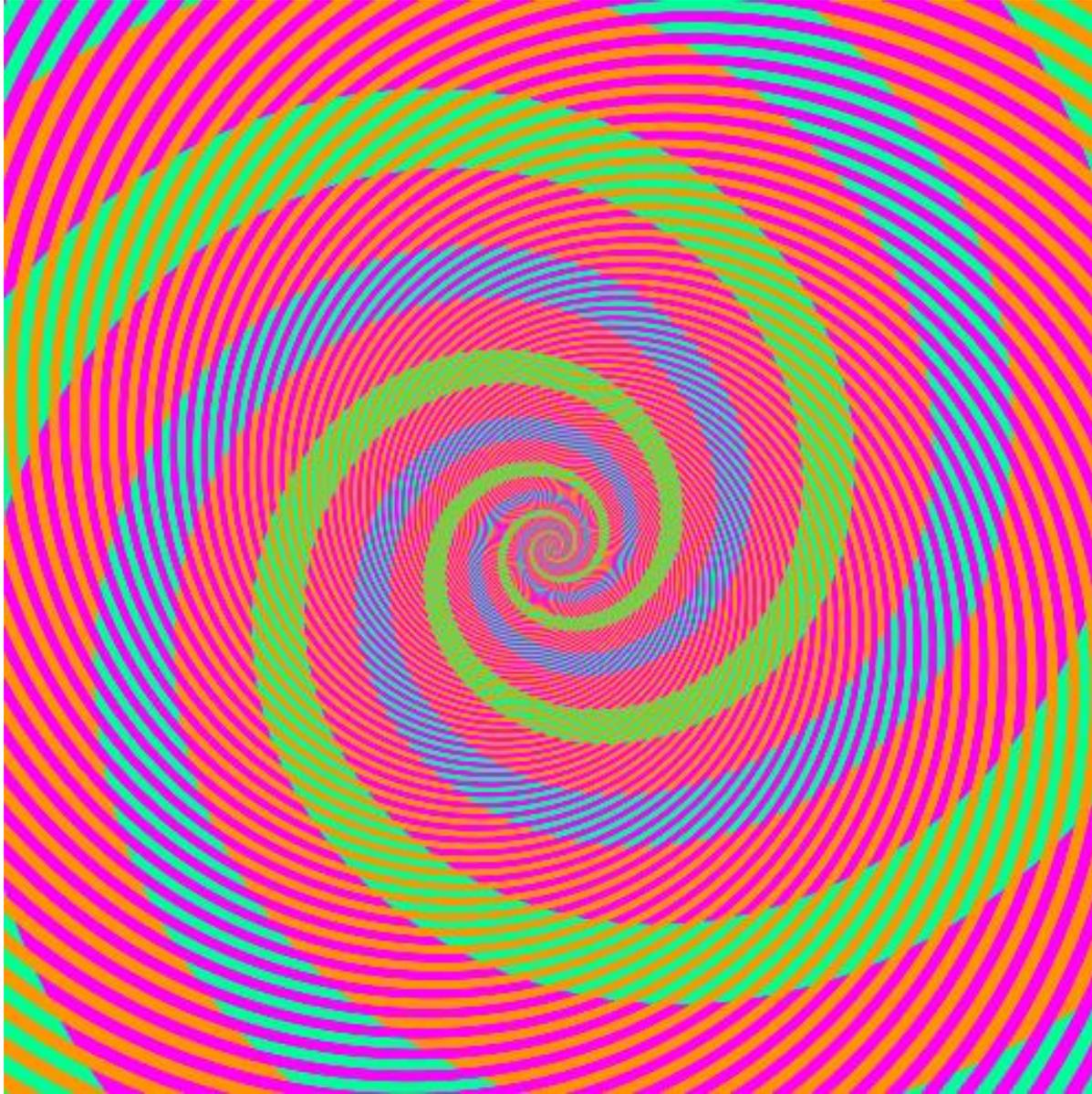
Instructor's Background

Tim Vlamis – Vice President & Analytics Strategist

- 30+ years in business modeling and valuation, forecasting, and scenario analyses
- Oracle ACE Director
- Co-author of "Data Visualization for Oracle Business Intelligence"
- Named contributor to and instructor for several of Oracle University's Machine Learning and Predictive Analytics Courses
- Professional Certified Marketer (PCM) from AMA
- MBA Kellogg School of Management (Northwestern University)
- BA Economics Yale University
- tvlamis@vlamis.com

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Think of color as being constructed in the brain

Blue/green spirals the same color?

Blue Gold White Dress

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Everything Matters!

Ingredients → Data Quality & Variety

Technique → Data Processing & Prep

Presentation → Data Visualization

Great Dashboards Balance 6 Requirements

Content   Comparisons

Context   Choice

Connection   Categorization

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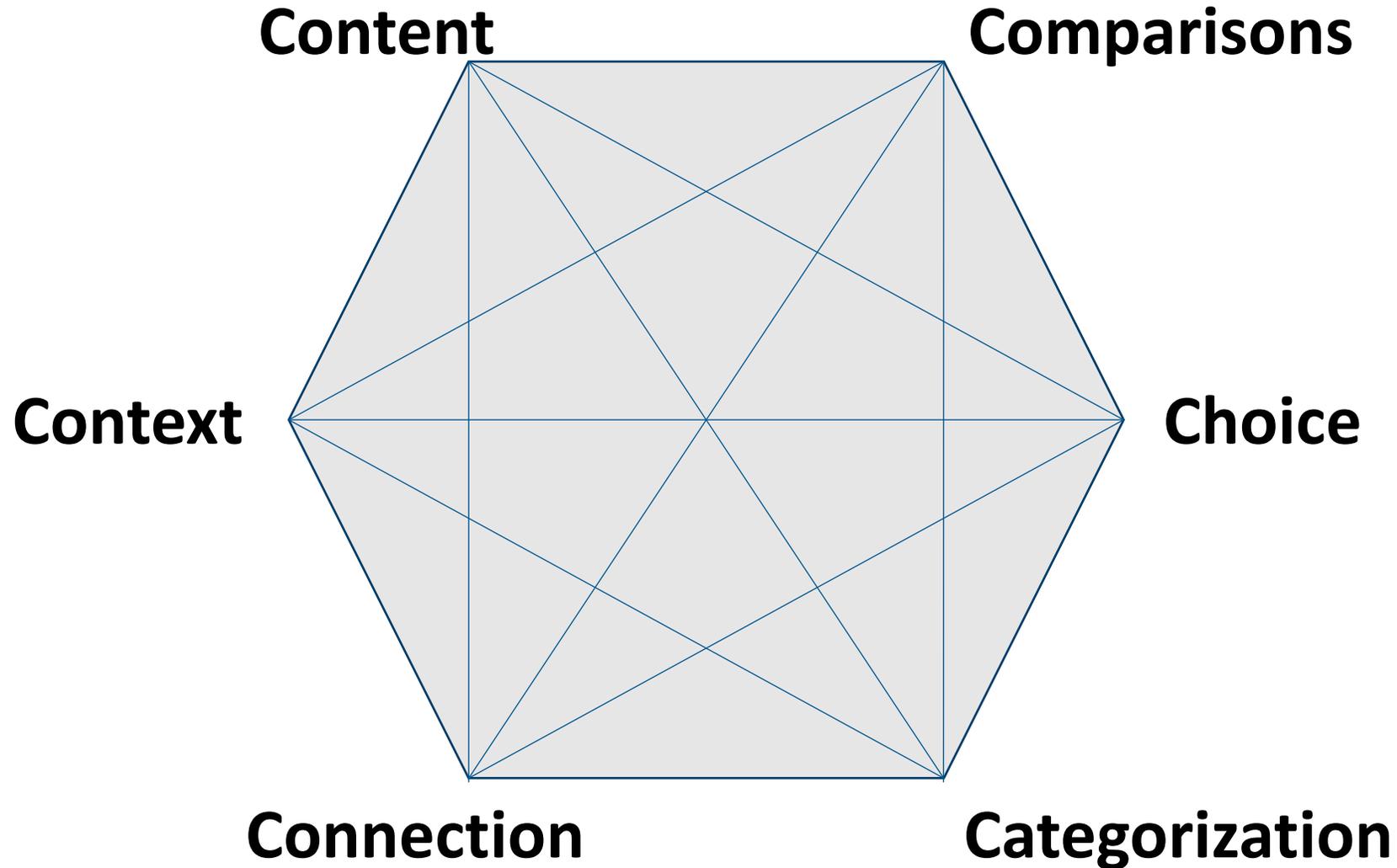
Redwood Visualization Colors

Hex	Color	Group	Order
#245D63		Dark	1
#DE7F11		Light	2
#5FB9B5		Light	3
#4E4137		Dark	4
#A0C98B		Light	5
#B4728B		Light	6
#83401E		Dark	7
#9E7FCC		Light	8
#FBC26A		Light	9
#58316E		Dark	10
#5FA2BA		Light	11
#317A45		Dark	12

https://docs.oracle.com/en/middleware/developer-tools/jet/11/reference-styling/CssVariablesOverview.html)

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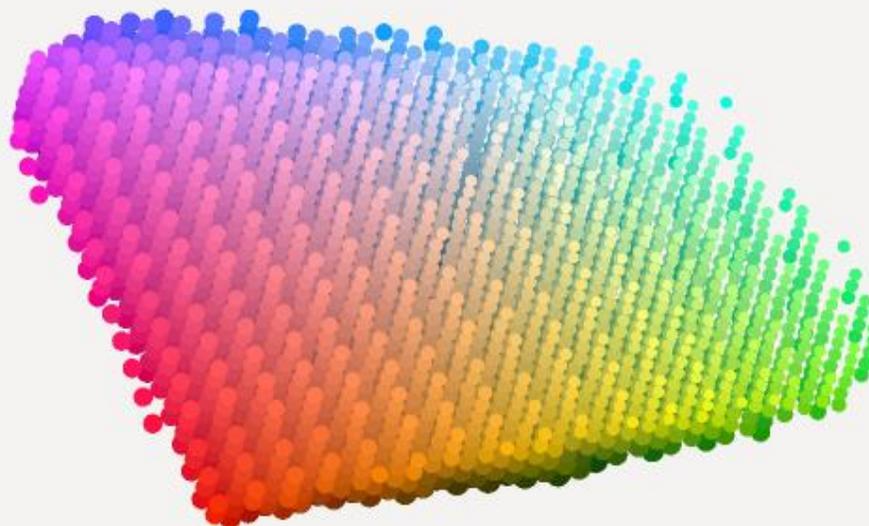
Color picker

×
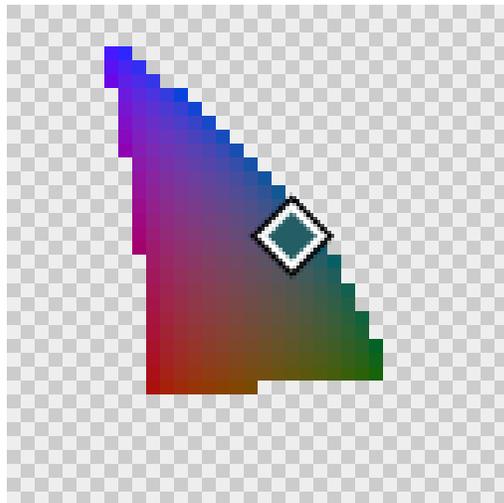
H 209

C 19

L 36

-16 A   -9 B

Hex #245d63

Close   Pick color

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Color picker
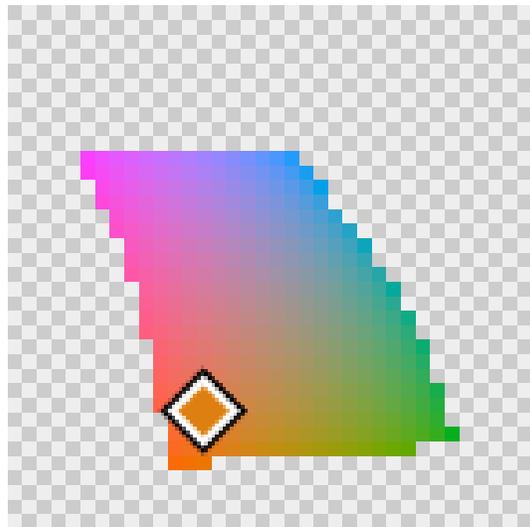
H 65

C 73

L 62

30 A 66 B

Hex #de7f11

Close Pick color

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Expand Redwood Light Colors from 7-10
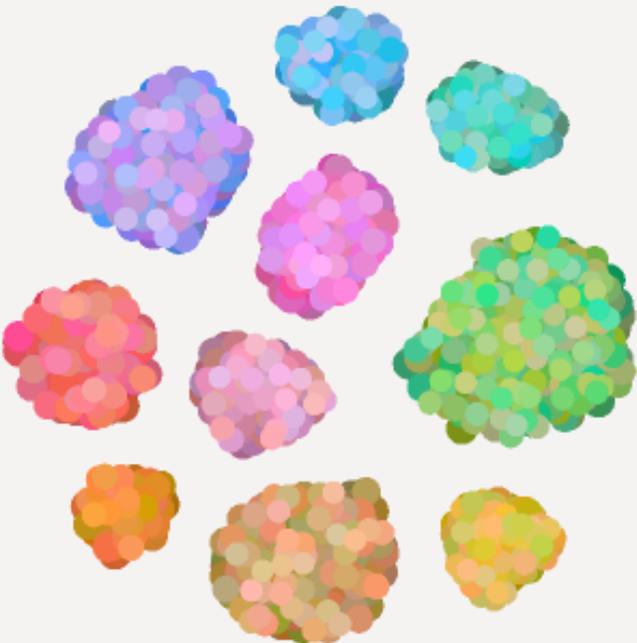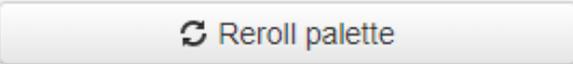
Order Colors to avoid likely bad pairings

Differenciation report and color vision deficiency

Color pairs by distance (average 60.3)

#de7f11		#9e7fcc	101.6	😄
#de7f11		#5fa2ba	96.1	😄
#de7f11		#5fb9b5	93	😄
#a0c98b		#db6fbf	93	😄

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Color Contrast Scores from iwanthue

	#DE7F11	#5FB9B5	#A0C98B	#B4728B	#9E7FCC	#FBC26A	#5FA2BA	#DB6FBF	#E46476	#BD9057
#DE7F11		93	69.3	69	101.6	31.2	96.1	91.6	55.2	35.5
#5FB9B5	93		33.8	59.2	63.6	70.6	19.4	82.2	82.7	57.8
#A0C98B	69.3	33.8		65.4	83.4	43.8	48.7	93	79.2	39.1
#B4728B	69	59.2	65.4		33	63	47.7	31	28.2	44.4
#9E7FCC	101.6	63.6	83.4	33		91.6	45.6	27.9	55.8	74.3
#FBC26A	31.2	70.6	43.8	63	91.6		77.2	87.5	59.1	24.1
#5FA2BA	96.1	19.4	48.7	47.7	45.6	77.2		67.1	74.4	60.9
#DB6FBF	91.6	82.2	93	31	27.9	87.5	67.1		38.1	72.9
#E46476	55.2	82.7	79.2	28.2	55.8	59.1	74.4	38.1		46.6
#BD9057	35.5	57.8	39.1	44.4	74.3	24.1	60.9	72.9	46.6	
Average	71.4	62.5	61.7	49.0	64.1	60.9	59.7	65.7	57.7	50.6
High	101.6	93.0	93.0	69.0	101.6	91.6	96.1	93.0	82.7	74.3
Low	31.2	19.4	33.8	28.2	27.9	24.1	19.4	27.9	28.2	24.1
Stnd Dev	24.9	22.4	20.0	14.9	24.3	22.5	21.1	25.0	17.5	16.1
Range	70.4	73.6	59.2	40.8	73.7	67.5	76.7	65.1	54.5	50.2
Median	69.3	63.6	65.4	47.7	63.6	63.0	60.9	72.9	55.8	46.6

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Hex	Color	Group	Order
#DE7F11		Light	1
#A0C98B		Light	2
#DB6FBF		Light	3
#FBC26A		Light	4
#9E7FCC		Light	5
#5FB9B5		Light	6
#E46476		Light	7
#5FA2BA		Light	8
#B4728B		Light	9
#BD9057		Light	10

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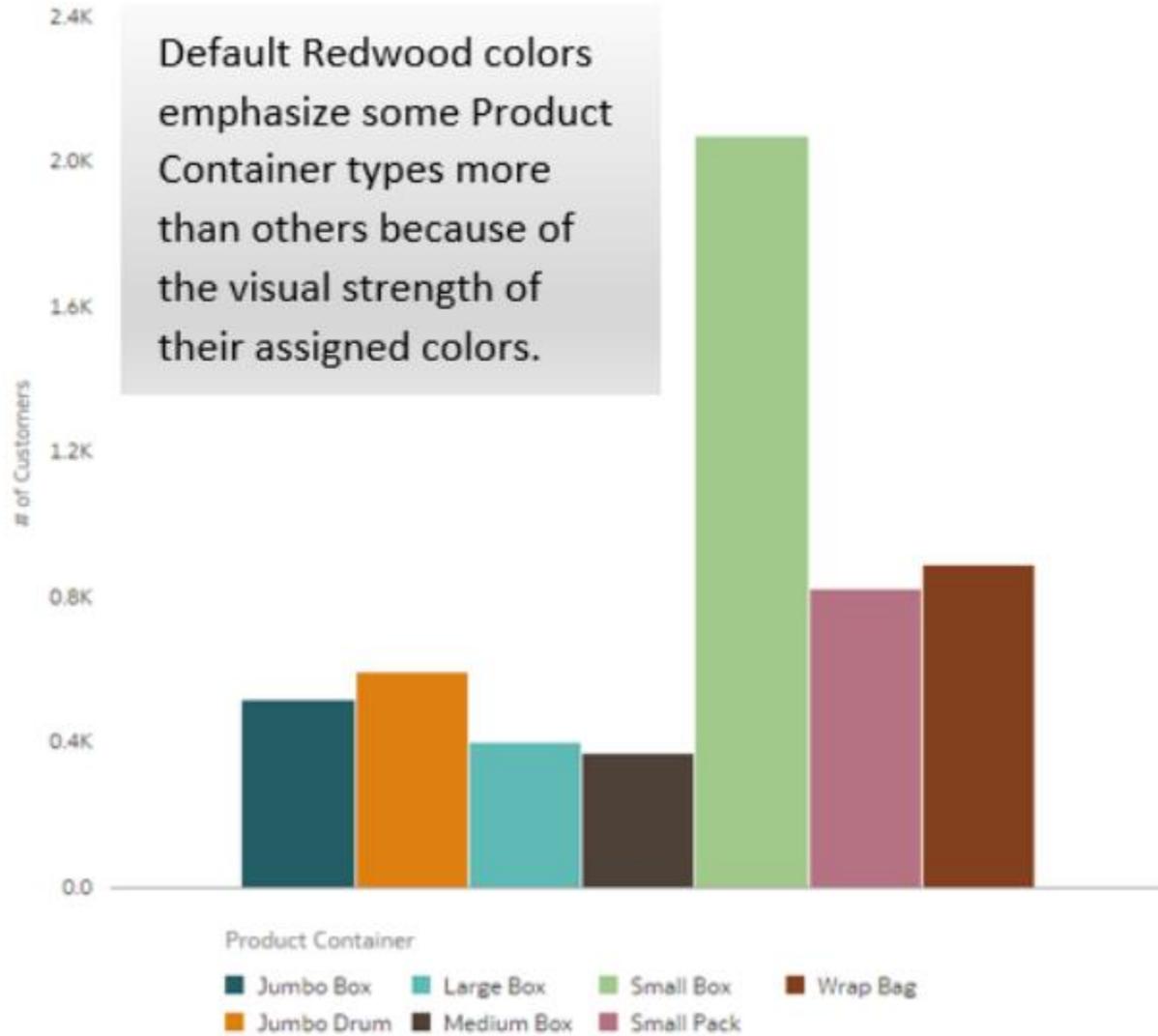
# of Customers by Product Container

# of Customers by Product Container alt color
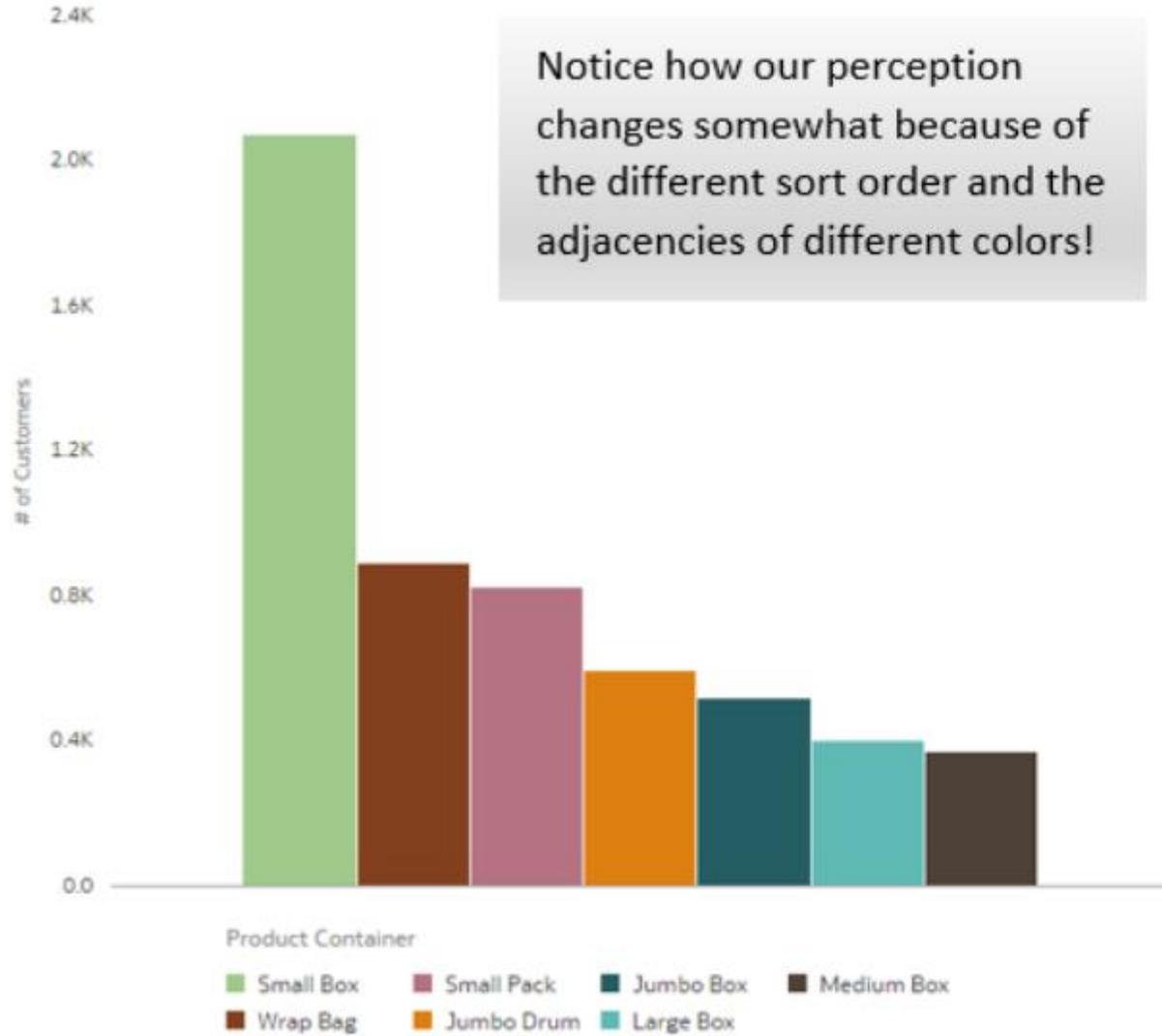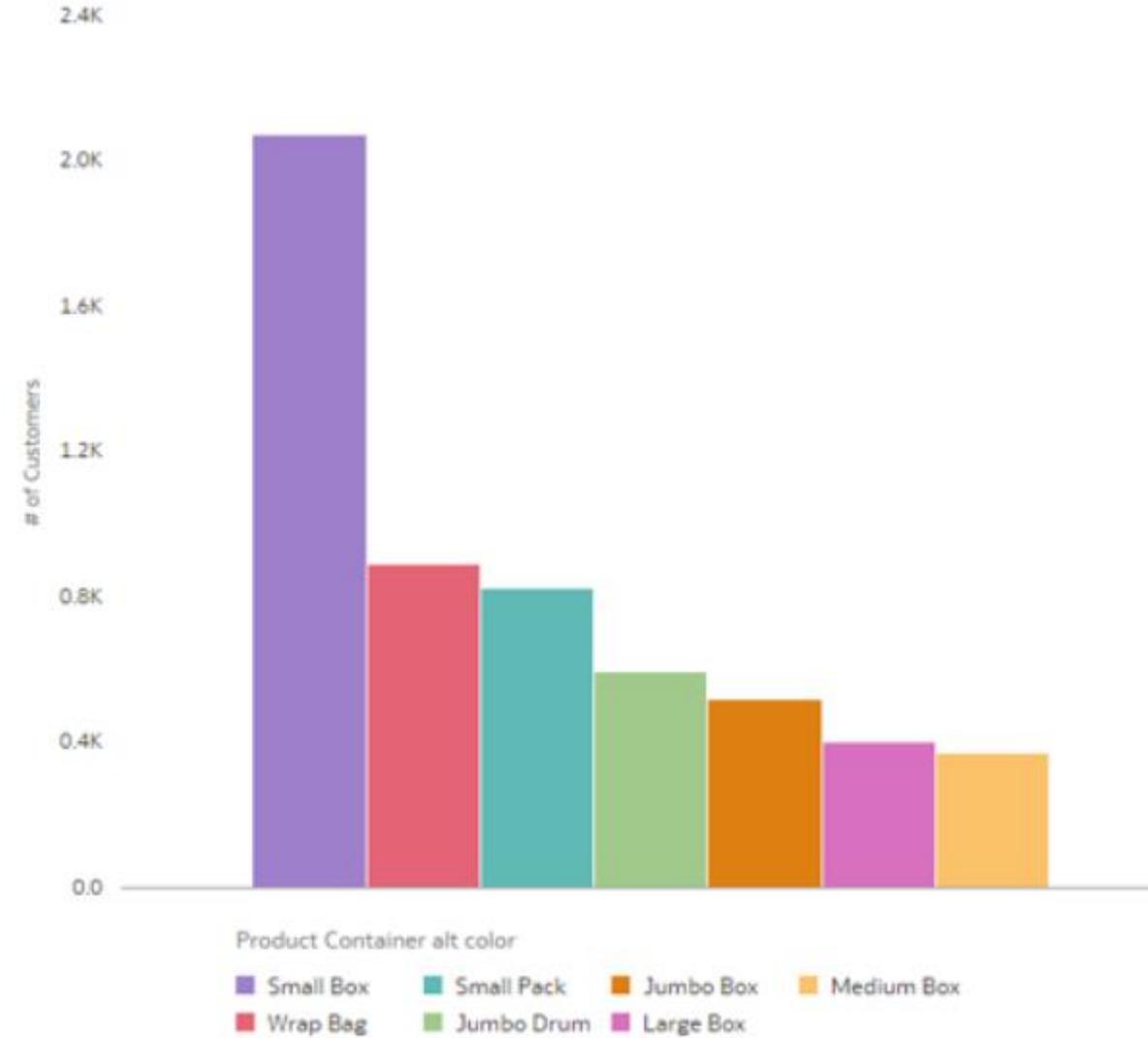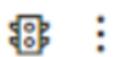
> Default Redwood colors emphasize some Product Container types more than others because of the visual strength of their assigned colors.

> The revised Redwood colors are more balanced in their visual weight.

Left chart legend (Product Container):
- Jumbo Box
- Large Box
- Small Box
- Wrap Bag
- Jumbo Drum
- Medium Box
- Small Pack

Right chart legend (Product Container alt color):
- Jumbo Box
- Large Box
- Small Box
- Wrap Bag
- Jumbo Drum
- Medium Box
- Small Pack

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# of Customers by Product Container

Notice how our perception changes somewhat because of the different sort order and the adjacencies of different colors!

# of Customers by Product Container alt color
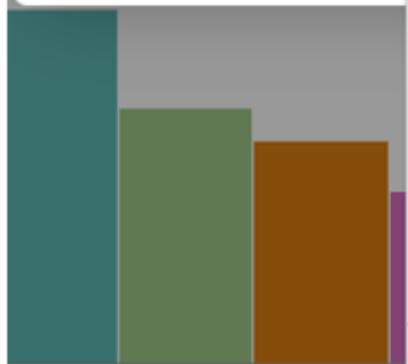
Dashboard Definition

A Dashboard is a visual presentation of current summary information needed to manage and guide an organization or activity.

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Dashboard Definition

BI Dashboards should be designed to drive organizational coherence through a shared understanding of organizational position, performance, flows, and influencers.

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Manufacturing Summary | New Availability Analysis | New Injection Reject Analysis | Delivery Analysis

IQMS Manufacturing ERP

Manufacturing Summary Page

CALENDAR YEAR
2018

CALENDAR MONTH
(All Column Value)

EPLANT
--Select Value--

MFG TYPE
--Select Value--

MFG CELL
--Select Value--

RETURN TO MAIN MENU

38.0%
OEE % Actual

| 40.4% Availability % Actual | 94.9% Performance % Actual | 99.0% Quality % Actual |
| 45,308.6 Production Hours | 99,089,453 Total Good Parts | 1.04% Scrap % |
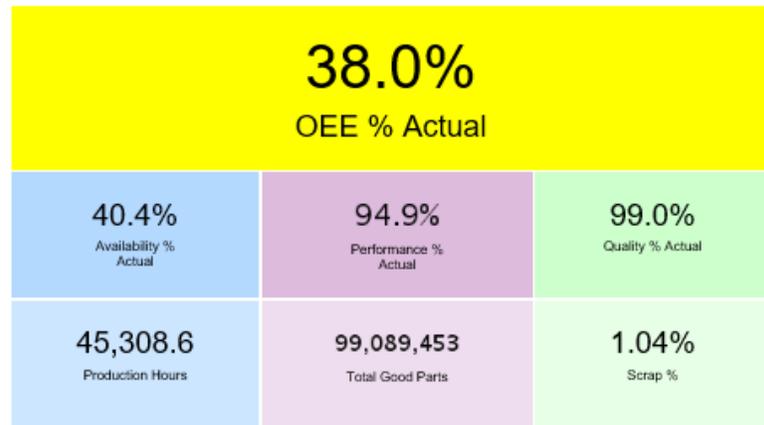
OEE Trend
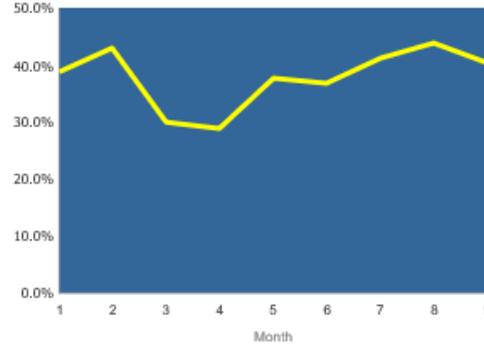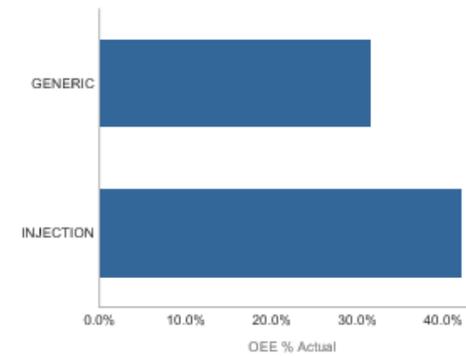
OEE by MFG Type

Production and Total Downtime Hours

Prod Hrs / Total DowntimeHrs
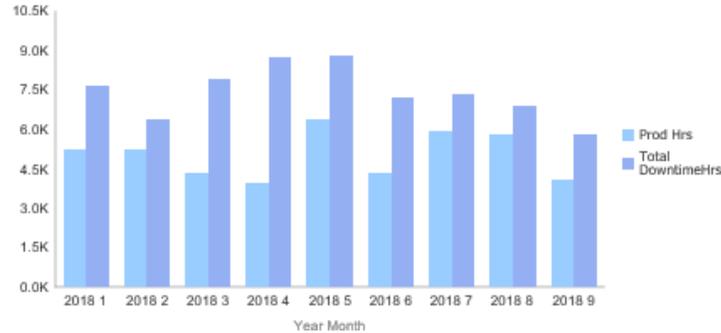
Standard and Actual Parts

Parts At Std / Total Parts
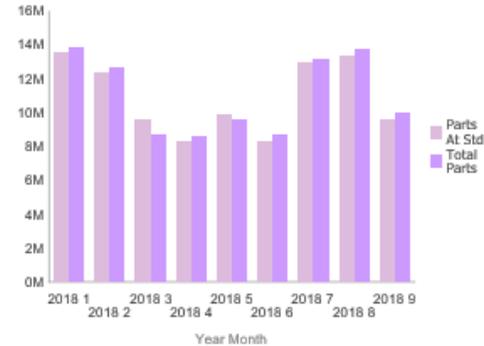
Scrap % by MFG Type
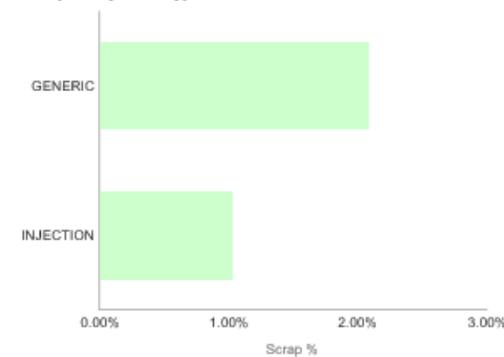
EPlant	Mfg Type	MFG Cell	Prod Hrs	Unplanned Downtime	Downtime %	Availability % Actual	Total Downtime Hrs	Hrs Available Actual
1	GENERIC	PASO GENERIC	14,491.1	28,684.4	66.35%	33.5%	28,684.4	43229.98
	INJECTION	PASO INJ	30,817.5	37,954.3	55.16%	44.8%	37,954.3	68811.90

EPlant	Mfg Type	MFG Cell	Parts At Std	Setup Hrs	Total Cycles	Line Utilization	OEE % Actual	Performance % Actual	Work Order ID	Prod Date	Total Parts	Prod Hrs
1	GENERIC	PASO GENERIC	2,096,975	54.5	1,747,778	166.23%	31.5%	95.9%			1,711,399	14,491.1
	INJECTION	PASO INJ	95,780,792	40.0	4,024,951	155.10%	42.1%	94.9%			97,422,136	30,817.5

EPlant	Mfg Type	MFG Cell	Good Parts	Quality % Actual	Scrap	Scrap %
1	GENERIC	PASO GENERIC	1,711,399	97.9%	2,227	2.08%
	INJECTION	PASO INJ	97,378,054	99.0%	15,322	1.03%

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Manufacturing Summary | New Availability Analysis | New Injection Reject Analysis | Delivery Analysis

IQMS Manufacturing ERP

Availability Analysis by Work Center
This page shows a comparison of Production Hours and Downtime Hours

CALENDAR YEAR
2018

CALENDAR MONTH
(All Column Values)

DATE

WORK CENTER ID
--Select Value--

CLASS
--Select Value--

ITEM
--Select Value--

ITEM NO
--Select Value--

RETURN TO MAIN MENU

Availability % Actual by EQNO and Work Center

Availability % Actual
96.9%

- 03 120 TON VAN DORN
- 04 200 TON STOKES
- 05 200 TON STOKES
- 07 300 TON ENGLE
- 08 300 TON NISSEI
- 09 300 TON KRAUSSMAFFEI
- 10 050 TON BATTENFELD
- 11 050 TON BATTENFELD
- 14 500 TON JSW
- 16 2.5" EXTRUDER
- 17 2.5 EXTRUDER
- ASSY-01 ASSEMBLY TABLE
- ASSY-02 ASSEMBLY TABLE
- HS-02 HOT STAMP
- PRINTER-01 PAD PRINTER

Legend:
- > 98%
- 95% <> 98%
- < 95%

EQNO	Work Center	Availability % Actual
03	120 TON VAN DORN	99.9%
04	200 TON STOKES	99.7%
05	200 TON STOKES	98.8%
07	300 TON ENGLE	99.9%
08	300 TON NISSEI	98.5%
09	300 TON KRAUSSMAFFEI	91.0%
10	050 TON BATTENFELD	96.4%
11	050 TON BATTENFELD	92.2%
14	500 TON JSW	99.5%
16	2.5" EXTRUDER	100.0%
17	2.5 EXTRUDER	94.3%
ASSY-01	ASSEMBLY TABLE	97.2%
ASSY-02	ASSEMBLY TABLE	18.1%

Export

Production Hours	Downtime Hours
54,320.7	1,475.5

Production Hours by EQNO and Work Center

Downtime Hours by EQNO and Work Center

EQNO and Work Center Bubble – Production Hours vs Downtime Hours

EQNO	Work Center	Item No	Item	Class	Total Hours	Line Utilization	Prod Hrs	Setup Hrs	Total Downtime Hrs	Downtime %	Availability % Actual
03	120 TON VAN DORN	A-200-H-BY	HANDLE, BATTERY	WP	3,607.1	1.00%	3,604.6	0.0	2.5	0.07%	99.9%
04	200 TON STOKES	05543-101	VOLUME CUP	FG	4,592.0	1.00%	4,578.5		13.5	0.29%	99.7%
05	200 TON STOKES	SH-020999-CLR	SHELF BRACKET 2 " CLEAR	FG	4,591.0	1.01%	4,533.6		57.4	1.25%	98.8%
07	300 TON ENGLE	9988-300	DOOR SEAL PLUG, SERIES 300	FG	1,537.8	1.00%	1,536.7	0.0	1.0	0.07%	99.9%
08	300 TON NISSEI	03092-102	RETAINER CLIP	FG	3,944.4	1.02%	3,883.7	0.0	60.7	1.54%	98.5%
09	300 TON KRAUSSMAFFEI	9988-300	DOOR SEAL PLUG, SERIES 300	FG	1,343.1	1.09%	1,222.1		121.0	9.01%	91.0%
10	050 TON BATTENFELD	HBUT-RD	1/2" BUTTON - RED	FG	4,680.0	1.02%	4,511.8	40.0	128.2	2.74%	96.4%
11	050 TON BATTENFELD	HBUT-BK	1/2" BUTTON - BLACK	FG	2,579.1	1.09%	2,378.3	0.0	200.8	7.79%	92.2%

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IQMS® Manufacturing ERP

Reject Analysis

CALENDAR YEAR
2018

CALENDAR MONTH
(All Column Value)
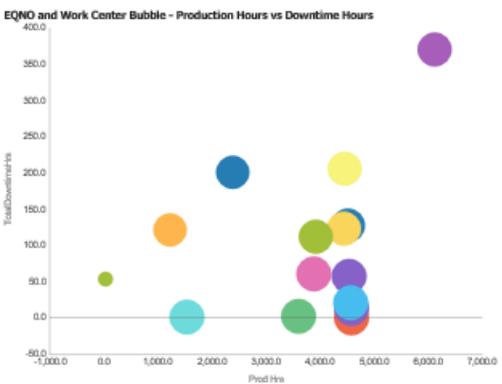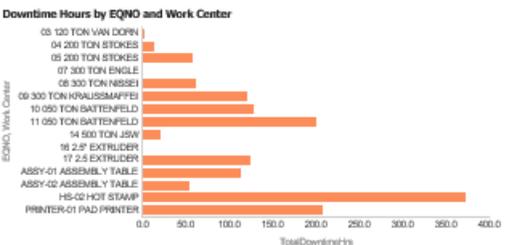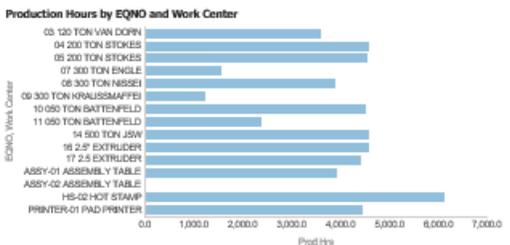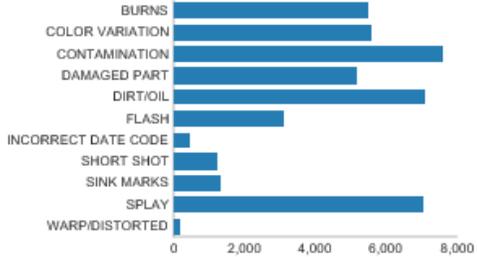
DATE

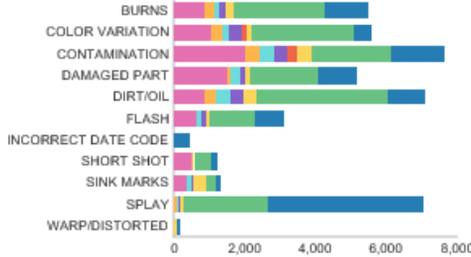EPLANT
--Select Value--

MFG CELL
--Select Value--

ITEM
(All Column Value)

RETURN TO MAIN MENU
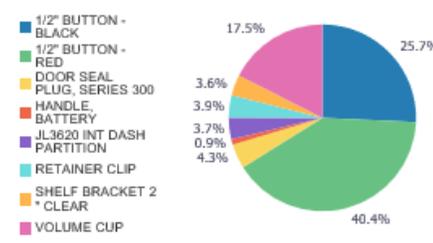
Reject Qty by Reject Description

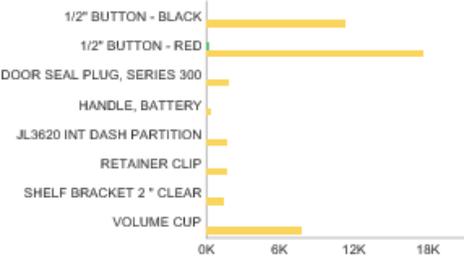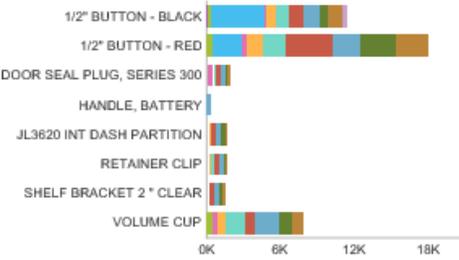**Reject Qty by Reject Reason and Product**

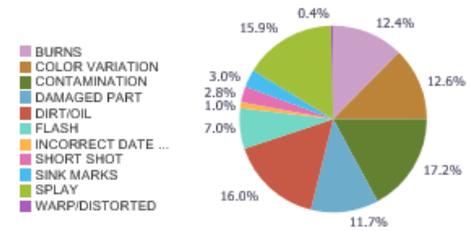**Reject QTY by Product**

Reject Qty by Product

Reject Qty by Product and Reject Reason

Reject QTY by Reject Reason

	BURNS	COLOR VARIA...	CONTAMINATI...	DAMAGED PART	DIRT/OIL	FLASH	INCORRECT D...	SHORT SHOT	SINK MARKS	SPLAY	WARP/DISTOR...
1/2" BUTTON - BLACK	1,237	521	1,446	1,103	1,038	811	462	154	131	4,411	99
1/2" BUTTON - RED	2,576	2,870	2,287	1,916	3,738	1,317		500	330	2,381	
DOOR SEAL PLUG, SI	246	131	420	166	373	85			321	76	68
HANDLE, BATTERY		139	277								
JL3620 INT DASH PAR	176	381	342	164	328	123			95	51	
RETAINER CLIP	138	174	437	262	409	114		27	89	69	
SHELF BRACKET 2 "	266	313	409	82	369	35		49		67	
VOLUME CUP	850	1,063	1,990	1,506	843	632		495	382		

Color Reject Qty   Low ▮▮▮ High

Item	Reject Qty										
	BURNS	COLOR VARIATION	CONTAMINATION	DAMAGED PART	DIRT/OIL	FLASH	INCORRECT DATE CODE	SHORT SHOT	SINK MARKS	SPLAY	WARP/DISTORTED
1/2" BUTTON - BLACK	1,237	521	1,446	1,103	1,038	811	462	154	131	4,411	99
1/2" BUTTON - RED	2,576	2,870	2,287	1,916	3,738	1,317		500	330	2,381	
DOOR SEAL PLUG, SERIES 300	246	131	420	166	373	85			321	76	68
HANDLE, BATTERY		139	277								
JL3620 INT DASH PARTITION	176	381	342	164	328	123			95	51	
RETAINER CLIP	138	174	437	262	409	114		27	89	69	
SHELF BRACKET 2 " CLEAR	266	313	409	82	369	35		49		67	

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OverviewTV | Overview Old | Routes | One Stop Flights | Delay Summary | Delay Analysis | Delay Causes | Time Blocks | Carriers | Delay Catchup | Passengers | Scorecard | Performance Tree | Smart Watch! »

All flights: 6,235,242
Report : 3,709,454

Flight Delay Performance by Geography
Key Metrics and Associated Delays

% of All Rows :

59.4%

Dashboard Prompts
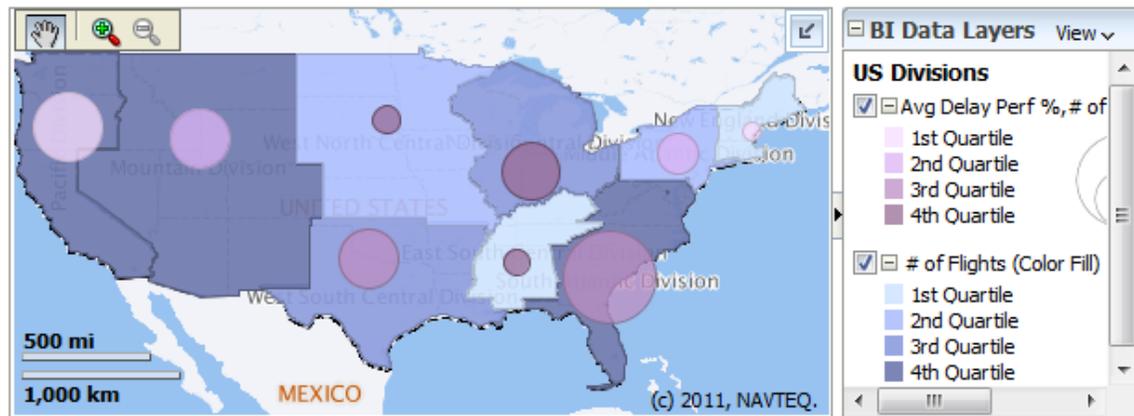for all four analyses

* Month

Between

12

6

1

Origin Airport
--Select Value--

Carrier
--Select Value--

Dest Region
☐ Midwest Region
☐ Northeast Region
☐ South Region
☐ West Region

500 mi
1,000 km
MEXICO
(c) 2011, NAVTEQ.

□ BI Data Layers   View ⌄

US Divisions
☑ □ Avg Delay Perf %, # of
  ☐ 1st Quartile
  ☐ 2nd Quartile
  ☐ 3rd Quartile
  ☐ 4th Quartile
☑ □ # of Flights (Color Fill)
  ☐ 1st Quartile
  ☐ 2nd Quartile
  ☐ 3rd Quartile
  ☐ 4th Quartile

Orig Airport	# of Flights	% of Total	Passenger - Miles (M)	Delay Perf %
⊟ All Orig Airports	3,709,454	100.0%	328,034	9.1%
⊟ Midwest Region	691,998	18.7%	48,525	10.8%
⊞ East North Central Division	491,158	13.2%	33,998	10.9%
⊞ West North Central Division	200,840	5.4%	14,527	10.4%
⊞ Northeast Region	423,226	11.4%	44,389	8.2%
⊟ South Region	1,492,575	40.2%	107,799	9.9%
⊞ East South Central Division	177,198	4.8%	7,199	! 11.3%
⊞ South Atlantic Division	821,345	22.1%	67,067	9.8%
⊞ West South Central Division	494,032	13.3%	33,533	9.5%
⊞ West Region	1,101,655	29.7%	122,759	7.6%

Late Flight Trends
By Time and Performance % Thresholds

▶ ◀◀ ━━━━━━━━━ ▶▶
All Orig Airports

Pct of Scheduled Flights

Index 0-100 — 100, 80, 60, 40, 20, 0
% Flights — 20%, 16%, 12%, 8%, 4%, 0%
2010 / 01 — 2010 / 03 — 2010 / 05 — 2010 / 07 — 2010 / 09 — 2010 / 11

- ▮ # of Flights Idx
- — Delay Perf %
- — % > 30 Min Late
- — Idx 50
- — Idx 100

Delay % by Passenger x Miles

▶ ◀◀ ━━━━━━━━━ ▶▶
All Orig Airports

Log / Log Scale

Delay Perf % Log scale — 100.0%, 10.0%, 1.0%
Passenger - Miles Log scale — 100K, 10,000K, 1,000,000K, 100,000,000K

- ✚ Delay Perf %, Passengers x Miles
- ▮ Poor (over 20%)
- ▮ Warning (5% - 20%)
- ▮ Good

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1.10 Flights Delay tv book layout

Alerts!   Custom Link   Home   Catalog   Favorites ⌄   Dashboards ⌄   New ⌄   Open ⌄   Signed In As Paulo Rodney ⌄

Overview Typical | OverviewTV | Overview Old | Routes | One Stop Flights | Delay Summary | Delay Analysis | Delay Causes | Time Blocks | Carriers | Delay Catchup | Passengers | Scorecard | Perfor»

All flights: 6,235,242
Report : 3,709,454

% of All Rows :

59.49%

* Month

Between

12 |12

6 |7

1

Origin Airport
--Select Value--

Carrier
--Select Value--

Dest Region
☐ Midwest Region
☐ Northeast Region
☐ South Region
☐ West Region

Delay Performance by Geography
Key Metrics and Associated Delays

Orig Airport	# of Flights	% of Total	Passenger - Miles (M)	Delay Perf %
⊟ All Orig Airports	3,709,454	100.0%	328,034	9.1%
⊟ Midwest Region	691,998	18.7%	48,525	10.8%
⊞ East North Central Division	491,158	13.2%	33,998	10.9%
⊞ West North Central Division	200,840	5.4%	14,527	10.4%
⊞ Northeast Region	423,226	11.4%	44,389	8.2%
⊟ South Region	1,492,575	40.2%	107,799	9.9%
⊞ East South Central Division	177,198	4.8%	7,199	! 11.3%
⊞ South Atlantic Division	821,345	22.1%	67,067	9.8%
⊞ West South Central Division	494,032	13.3%	33,533	9.5%
⊞ West Region	1,101,655	29.7%	122,759	7.6%

Late Flight Trends
By Time and Performance % Thresholds

All Orig Airports

Pct of Scheduled Flights

of Flights Idx

Delay Perf % (0=Ontime, >0=Late)

% Over 30 Min Late

2010 / 01   2010 / 05   2010 / 09
    2010 / 03   2010 / 07   2010 / 11

20%
16%
12%
8%
4%
0%
% Flights

⊟ BI Data Layers   View

US Divisions
☑ ⊟ # of Flights, Avg Delay Per
  ☐ First Quartile
  ☐ Second Quartile
  ☐ Third Quartile
  ☐ Fourth Quartile

☑ ⊟ # of Flights (Color Fill)
  ☐ First Quartile
  ☐ Second Quartile
  ☐ Third Quartile
  ☐ Fourth Quartile

1,000 mi
2,000 km

Orig Airport [All Orig Airports ⌄]

Delay % by Passenger x Miles

100.0%

10.0%

1.0%
100K   10,000K   1,000,000K   100,000,000K
     Passenger - Miles

Delay Perf %

+ Delay Perf %, Passengers x Miles
■ Poor (over 20%)
■ Warning (within 20%)
■ Good
—

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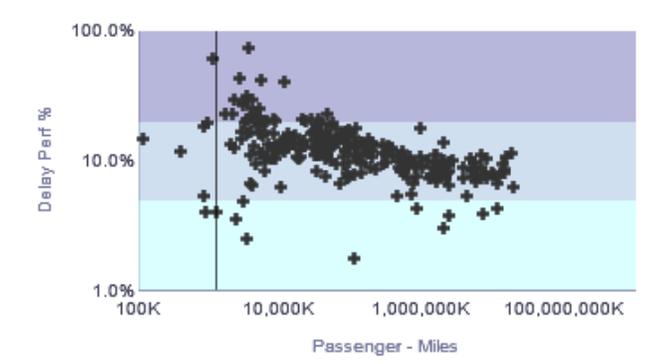
Best Practice Focus for Dashboards

- Best practices are objective guides for effectiveness
- Visualizations should be guided by:
    - Human cognition
    - Accurate representations of data
    - Preferred message (consciously designed)
- Visualizations should NOT be guided by:
    - Taste or what looks "good" to one person
    - Entertain users
    - A desire to "fill the white space"

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Key Questions to Ask About Dashboards

- Who is the audience?

- What is the subject or topic?

- What is the major insight?
    - What element has the most visual weight?
    - What element has the most prominent position?

- What context is provided and what comparisons are made?

- What are the decision scope and the data scope?

- Are navigation options understood?

- Are prompts and selectors understood?

- Are dashboard pages ordered logically?

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BI Dashboards

- Role-based.
- Data selection and filtering are extremely important.
- Dashboards support evidenced-based decision making.
- Shared understanding of business situation is a key benefit.
- Content may be individualized.
- Design should be standardized.

Great Dashboards Balance:

- Content (what's displayed)
- Comparisons (relative importance)
- Choice (user-invoked changes to the display like prompts)
- Connectivity (navigation, drill-to-detail, cross-drills, linked displays)
- Context (how displayed, i.e. design)
- Categorization (how organized and logically collected)

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Graphs and Tables

- Graphs and Charts depict visual representations and relationships

New Product Market Penetration

	100		
	90		
	80		
	70		
	60		
	50		
	40		
	30		
	20		
	10		
	0		
0.1	6	12	18

Month Number
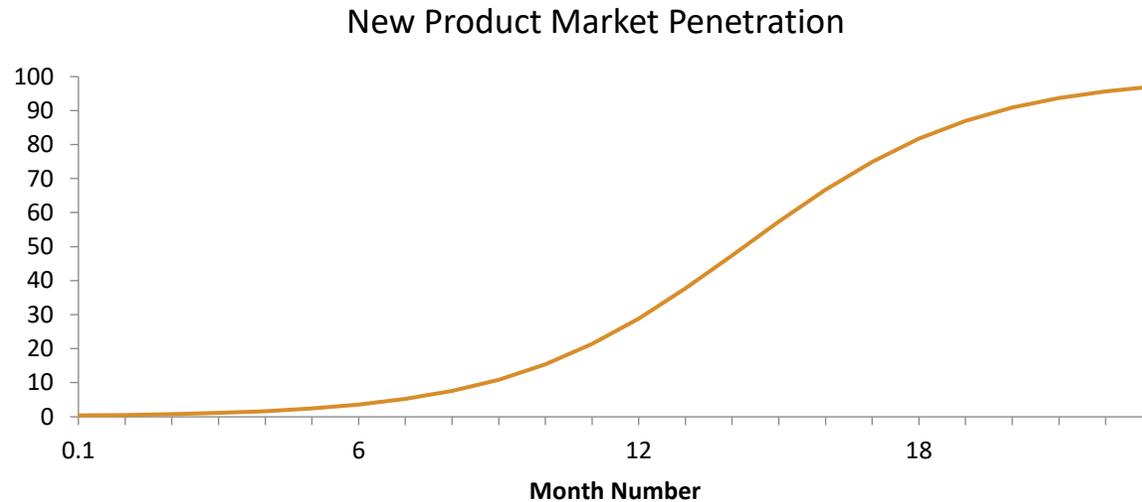
- Tables show data organized for lookup of specific, precise values or items.

Order Type	No of Orders	Sales	Billed Quantity	Actual Unit Price
Express	13,980	$14,027,034	1,117,199	$12.56
Secure	29,347	$28,513,745	2,326,540	$12.26
Standard	27,673	$27,459,221	2,213,482	$12.41
Grand Total	**71,000**	**$70,000,000**	**5,657,221**	**$12.37**

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7 Keys to Effective Graphs

- Do not use 3-D effects.

- Avoid "stop light" color palette.

- Prefer pastel color palettes and avoid bright colors.

- Eliminate gridlines, drop shadows, and other graphics.

- Enable interaction for "exploration" graphs.

- Prioritize a single message for "explanation" graphs.

- Above all else, show the data!

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Four Recommended Visualizations

- Bar graph –   comparison analysis
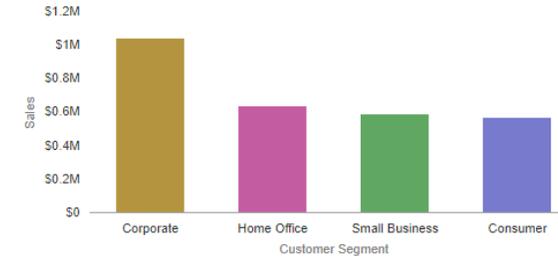
- Line graph –   trend analysis

- Scatter plot –   data distribution &
                              outlier detection
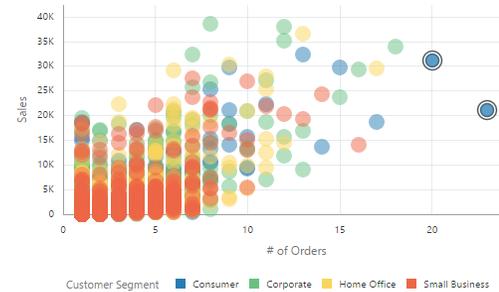
- Maps –   location analysis
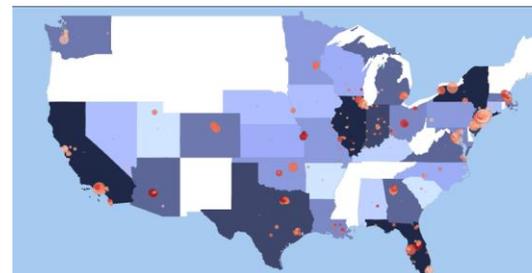
Bar Graphs
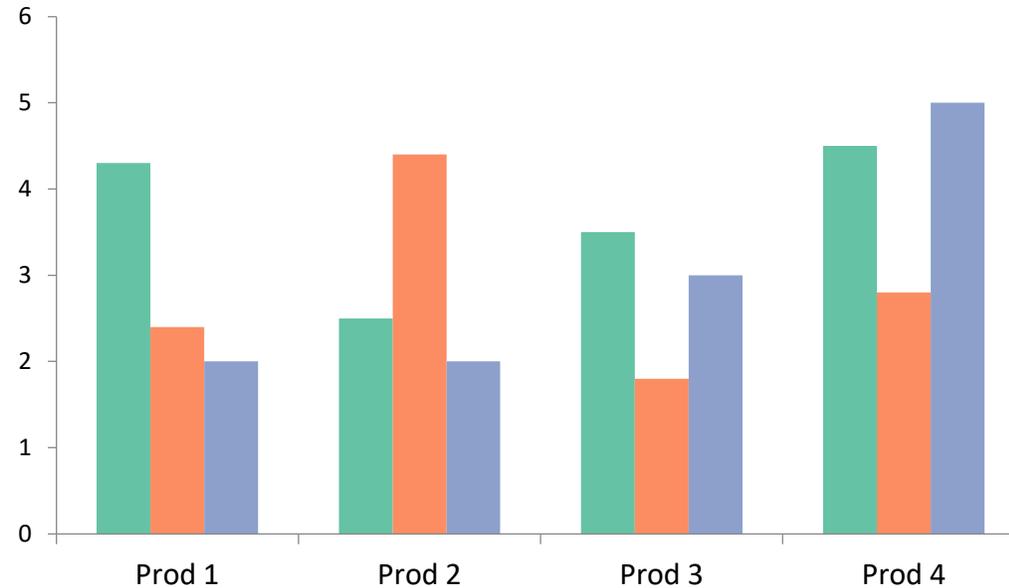
- Show nominal data values in comparison to one another.
- Start with zero.
- If use a logarithmic scale, clearly notate.
- Think through sort order carefully.

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Bar Graphs
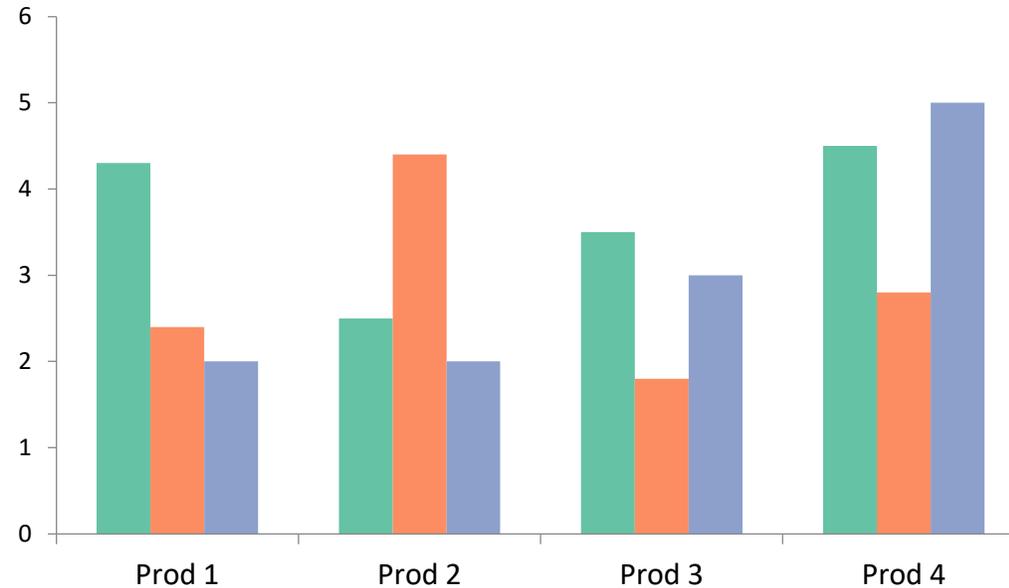
- Add data labels as interactive rollover.
- Balance colors.
- If change is most important, graph change.

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Stacked Bar Chart
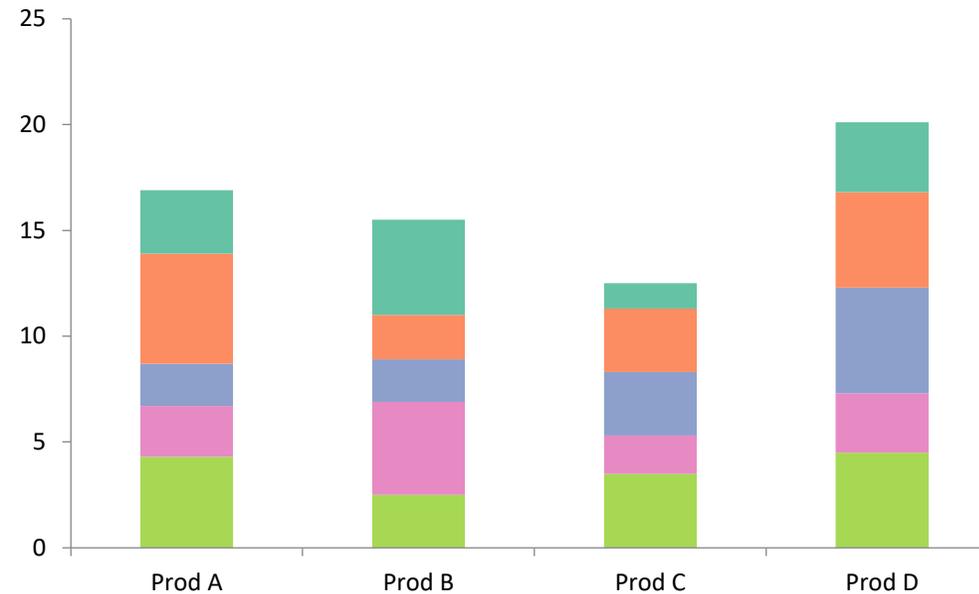
- Somewhat confusing, not great for representing change.
- Total is most clearly represented number.
- Single scale can make for interesting intra-bar comparisons.

Every time you add dimension to a graph, you should ask yourself "should I break this into two simpler graphs?

Every time you add a second graph with the same axes, you should ask yourself, "should I combine these graphs into one denser graph?"
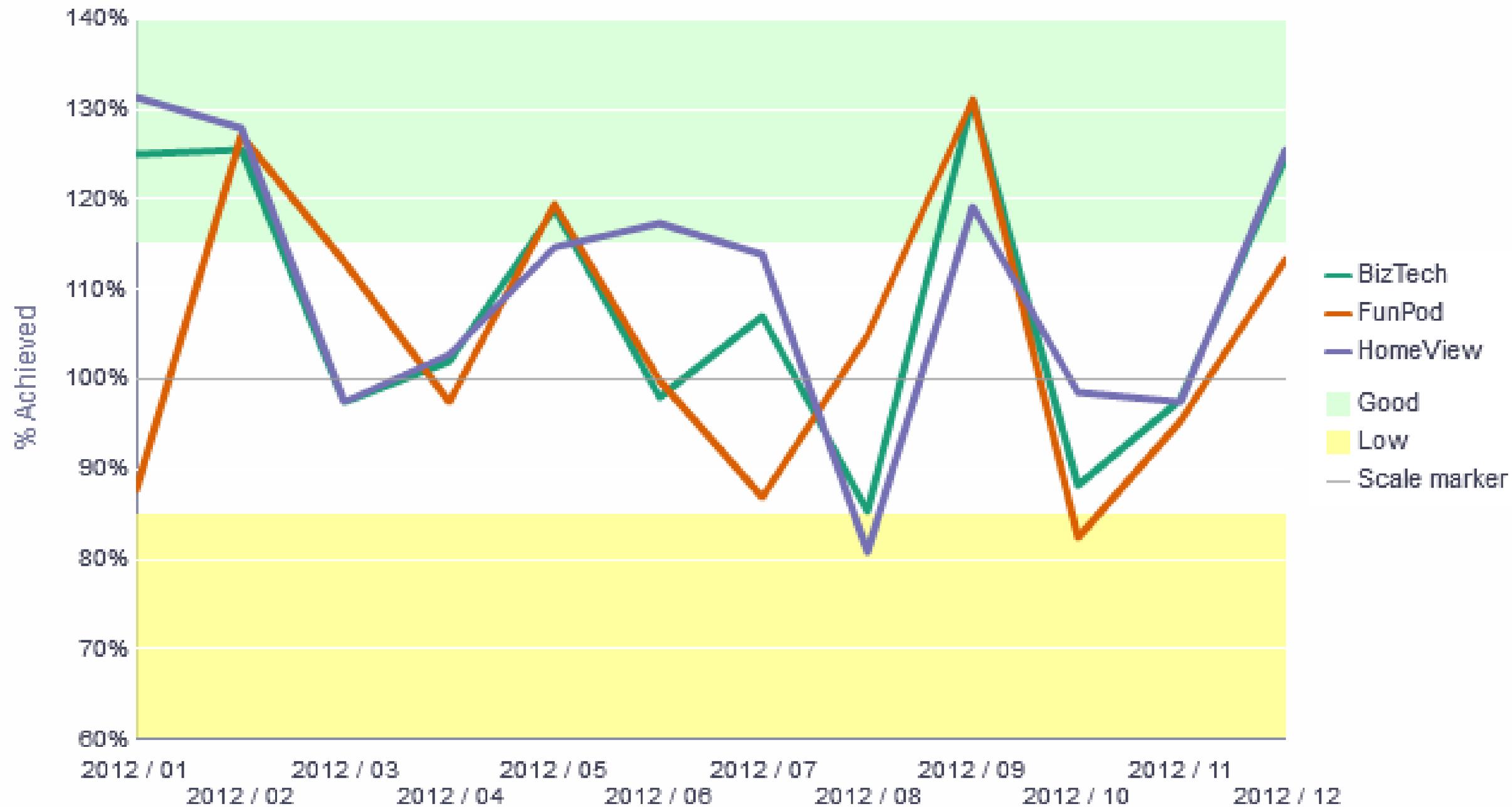
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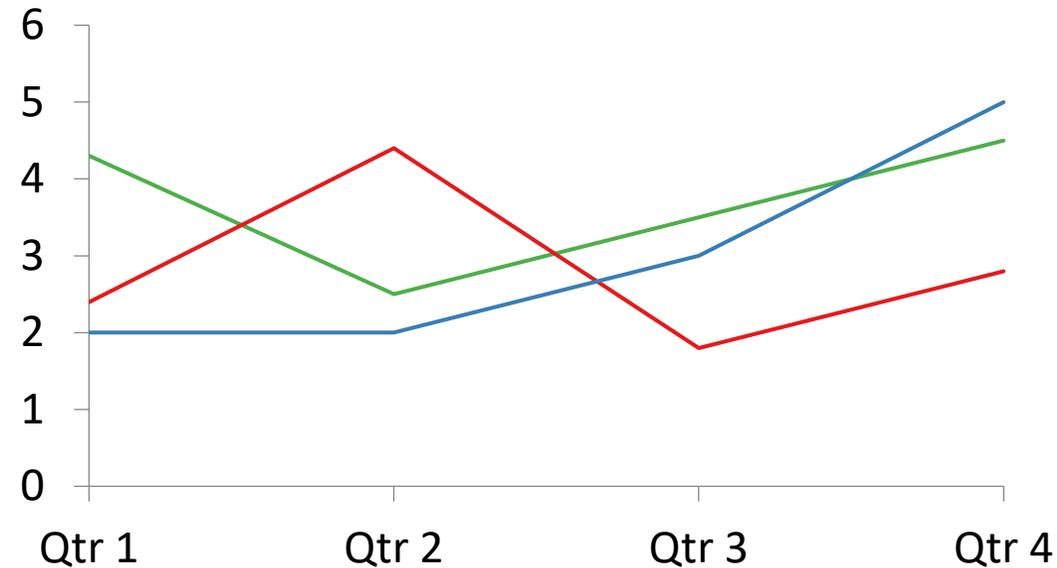
Line Graph

- Show a pattern or progression over a continuous range.
- Can be valued within a range to highlight a particular pattern (careful!).
- Maintain a rectangular shape close to golden proportion.
- Use scale marker lines and ranges for context.
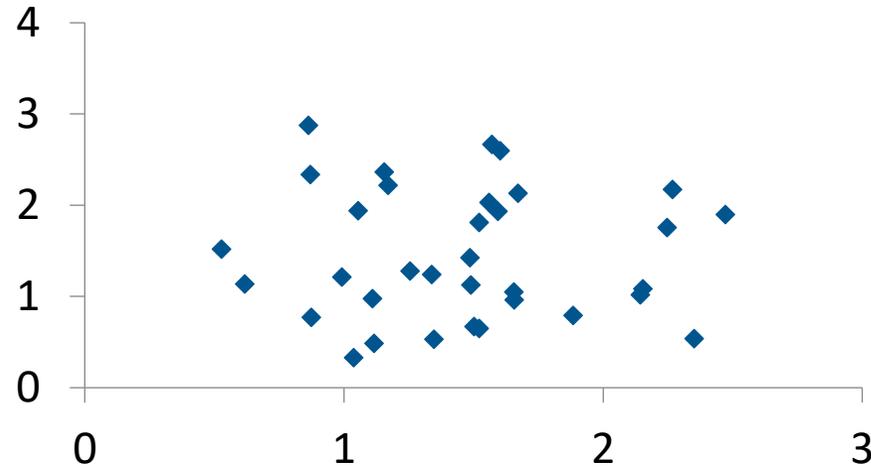
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Line Graph
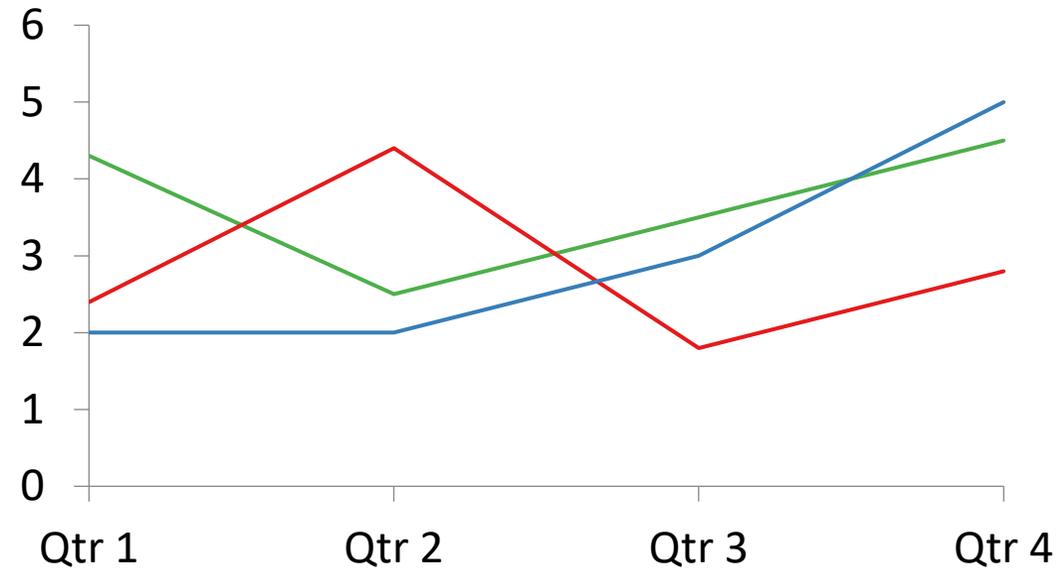
- Use darker versions of standard colors.
- Eliminate grid lines.
- Choose curved lines to smooth overall shape.
- Choose stepped lines to emphasize point transitions.

Target Revenue % by Brand for 2012

Legend:
- BizTech
- FunPod
- HomeView
- Good
- Low
- Scale marker

Y-axis: % Achieved (60% to 140%)

X-axis: 2012 / 01, 2012 / 02, 2012 / 03, 2012 / 04, 2012 / 05, 2012 / 06, 2012 / 07, 2012 / 08, 2012 / 09, 2012 / 10, 2012 / 11, 2012 / 12

Scatter Plot

- Shows single data points at the intersection of two values.
- Often depict a large number of discrete data points (hundreds or thousands).
- Useful comparisons of two variables.
- Trend or reference lines are often added.
- Clearly notate if use logarithmic scale(s).

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ColorBrewer2.org

i want hue

W3Schools Color Picker

Colors Tutorial

Colors HOME
Color Names
Color Values
Color Groups
Color Shades
Color Picker
Color Mixer
Color Converter
Color RGB
Color HEX
Color HSL
Color HWB
Color CMYK
Color NCol
Color Gradient
Color Theory
Color Wheels
Color Hues
Color Schemes
Color Palettes
Color Brands
Color W3.CSS
Color Metro UI
Color Win8
Color Flat UI
Color Psychology
Colors of the Year
Colors 2019
Colors 2018
Colors 2017
Colors 2016

Color Schemes

HTML Color Picker

‹ Previous   Next ›

Pick a Color:

Or Enter a Color:

Color value   OK

Or Use HTML5:

Selected Color:

Black Text

Shadow

White Text

Shadow

Red
#ff0000
rgb(255, 0, 0)
hsl(0, 100%, 50%)

Lighter / Darker:

100%	#ffffff
95%	#ffe6e6
90%	#ffcccc
85%	#ffb3b3
80%	#ff9999
75%	#ff8080
70%	#ff6666
65%	#ff4d4d
60%	#ff3333
55%	#ff1a1a
50%	**#ff0000**
45%	#e60000
40%	#cc0000
35%	#b30000
30%	#990000
25%	#800000
20%	#660000
15%	#4d0000
10%	#330000
5%	#1a0000
0%	#000000

COLOR PICKER

HOW TO

Tabs
Dropdowns
Accordions
Side Navigation
Top Navigation

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Bad Exec Dashboards Cause Grind

- People see different things
- Assumed context
- Data is distorted

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Great Exec Dashboards Reduce Friction

- Common data
- Shared context
- Established prioritization

Questions?

Thank You!!

- Tim Vlamis   tvlamis@vlamis.com

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Don't Forget To

ODT U G

Kscope22

grapevine, tx   june 19 – 23

Fill Out Your Evals

Resources

- ColorBrewer website. Color ramps. http://colorbrewer2.org/

- Iwanthue. color ramps and scripts for data scientists https://medialab.github.io/iwanthue/

- W3 Schools Color Picker. Adjust color intensity

https://www.w3schools.com/colors/colors_picker.asp

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