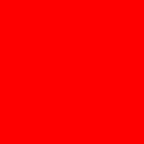


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The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.



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Value of Spatial Analytics in Business Intelligence

Jayant Sharma
Technical Director, Oracle Spatial

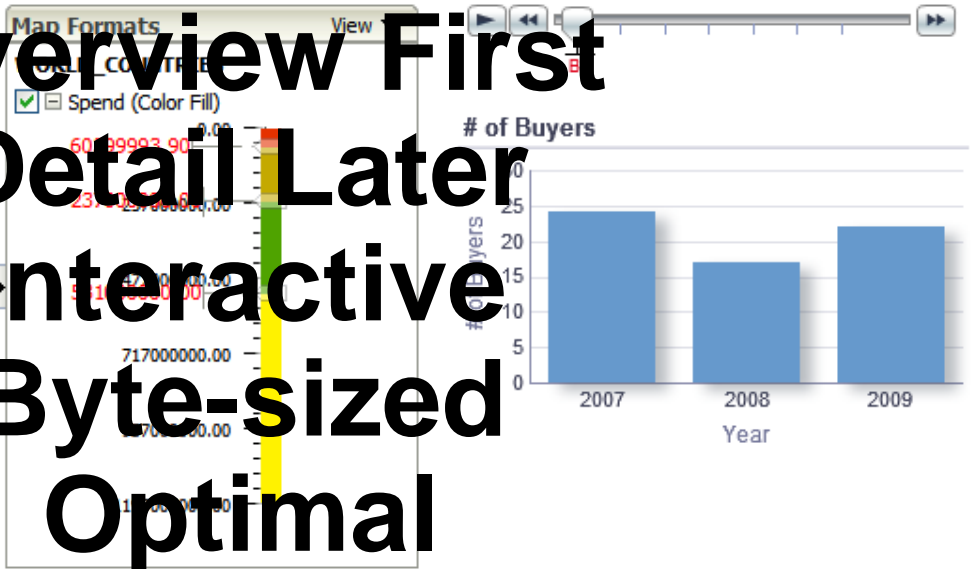
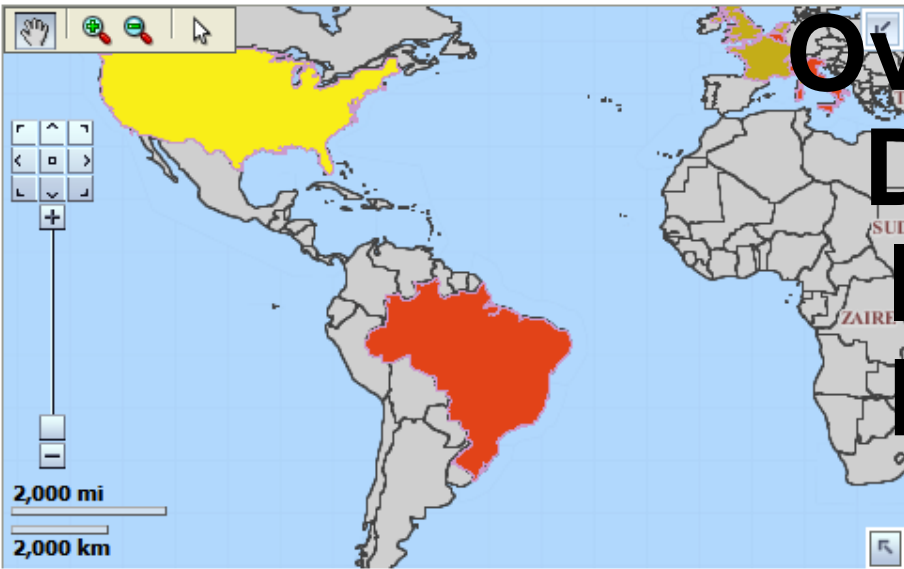
Abhinav Agarwal
Consulting Product Manager, OBIEE

Information Visualization

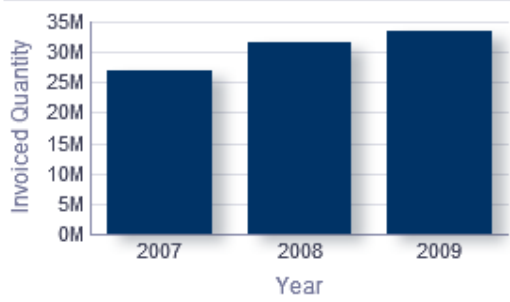
- Effective Information visualization is key to insight
- Choices are aplenty...

Year	Plant Location Country	Plant Location State	Spend Type	Spend	# of Suppliers	# of Buyers	Invoiced Quantity
BE	Unspecified	ITEM	8,451,585	11	4	11,746	
		TAX	288,325	8	4		
BR	SP	ITEM	706,542	2	3	848	
FR	Unspecified	ITEM	36,058,468	10	8	51,139	
		TAX	958,229	9	8		
GB	Unspecified	ITEM	22,308,436	14	15	45,025	

Overview First Detail Later Interactive Byte-sized Optimal



Invoiced Quantity



of Suppliers, # of Buyers



of Buyers, # of Suppliers



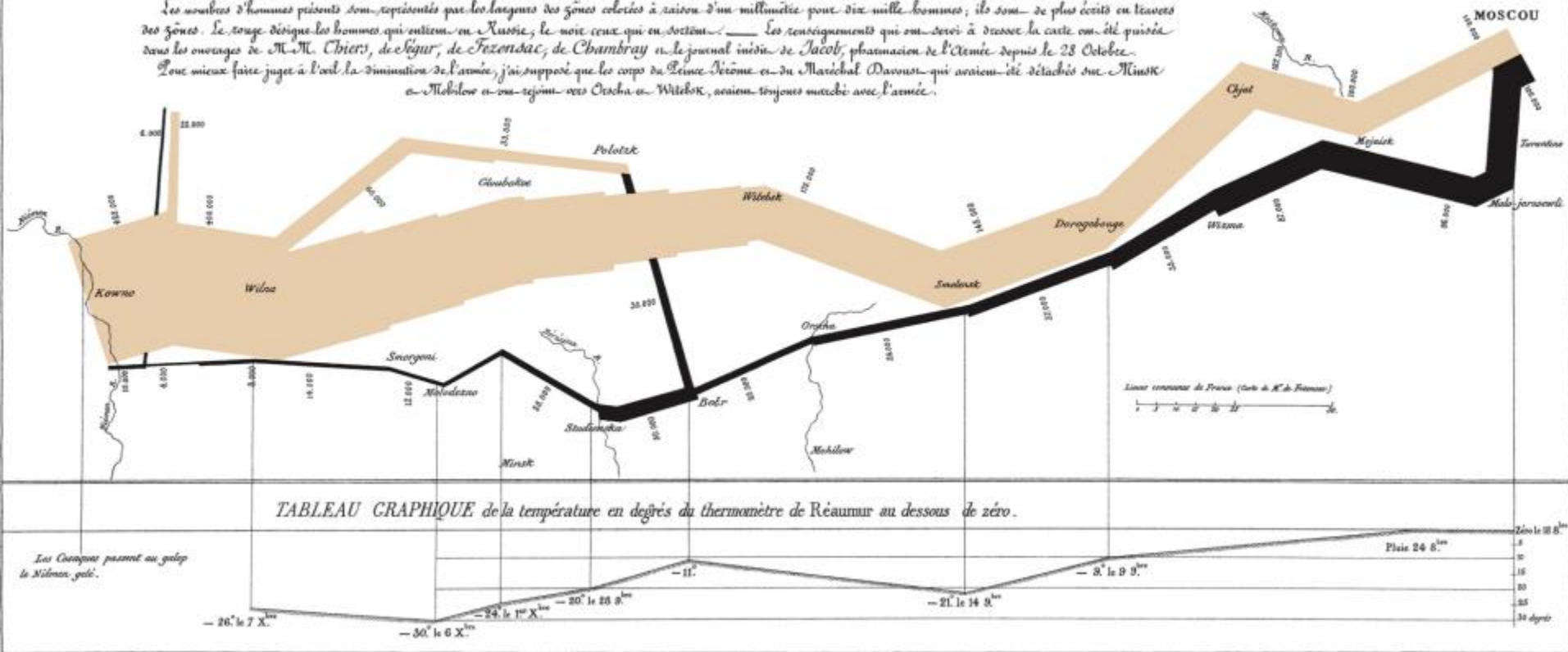
Good...

Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite, Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui ont été en Russie; le noir ceux qui en sont restés. Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Chiers, de Légar, de Fozensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Leur mieux faire jugés à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mohilew et qui se joignirent vers Orscha et Wilkôk, avaient toujours marché avec l'armée.



Charles Minard's 1869 chart showing the losses in men, their movements, and the temperature of Napoleon's 1812 Russian campaign.

... and

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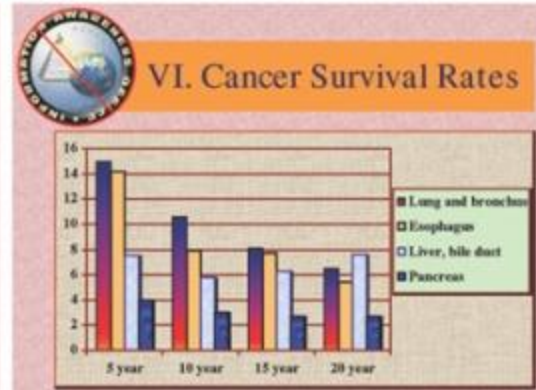
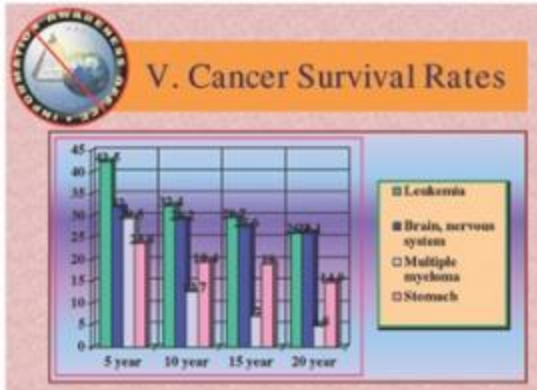
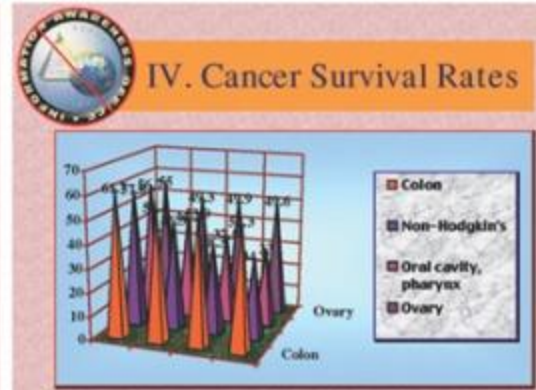
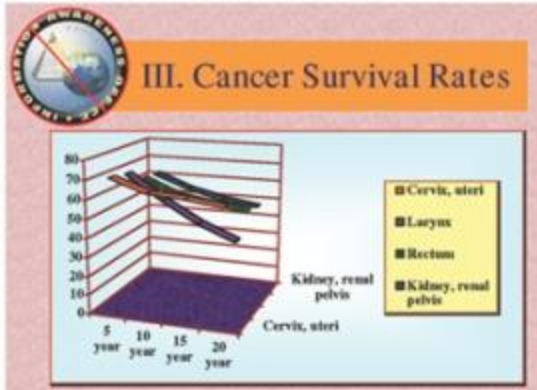
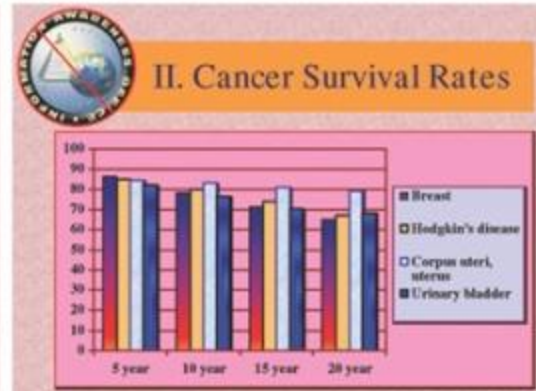
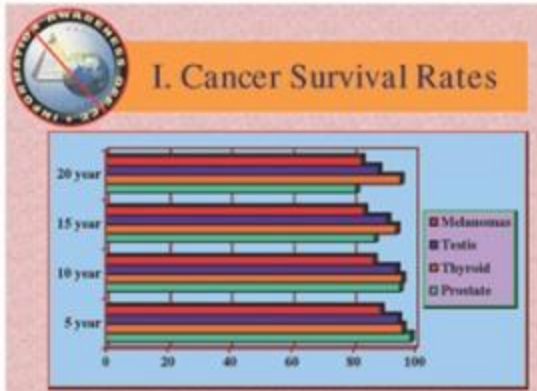
Banks:

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- Mari



J.P.Morga

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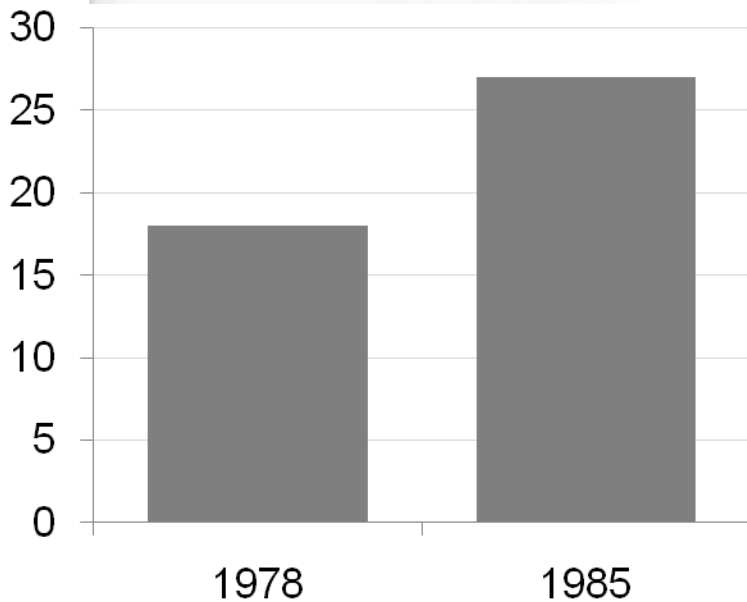
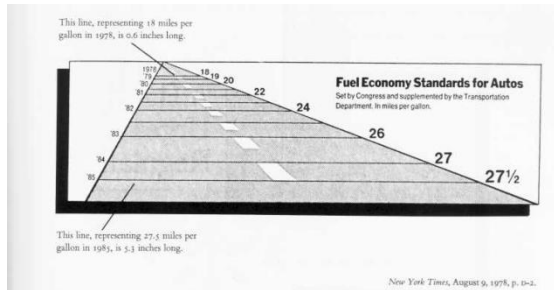
27 1/2

erg. Jan 20th 2009), 1978, p. D-2.

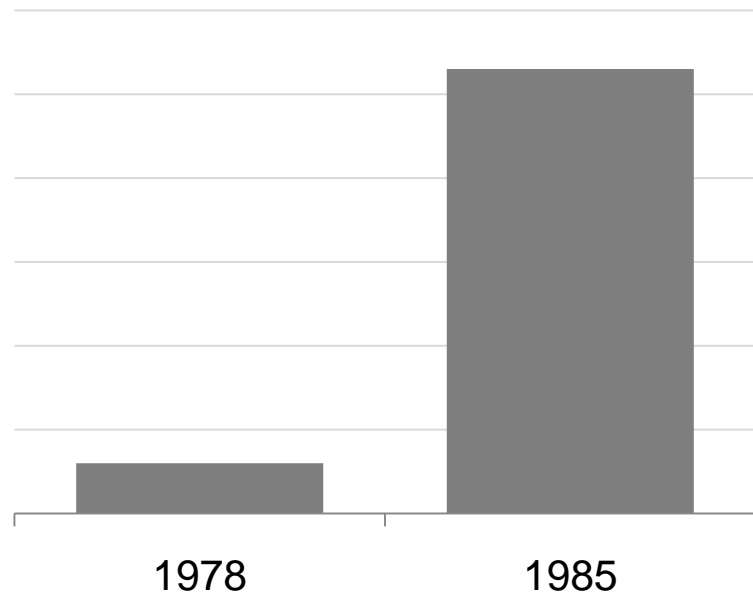
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Charts Can Lie

Chart Revisited



What The Data Told



What The Chart Suggested

Example 1

Tables Can Be Effective

Plant Location Country Name	Spend
Belgium	33,829,041
Brazil	3,050,285
France	112,305,374
Germany	124,334,223
Italy	37,574,242
Japan	9,606
Netherlands	95,167,887
Sweden	162,027,026
United Kingdom	70,057,336
United States	1,053,287,027

Example 1

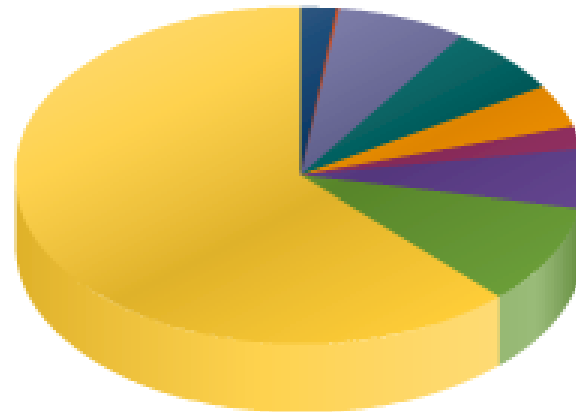
Tables Can Be Effective

Plant Location Country Name	Spend
United States	1,053,287,027
Sweden	162,027,026
Germany	124,334,223
France	112,305,374
Netherlands	95,167,887
United Kingdom	70,057,336
Italy	37,574,242
Belgium	33,829,041
Brazil	3,050,285
Japan	9,606

Example 1

Charts Can Be Effective...

Spend



Spend

BE, Belgium

BR, Brazil

DE, Germany

FR, France

GB, United Kingdom

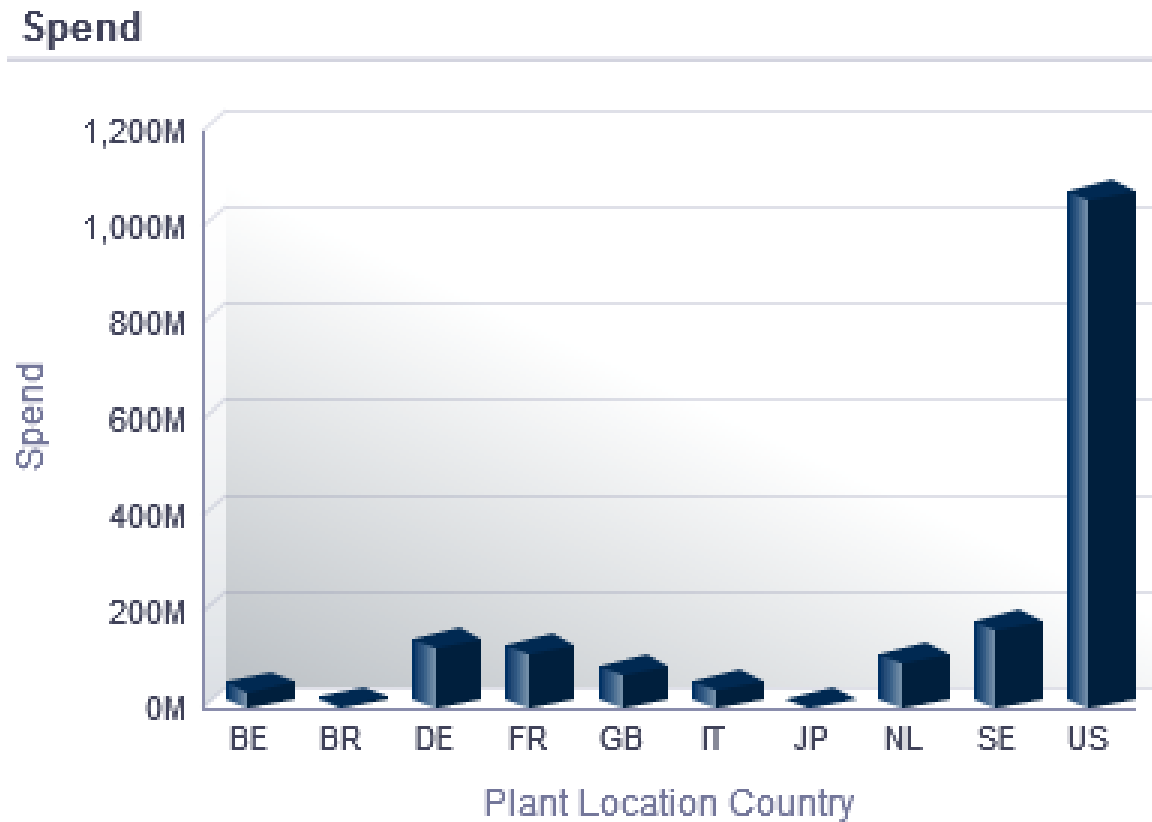
IT, Italy

JP, Japan

NL, Netherlands

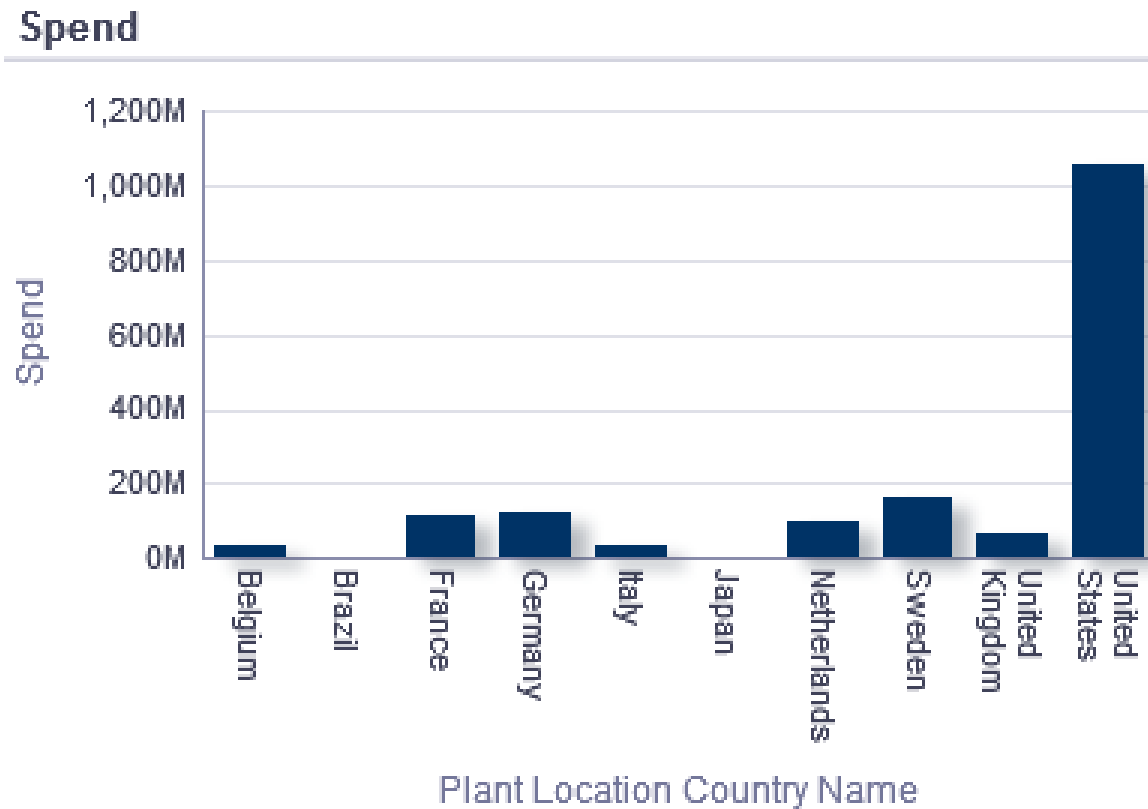
Example 1

The Correct Chart Can Be Effective



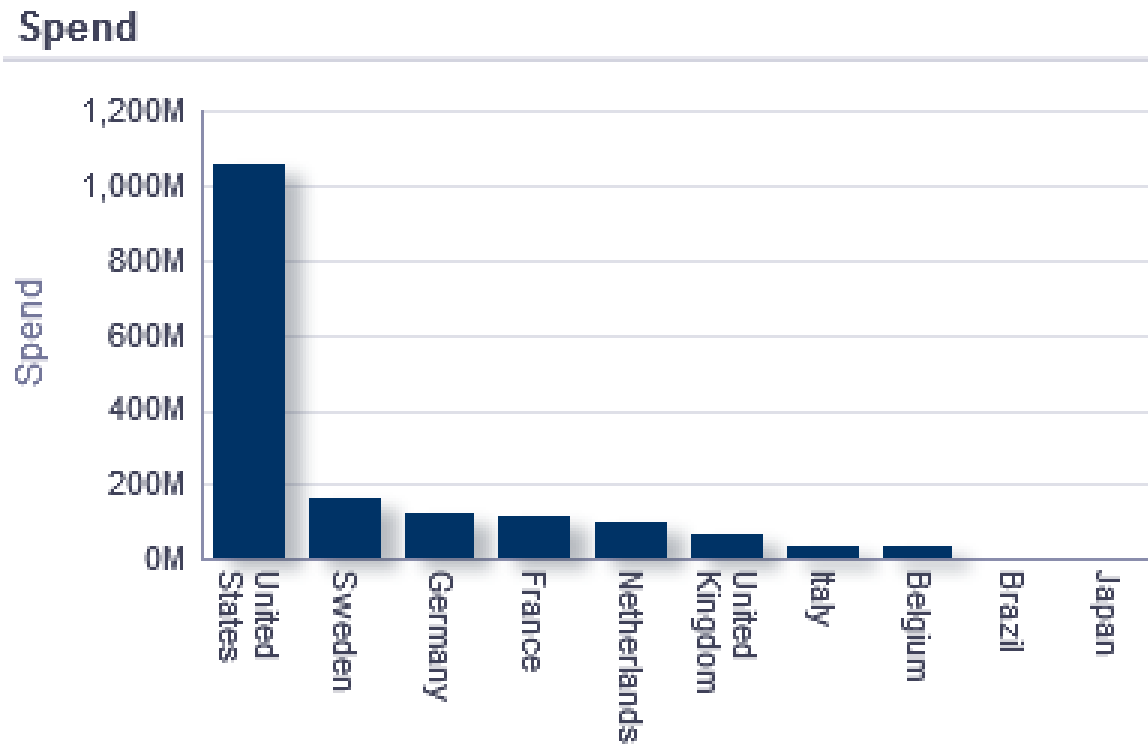
Example 1

The Correct Chart Can Be Effective



Example 1

The Correct Chart Can Be Effective



Example 2

Improving The Table

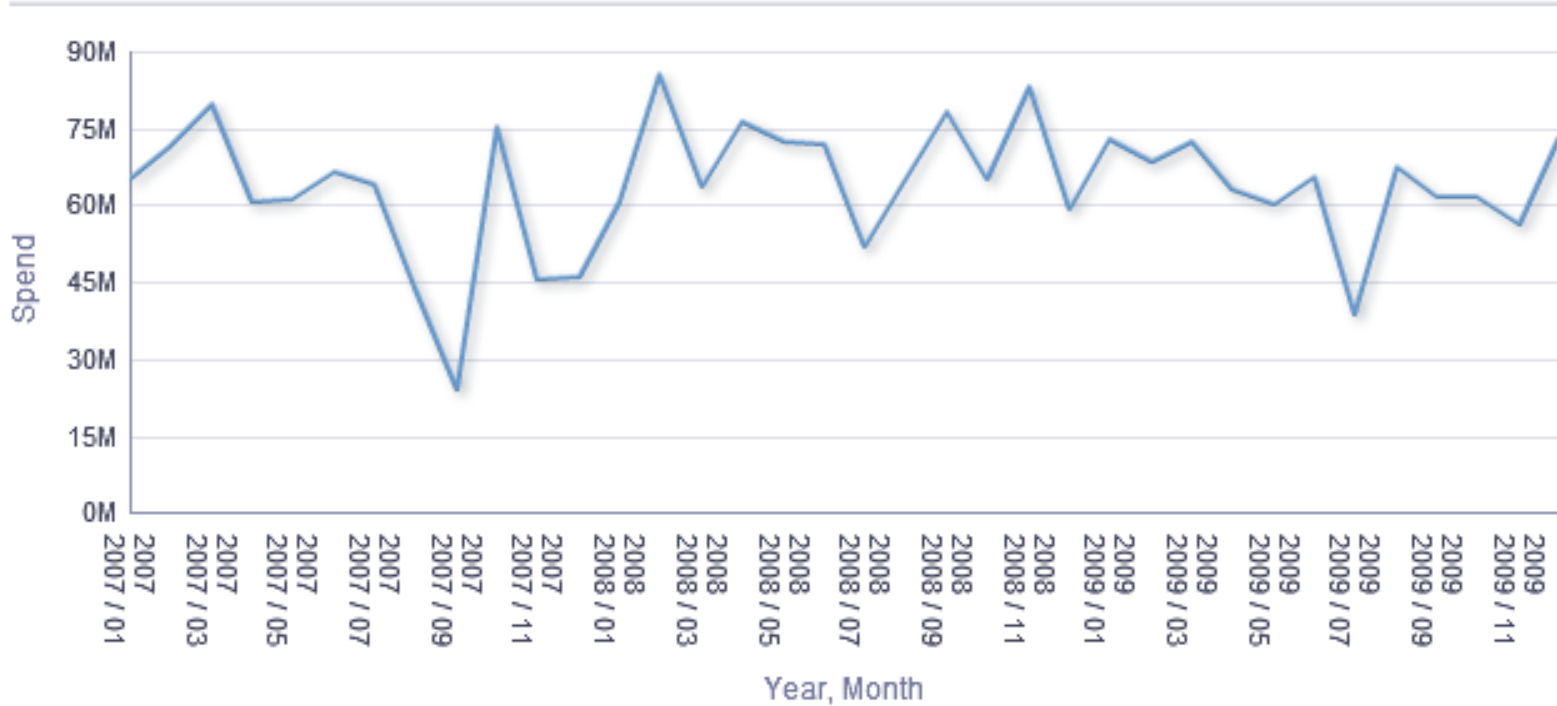
Year	Month	Spend
2007	2007 / 09	24,196,417
2009	2009 / 07	38,638,703
2007	2007 / 08	43,863,963
2007	2007 / 11	45,506,217
2007	2007 / 12	45,836,736
2008	2008 / 07	51,973,401
2009	2009 / 11	56,362,986
2008	2008 / 12	59,201,278
2009	2009 / 05	60,320,290
2008	2008 / 01	60,433,288
2007	2007 / 04	60,850,188
2007	2007 / 05	61,148,574
2009	2009 / 09	61,513,541
2009	2009 / 10	61,639,431
2009	2009 / 04	62,964,964
2008	2008 / 03	63,776,081
2007	2007 / 07	64,155,668
2008	2008 / 10	64,865,310
2007	2007 / 01	65,140,526
2009	2009 / 06	65,404,615
2008	2008 / 08	65,472,411
2007	2007 / 06	66,454,030
2009	2009 / 08	67,477,693
2009	2009 / 02	68,343,671
2007	2007 / 02	71,346,492
2008	2008 / 06	71,869,026
2008	2008 / 05	72,328,772
2009	2009 / 03	72,448,713
2009	2009 / 01	72,858,467
2009	2009 / 12	73,275,201
2007	2007 / 10	75,253,995
2008	2008 / 04	76,339,364
2008	2008 / 09	78,205,682
2007	2007 / 03	79,539,479
2008	2008 / 11	82,904,365
2008	2008 / 02	85,534,531

But...

Example 2

Improving The Chart

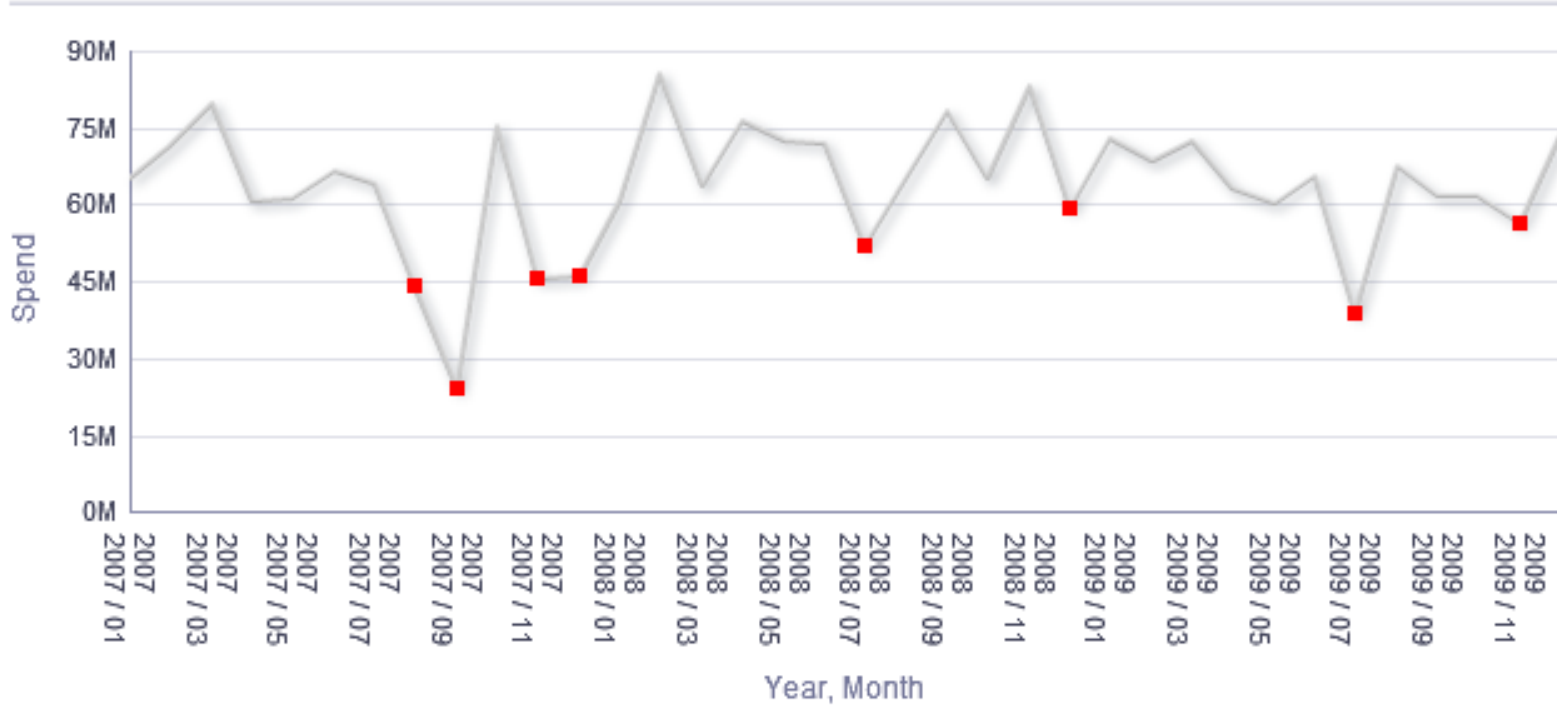
Spend



Example 2

Improving The Chart

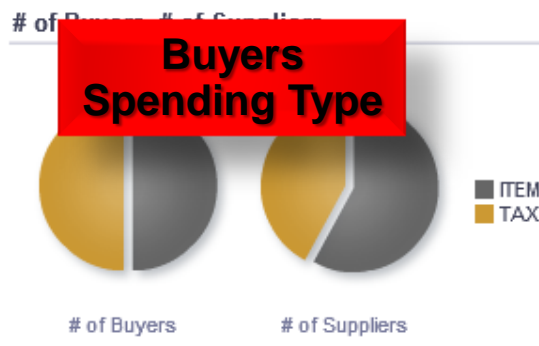
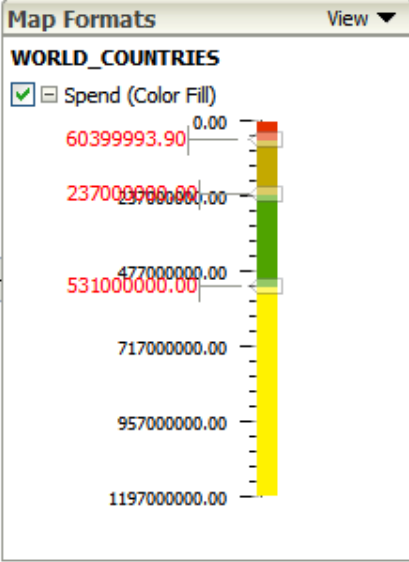
Spend



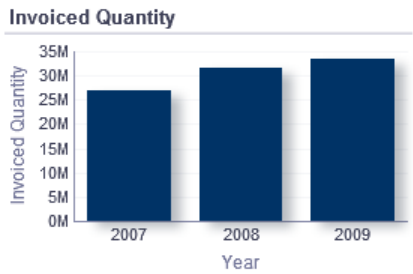
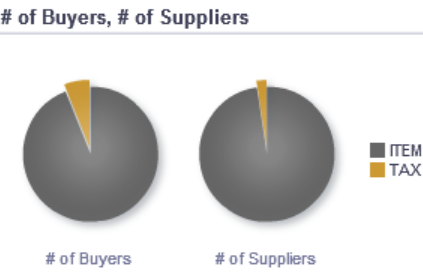
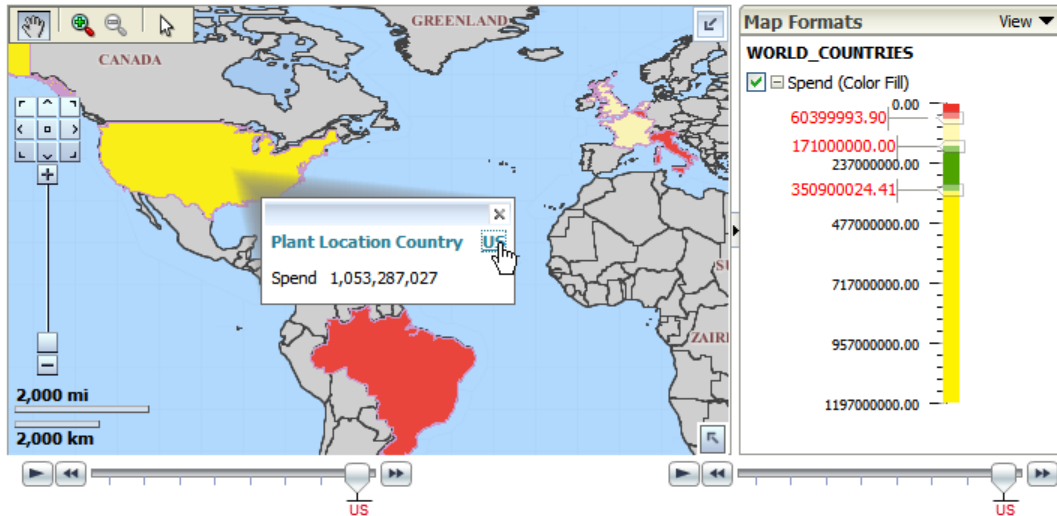
Interactive Visualizations

Year	Plant Location Country	Plant Location State	Spend Type	Spend	# of Suppliers	# of Buyers	Invoiced Quantity
BE	Unspecified		ITEM	8,451,585	11	4	11,746
			TAX	288,325	8	4	
BR	SP		ITEM	706,542	2	3	848
FR	Unspecified		ITEM	36,058,468	10	8	51,139
			TAX	958,229	9	8	
GB	Unspecified		ITEM	22,308,436	14	15	45,025

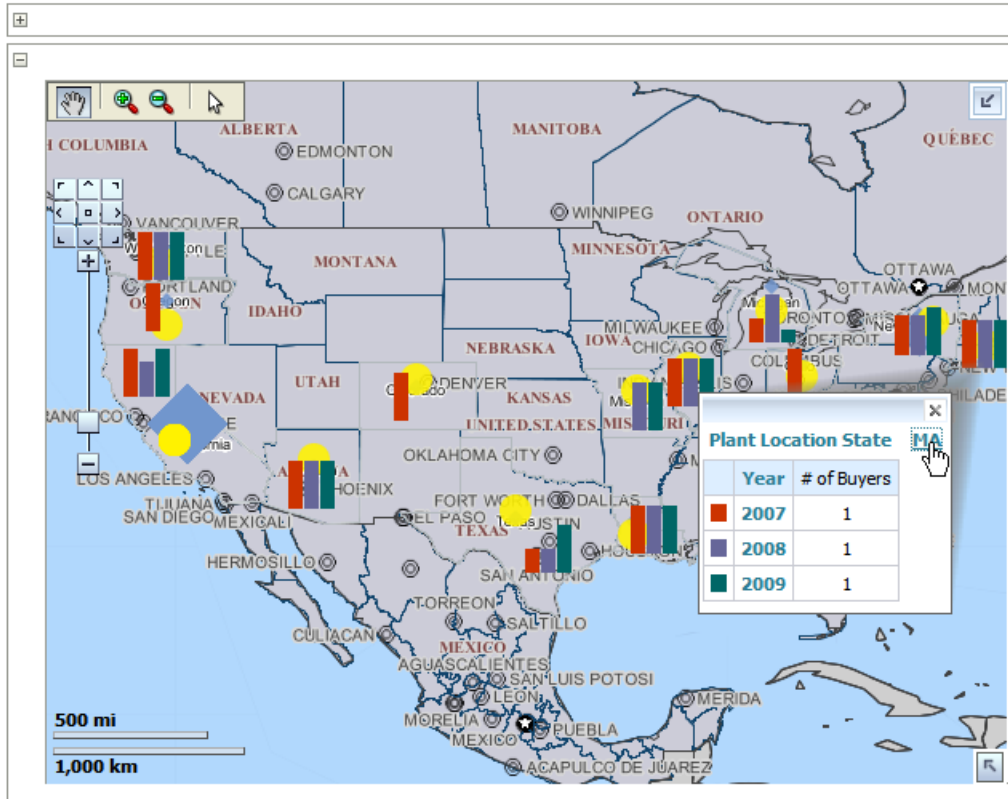
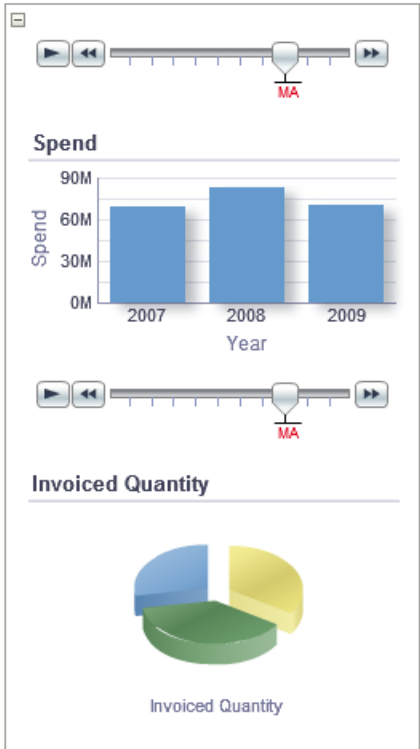
Interactive Visualizations



Interactive Visualizations



[Edit](#) - [Refresh](#) - [Print](#)



Plant Location State

Year	# of Buyers
2007	1
2008	1
2009	1

Map Formats View

US_STATES

- # of Buyers (Bar Chart)
 - 2007
 - 2008
 - 2009
- Spend (Variable Marker)
 - 2,097,953,527
 - 1,631,741,651
 - 233,106,022
- # of Suppliers (Variable Marker)
 - 62
 - 48
 - 8

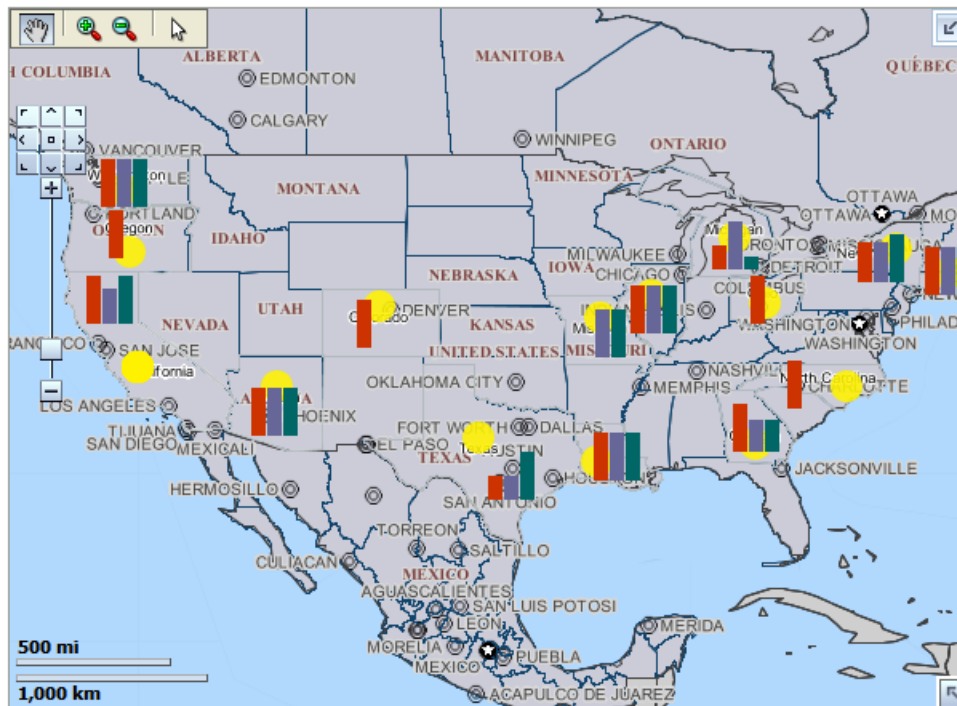
Spend



Invoiced Quantity



Invoiced Quantity



Map Formats

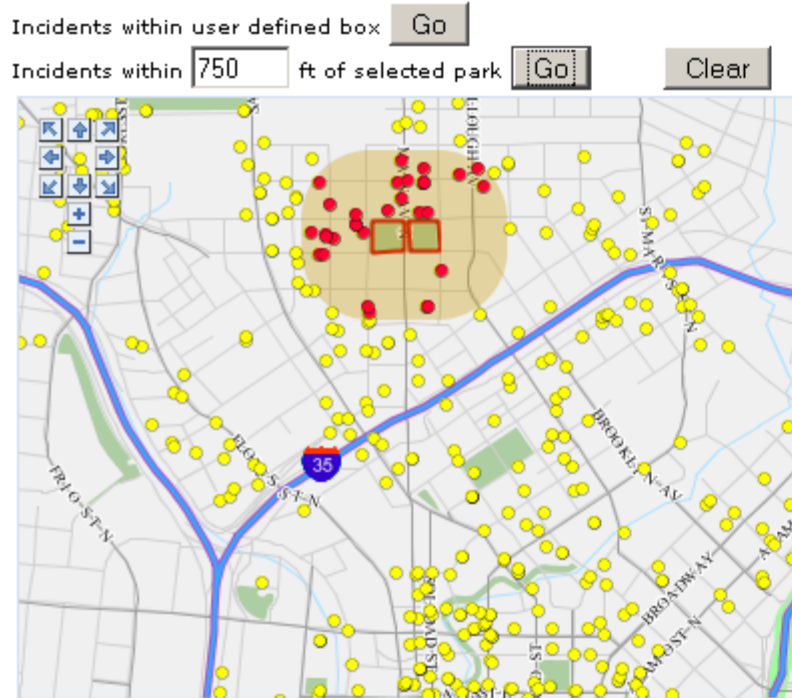
View [dropdown]

US_STATES

- # of Buyers (Bar Chart)
- Spend (Variable Marker)
- # of Suppliers (Variable Marker)



Some Analysis Possible Only With Spatial Analytics



Complaint Detail

Offense Desc	PD Desc	Date Key	Complaint Key	Service Area	Region
CRIMINAL MISCHIEF & RELATED OF	MISCHIEF, CRIMINAL 4, OF MOTOR	18-Feb-03	1026	28	Central
DANGEROUS DRUGS	CONTROLLED SUBSTANCE, POSSESSI	10-Nov-02	30099	28	Central
		10-Mar-03	40099	28	Central
HARRASSMENT 2	HARRASSMENT, SUBD 1, CIVILIAN	02-Aug-03	1064	32	Central
		04-Mar-03	1027	28	Central
		04-May-03	31027	28	Central
		04-Sep-03	41027	28	Central
		19-Sep-03	41028	28	Central
ROBBERY	ROBBERY, UNCLASSIFIED, OPEN AREA	09-Jan-04	41032	28	Central

Some Analysis Possible Only With Spatial Analytics

Find all competitors **within 2 miles** of **Northport Branch**

```
SELECT c.holding_company, c.location
FROM competitor c,
      bank b
WHERE b.site_id = 1604
      AND
      SDO_WITHIN_DISTANCE(c.location,
                          b.location, 'distance=2 unit=mile')
      = 'TRUE'
```





Spatial Data Visualization with Satellite Imagery

Location Too Needs Context

- Maps with satellite imagery
- Additional context
- Examples
 - Retail Planning
 - Insurance Analytics
 - Telecom
 - Utilities

Service Area Offence

13

BURGLARY

Go

Complaint Detail by Region/Service Area - Offence - 2004

for BURGLARY

Service Area	PD Code	PD Desc	Complaint Key
13	213	BURGLARY_COMMERCIAL_NIGHT	10873
			40873
	221	BURGLARY_RESIDENCE_DAY	1887
			10874
			31887
			40874
	223	BURGLARY_RESIDENCE_NIGHT	1884
			10878
			11884
			30878
			31884

Pin Map of Offences

Filtered for All Choices Service Area and BURGLARY



Example – Water Quality

Reporting Year

All Total Releases by Year and Region

TRI Fac Region	Change from Prior Year
8	● -33.79%
4	● -8.13%
5	● -6.51%
9	● -5.32%
3	● -1.37%
2	● 0.18%
6	● 0.85%
10	● 2.60%
7	● 6.47%
1	● 22.58%

[Modify](#) - [Refresh](#) - [Print](#) - [Download](#) - [Add to Briefing Book](#)

All Total Releases by Year and Region

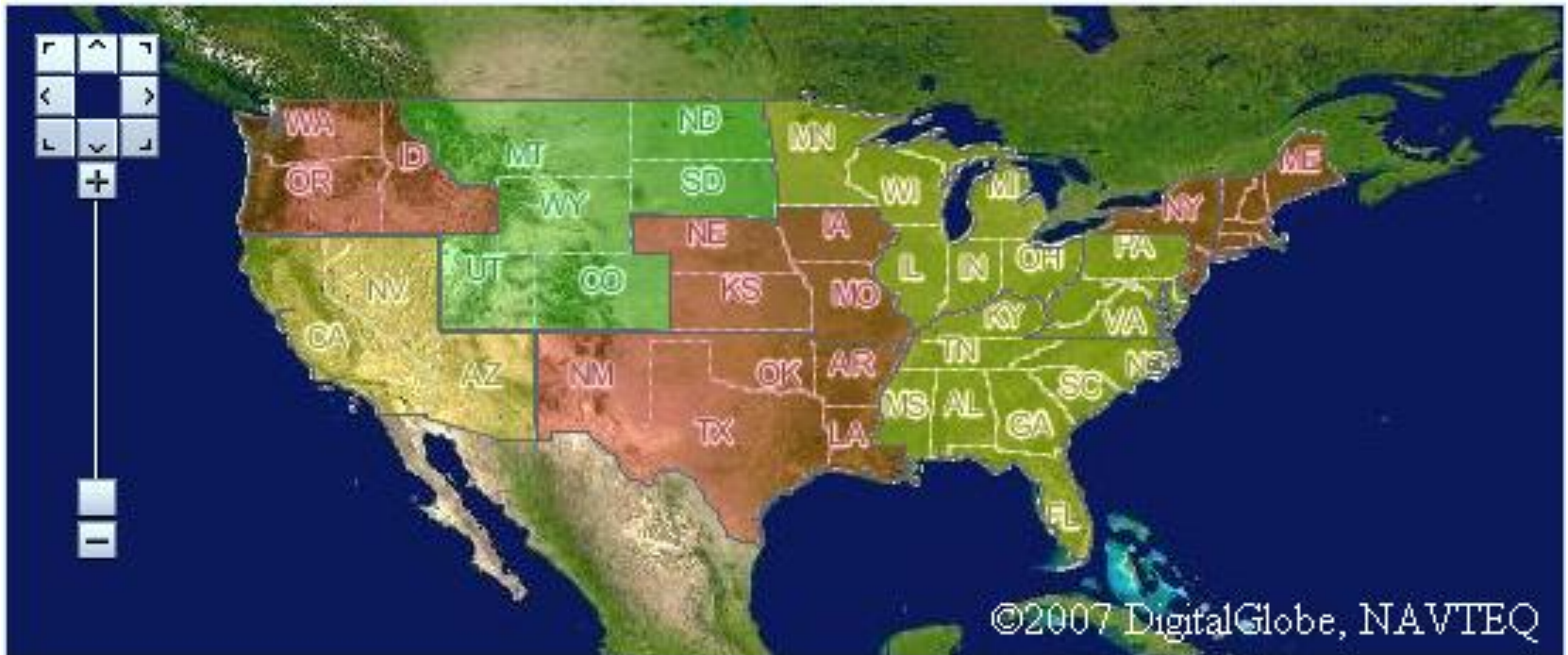


All Total Releases by Year and Region Chart

Choose Chart Type



Example – Water Quality



Example – Water Quality



Example – Water Quality



Example – Water Quality



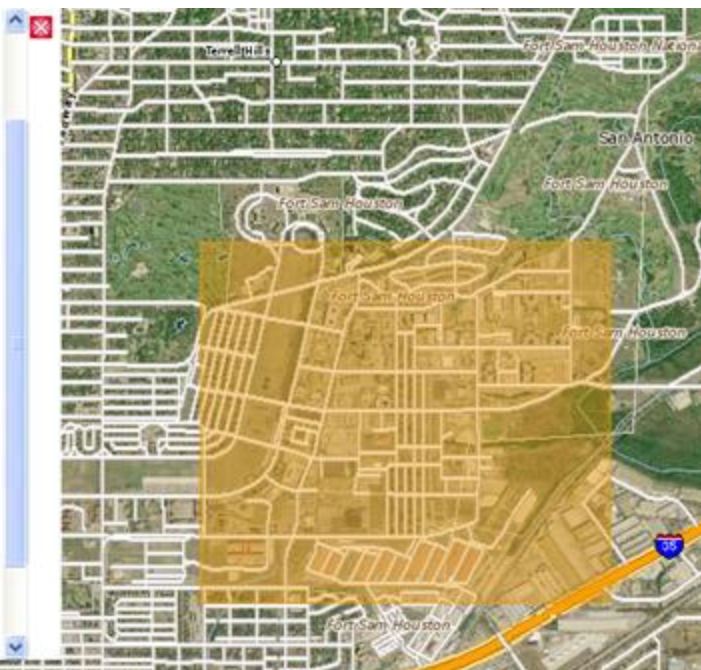
Example – Water Quality



Data Has Memory

- Data analytics is multi-dimensional
 - Y-o-Y Growth in Sales by Region
- Locations change over time
- Decisions call for consistent data & consistency in presentation
 - Insurance, Utilities, Retail Analytics

2007-10-19	Preview	0.6	50000.0	Add
2007-02-01	Preview	0.3	6000.0	Add
2007-01-04	Preview	0.6	50000.0	Add
2006-04-09	Preview	0.6	50000.0	Add
2005-10-21	Preview	0.6	4800.0	Add
2005-06-04	Preview	0.6	50000.0	Add
2005-04-11	Preview	0.6	50000.0	Add
2004-12-01	Preview	0.6	4000.0	Add
2004-08-30	Preview	0.6	4800.0	Add
2004-07-01	Preview	1.0	12000.0	Add
2004-06-02	Preview	1.0	12000.0	Add
2003-06-07	Preview	0.6	50000.0	Add
2003-06-07	Preview	0.6	50000.0	Add
2003-03-27	Preview	0.6	50000.0	Add
2003-03-27	Preview	0.6	50000.0	Add
2003-03-27	Preview	0.6	50000.0	Add
2002-09-20	Preview	0.6	4800.0	Add
2002-08-28	Preview	0.6	50000.0	Add
2002-08-28	Preview	0.6	50000.0	Add
2000-12-19	Preview	0.15	0.0	Add
2000-11-10	Preview	0.15	0.0	Add
2000-11-09	Preview	0.15	0.0	Add
2000-09-17	Preview	1.0	0.0	Add



Why Isn't It Everywhere?

- BI adoption no longer an issue
- Geo-Spatial visualizations getting more commonplace
- But...
- Spatial Data
 - Partnerships, OOTB availability
- Performance, Scalability, Reliability, Manageability
 - Hosted model...
- Integration
 - Build into product
 - Provide a pluggable, extensible framework

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