



# Auditing For Procurement Fraud

Florida Audit Forum  
February 3, 2017

*Lance E. H. Schmidt, CPA, CFE, Principal*

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# Learning Objectives

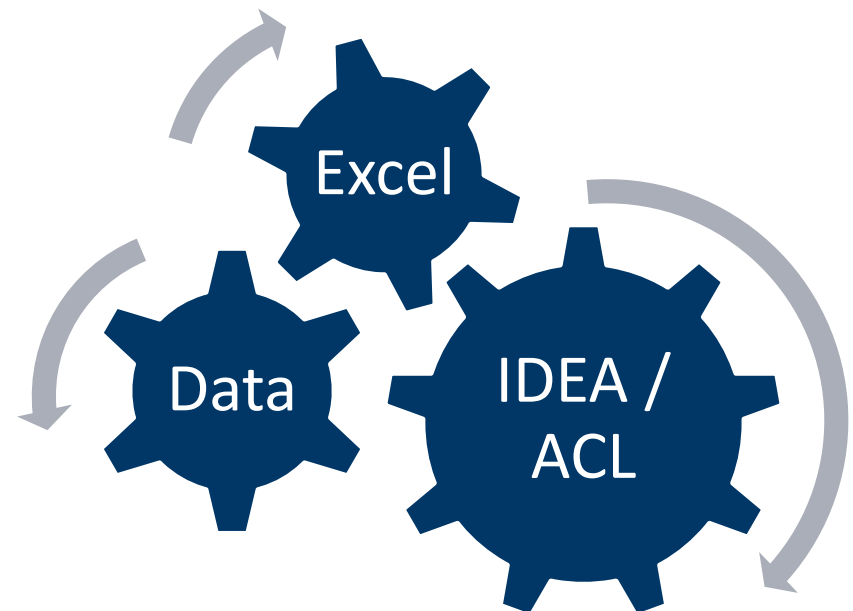
This course will cover types of procurement fraud, how procurement fraud is committed and ways to audit for procurement fraud.



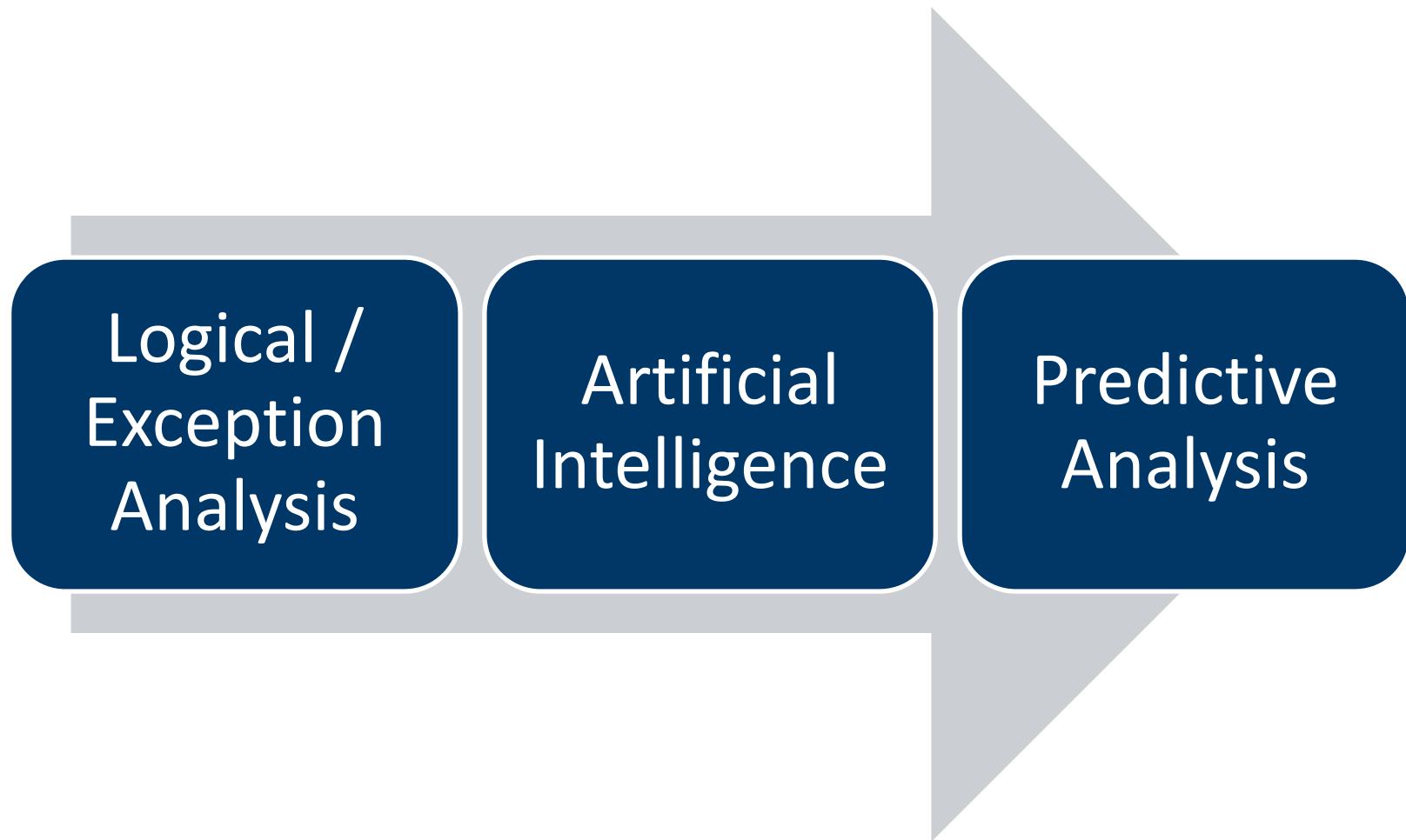
## Quick Poll

- How well is your team utilizing *Computer Assisted Audit Techniques (CAAT)*?
- What tools are being used for data analysis?

**It is difficult to explain  
what data analysis is,  
but you know it when  
you see it.**



# The Evolution of Data Analysis




# CBOK 2015 Practitioner Survey

- The use of monitoring and data analytics increased by 14% from 2006 to 2015
- Use of continuous/real-time auditing increased by 7% from 2006 to 2015
- Only 40 percent of Chief Audit Executives (CAEs) say their use of technology is “appropriate or extensive”
- 20% of CAEs say their departments rely primarily on manual testing
- 53% of audit departments use a tool for data mining or data analysis
- 80% of CEOs (Management) say data mining and analysis is strategically important to their organizations


Source: [www.theiia.org/goto/CBOK](http://www.theiia.org/goto/CBOK)



# CBOK 2015 Practitioner Survey



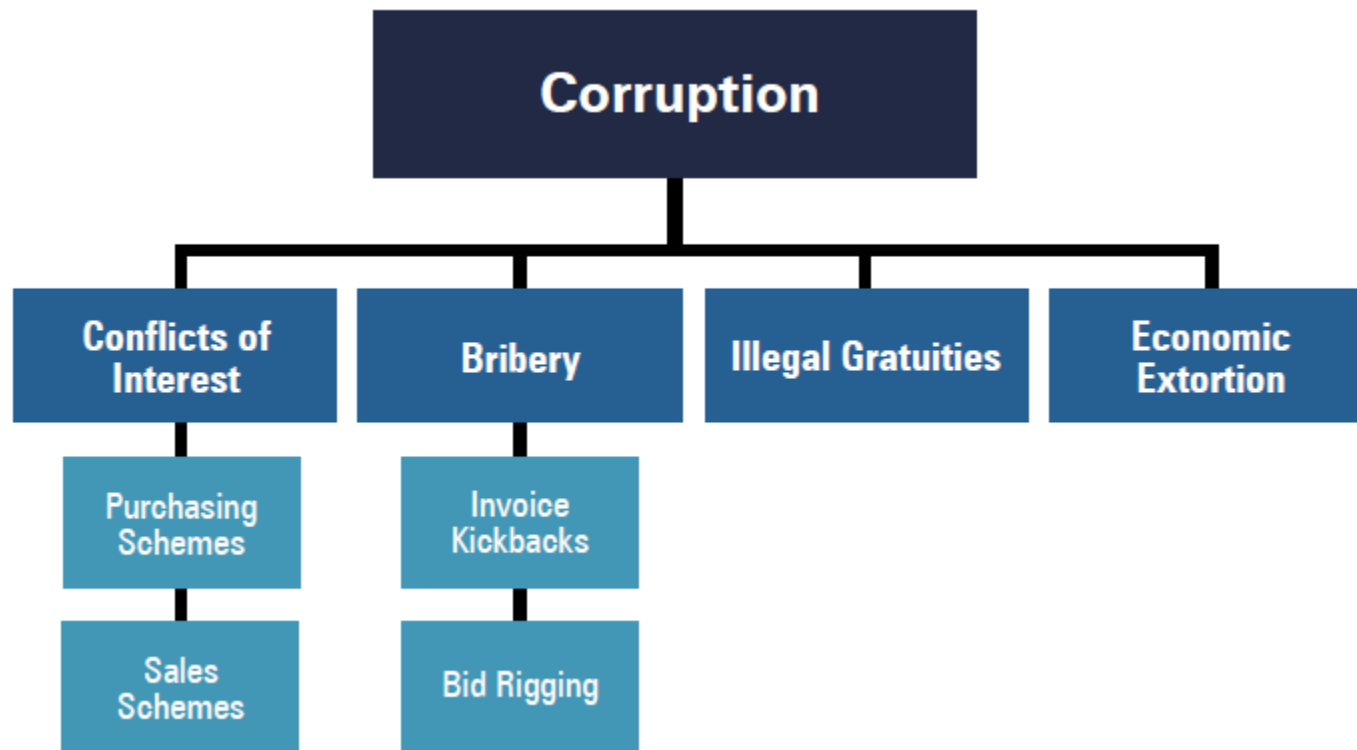
80% of CEOs say data mining and analysis is strategically important to their organizations



53% of internal audit departments use a software tool for data mining or data analysis



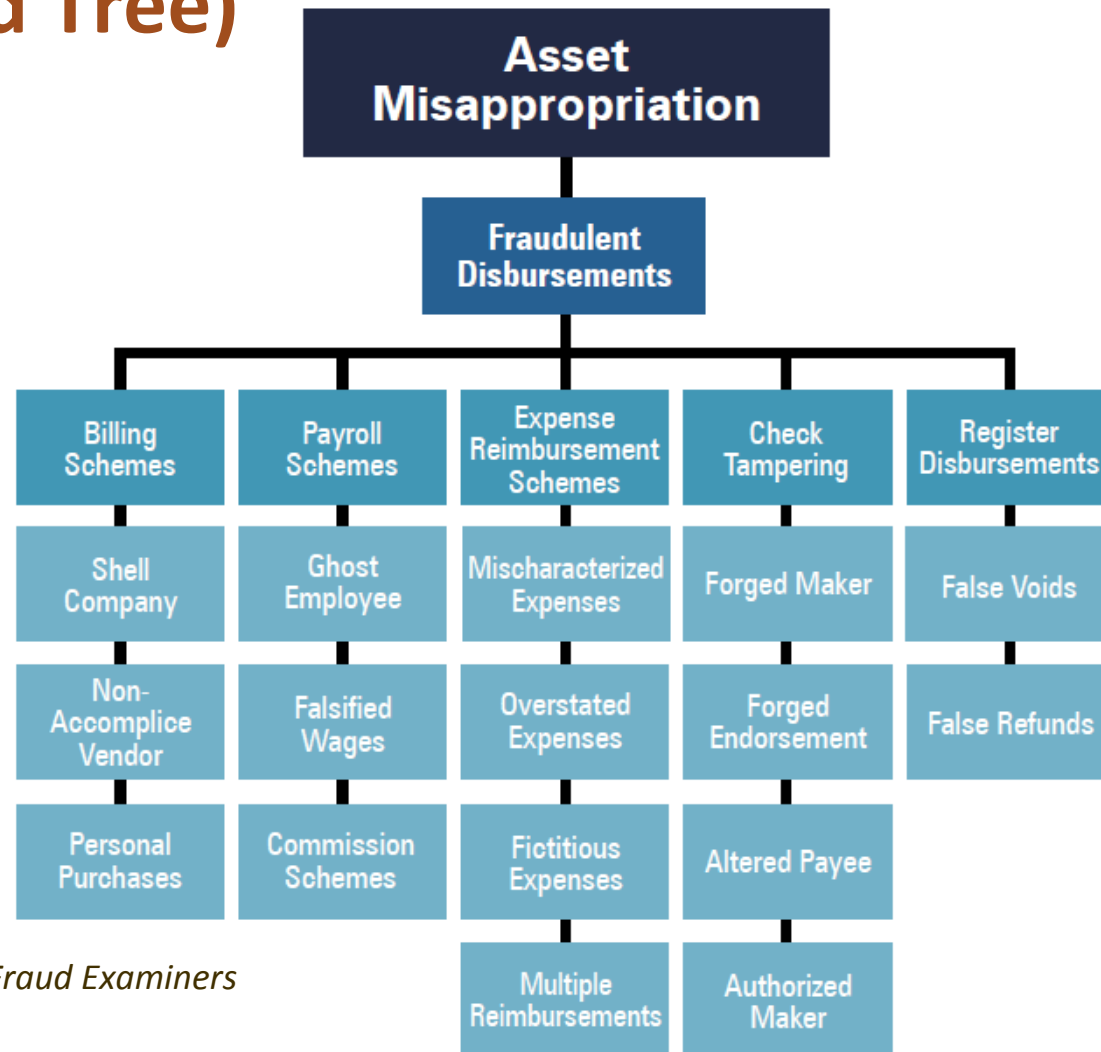
# Occupational Fraud and Abuse Classification System (Fraud Tree)



Source: Association of Certified Fraud Examiners



# Occupational Fraud and Abuse Classification System (Fraud Tree)

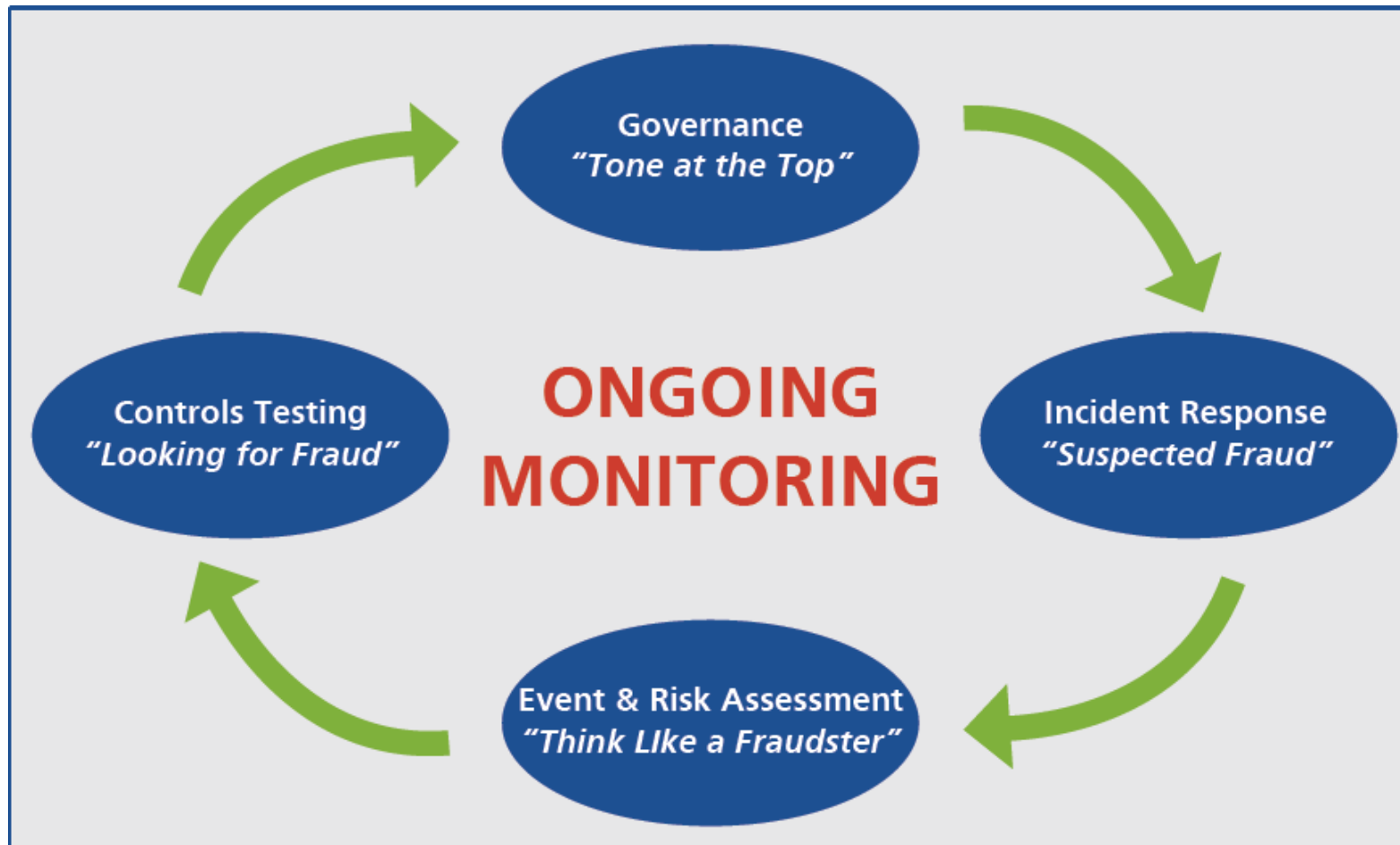


Source: Association of Certified Fraud Examiners





# Proactive Fraud Detection Cycle



Source: Audimation Services, Inc. (audimation.com)



# Why ongoing monitoring is important?



Source: <http://www.acfe.com/rtnn2016/docs/2016-report-to-the-nations.pdf>

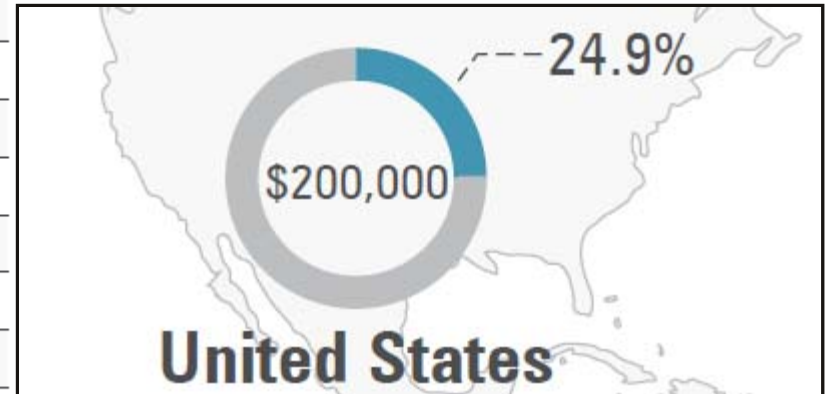


# A Look At the United States

**Figure 8:** Scheme Types by Region—  
United States

Scheme	Number of Cases	Percent of Cases
Billing	289	27.8%
Corruption	258	24.9%
Non-Cash	174	16.8%
Skimming	167	16.1%
Expense Reimbursements	164	15.8%
Check Tampering	154	14.8%
Payroll	131	12.6%
Cash on Hand	125	12.0%
Cash Larceny	102	9.8%
Financial Statement Fraud	93	9.0%
Register Disbursements	29	2.8%

**Frequency and Median Loss of  
Corruption Cases by Region**

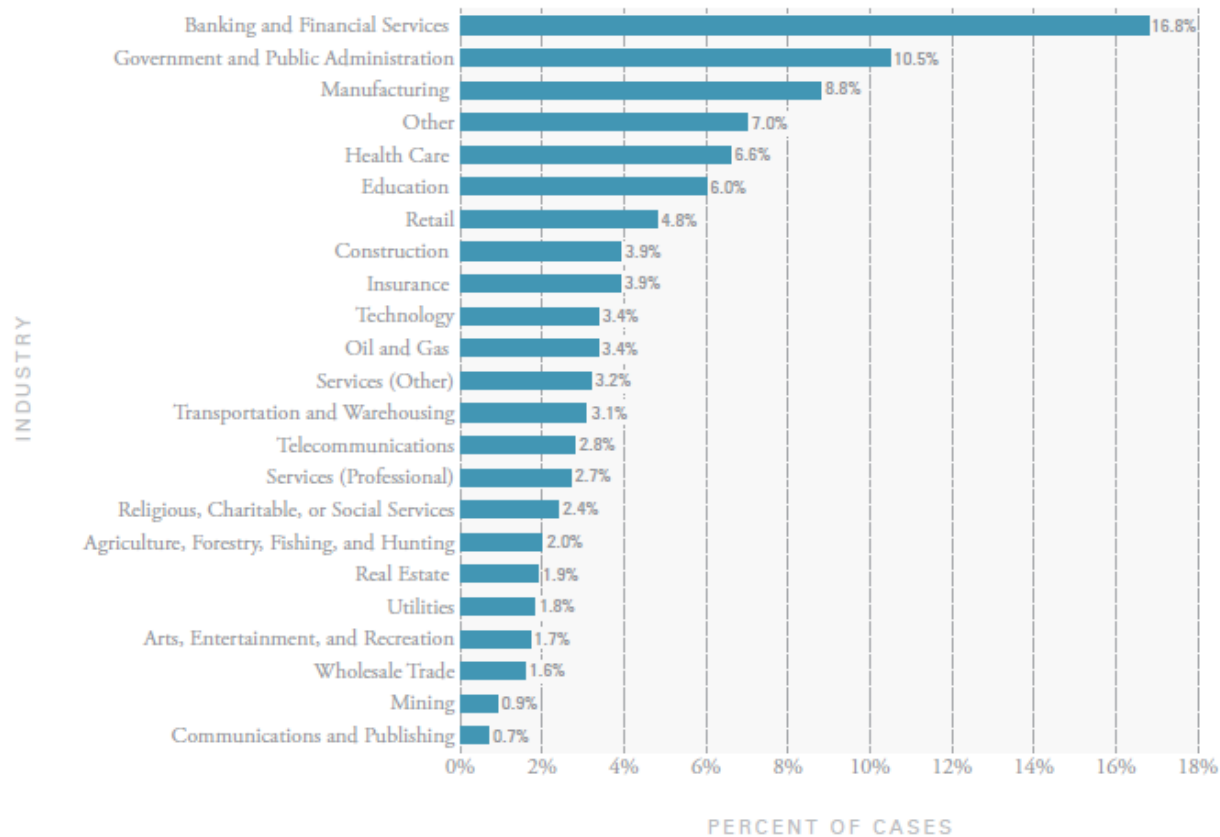


Source: <http://www.acfe.com/rtn2016/docs/2016-report-to-the-nations.pdf>



# Fraud Losses by Industry

Figure 43: Industry of Victim Organizations

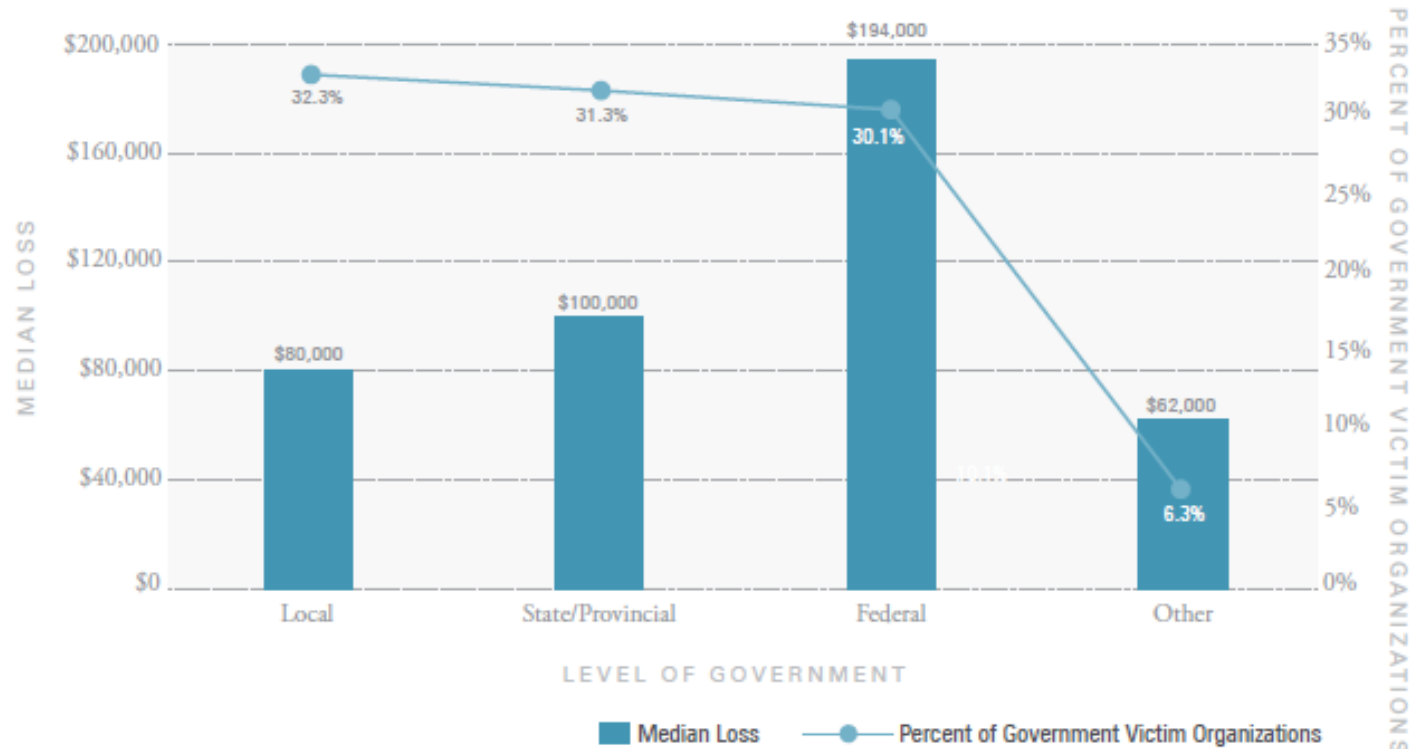


Source: <http://www.acfe.com/rtnn2016/docs/2016-report-to-the-nations.pdf>



# Level of Government Frequency & Median Loss

Figure 39: Level of Government—Frequency and Median Loss

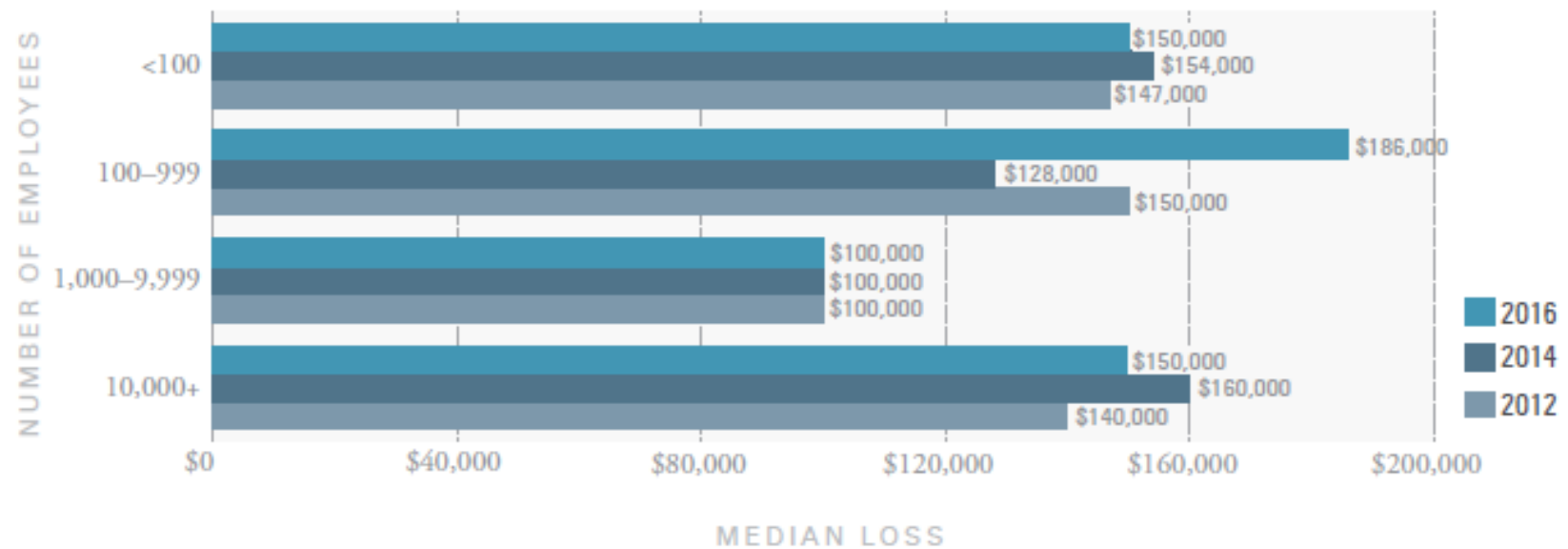


Source: <http://www.acfe.com/rtnn2016/docs/2016-report-to-the-nations.pdf>



# Median Fraud Loss by Organization Size

**Figure 41: Size of Victim Organization—Median Loss**

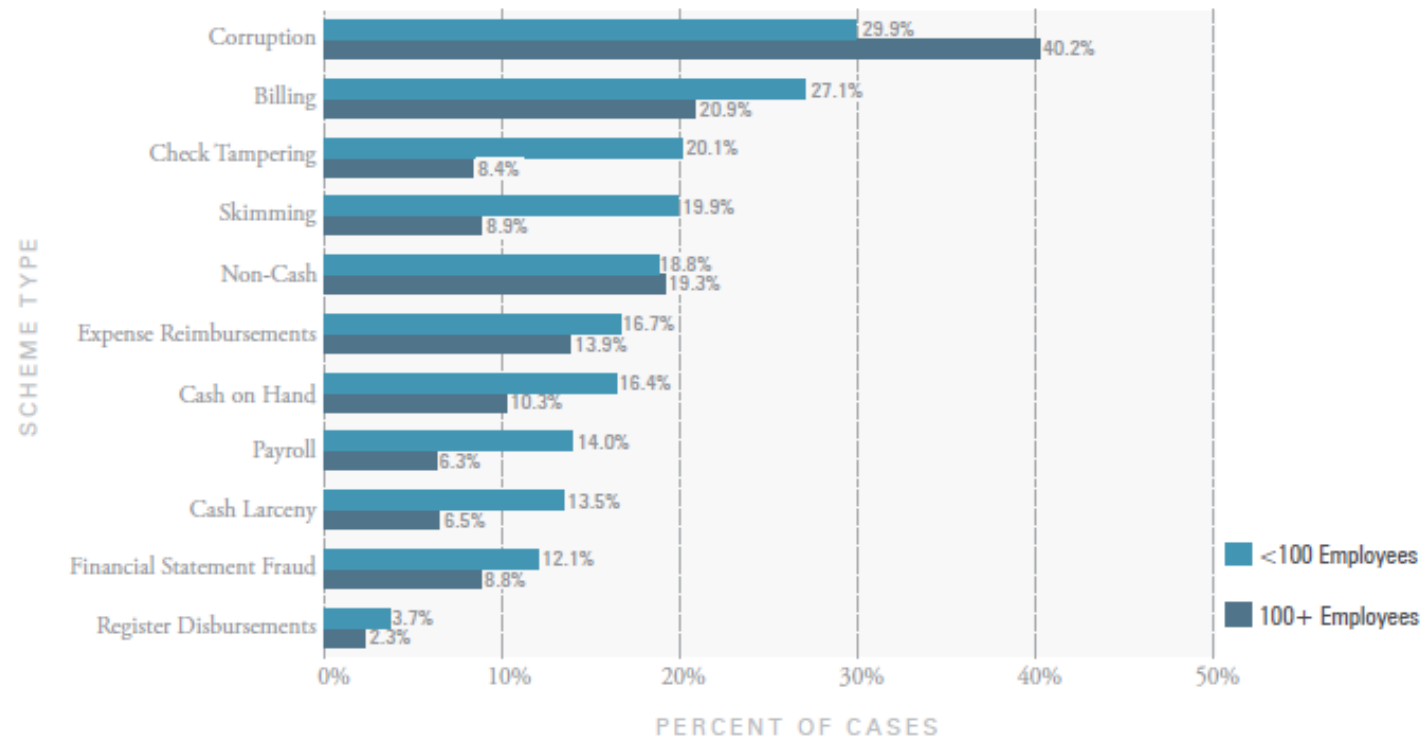


Source: <http://www.acfe.com/rtnn2016/docs/2016-report-to-the-nations.pdf>



# Scheme Type by Size of Victim Organization

Figure 42: Scheme Type by Size of Victim Organization



Source: <http://www.acfe.com/rtn2016/docs/2016-report-to-the-nations.pdf>



# Frequency of Scheme Based on Industry



Industry/Scheme	Banking and Financial Services	Government and Public Administration	Manufacturing	Health Care	Education	Retail	Construction	Insurance	Oil and Gas	Technology	Services (Other)	Transportation and Warehousing	Telecommunications	Services (Professional)	Religious, Charitable, or Social Services
Cases	368	229	192	144	132	104	86	85	74	74	70	68	62	60	52
Billing	9.5%	25.3%	32.8%	31.3%	34.1%	15.4%	27.9%	17.6%	20.3%	29.7%	22.9%	22.1%	12.9%	26.7%	25.0%
Cash Larceny	11.1%	7.9%	5.2%	9.7%	13.6%	12.5%	8.1%	4.7%	4.1%	5.4%	15.7%	4.4%	1.6%	13.3%	9.6%
Cash on Hand	17.9%	10.5%	8.3%	11.1%	17.4%	11.5%	7.0%	4.7%	9.5%	8.1%	22.9%	5.9%	4.8%	20.0%	13.5%
Check Tampering	9.5%	9.2%	13.5%	14.6%	7.6%	9.6%	10.5%	17.6%	4.1%	5.4%	18.6%	10.3%	6.5%	31.7%	25.0%
Corruption	37.5%	38.4%	48.4%	30.6%	31.8%	32.7%	36.0%	28.2%	48.6%	44.6%	28.6%	51.5%	41.9%	16.7%	28.8%
Expense Reimbursements	5.4%	15.7%	22.9%	20.1%	15.9%	8.7%	20.9%	9.4%	10.8%	27.0%	12.9%	8.8%	19.4%	16.7%	25.0%
Financial Statement Fraud	12.0%	7.9%	10.9%	13.2%	5.3%	5.8%	17.4%	7.1%	6.8%	12.2%	17.1%	5.9%	9.7%	11.7%	3.8%
Non-Cash	10.6%	14.8%	30.2%	13.2%	17.4%	32.7%	22.1%	5.9%	17.6%	18.9%	22.9%	29.4%	38.7%	10.0%	13.5%
Payroll	3.8%	13.5%	11.5%	9.7%	7.6%	3.8%	16.3%	5.9%	8.1%	2.7%	11.4%	7.4%	3.2%	11.7%	13.5%
Register Disbursements	2.7%	1.7%	5.7%	2.1%	1.5%	8.7%	1.2%	0.0%	0.0%	1.4%	5.7%	2.9%	3.2%	1.7%	1.9%
Skimming	6.8%	14.0%	8.3%	12.5%	25.0%	17.3%	15.1%	10.6%	8.1%	5.4%	21.4%	11.8%	6.5%	18.3%	19.2%

Less Risk  More Risk

Source: <http://www.acfe.com/rtnn2016/docs/2016-report-to-the-nations.pdf>





# Frequency of Scheme Based on Department

Department/ Scheme	Accounting	Operations	Sales	Executive/Upper Management	Customer Service	Purchasing	Finance	Warehousing/ Inventory
Cases	348	312	260	228	189	161	94	86
Billing	27.0%	21.5%	14.2%	36.8%	9.5%	25.5%	24.5%	9.3%
Cash Larceny	14.9%	7.7%	8.1%	10.1%	14.3%	3.7%	18.1%	0.0%
Cash on Hand	15.5%	13.8%	6.5%	12.3%	18.5%	13.0%	22.3%	5.8%
Check Tampering	30.5%	9.3%	2.7%	13.6%	7.4%	6.2%	24.5%	1.2%
Corruption	21.6%	34.9%	34.6%	50.9%	25.4%	68.9%	37.2%	32.6%
Expense Reimbursements	15.8%	12.2%	14.2%	23.7%	5.8%	14.9%	14.9%	3.5%
Financial Statement Fraud	12.9%	5.4%	7.3%	30.3%	3.7%	3.1%	23.4%	9.3%
Non-Cash	7.2%	19.6%	20.4%	24.6%	16.4%	18.6%	13.8%	57.0%
Payroll	21.6%	6.4%	1.5%	10.1%	3.7%	5.0%	7.4%	2.3%
Register Disbursements	3.2%	4.2%	5.0%	1.8%	3.2%	4.3%	3.2%	0.0%
Skimming	17.5%	12.8%	11.9%	11.8%	16.9%	7.5%	12.8%	5.8%

Less Risk  More Risk

Source: <http://www.acfe.com/rtnn2016/docs/2016-report-to-the-nations.pdf>



# What does procurement fraud look like?

- Kickbacks and bribes
- Bid-rigging
- Billing fraud
- Conflicts of interest
- Change order abuse
- Shell company schemes
- Inflated or duplicate invoices
- Product substitution
- Split purchases
- Sole source abuse
- Unnecessary purchases



# Kickbacks and Bribes

- Key Attributes:
  - Difficult to audit
  - Typically “off book”
  - Typically associated with larger contracts
  - Corruption fraud median loss - \$200,000
  - Kickbacks may be non-cash



# Kickbacks and Bribes

- Major Red Flags:
  - Unexplained change in employee lifestyle
  - All but one employee is happy with goods/service being provided
  - Significant pressure to keep a vendor or unnecessary involvement in the procurement process by an employee
  - Typically not the lowest bid/provider of the service



# Kickbacks and Bribes

- Audit Tests:
  - Purchasing trends over time
  - Identifying Key Performance Indicators (KPIs) and comparing KPIs by vendor
  - Vendor satisfaction surveys – looking for anomalies in the data set
  - When appropriate, implement “Right to Audit” clauses in contracts (#1 defense is a good contract)
  - Identify new vendors and test for procurement



# Kickbacks and Bribes

- Purchasing Trends:
  - Vendor purchases over a 3 year period
  - Vendor purchases by month over a 3 year period
  - Identifying new vendors, then testing for procurement those with the most vendor payments or vendors over a pre-defined procurement threshold
  - Great for data analysis
- KPI Analysis:
  - Average cost square foot of construction, mile of road, average rate per hour, etc.
  - Very manual process, often times metrics are not available



# Bid Rigging

- Key Attributes:
  - Difficult to audit
  - Typically “off book”
  - Typically associated with larger contracts
  - Corruption fraud median loss - \$200,000
  - Typically data analysis is not useful, labor intensive



# Bid Rigging

- Major Red Flags:
  - Limited number of qualified bids
  - Same company has won a bid for a long period of time with no competition
  - Bids exceed internally developed cost estimates
  - Significant increase in prices year over year
  - Large discrepancies in bids
  - Most commonly discovered by a tip





# Bid Rigging

- Audit Tests:
  - Identify new vendors and sample for procurement irregularities
  - Review bids that significantly exceed cost estimates
  - Cases where the ultimate winner of bid subsequently subcontracts with a different bidder (reviewing invoices and contracts for new vendors)



# Change Order Abuse

- Key Attributes:
  - Difficult to audit
  - Typically “off book”
  - Typically associated with larger contracts
  - Typically data analysis is not useful, labor intensive



# Change Order Abuse

- Major Red Flags:
  - Very low bids
  - Procurement method for a vendor is just below competitive bidding threshold
  - Vendors that exceed contracts amounts
  - Changes to scope after procurement
  - Significant increase in vendor spending year over year
  - Poor documentation of change orders
  - “After the fact” approval of change orders



# Change Order Abuse

- Audit Tests:
  - Compare contract listing to purchases by vendor purchases
  - Compare procurement thresholds to vendor purchases
  - Obtain listing of bids and review for those just under pre-determined thresholds
  - Review multi-year contracts that may be more likely to go undetected
  - Select audit procurement bids related to departments with turnover in key fiscal positions



# Conflicts of Interest

- Key Attributes:
  - Difficult to audit
  - Typically “off book”
  - Occasionally employee has a direct interest, but more commonly is a relative
  - Often tied to kickbacks
  - Elected officials and upper management will typically cause the largest fraud



# Conflicts of Interest

- Major Red Flags:
  - Unusual favoritism of particular contractor or vendor
  - Employee has discussions about employment with current or prospective vendor
  - Close socialization with and acceptance of inappropriate gifts, travel or entertainment from a vendor
  - Fiscal or procurement has side businesses



# Conflicts of Interest

- Audit Tests:
  - Employee and vendor address match using fuzzy logic or uniquely created fields to standardize the data
  - Keyword search of master vendor data file or general ledger
  - Sunbiz.org search for companies owned by key members of management
  - Sunbiz.org search for significant vendors, then comparison to



# Conflicts of Interest

## Summary:

CLA imported the entire check register and the county wide employee listing into IDEA for analysis. CLA compared the street address + zip code of all employees and all vendors for matches. CLA reviewed the transactions highlighted on the first tab, including the check and the invoice for proper approval and invoice details and inquired of XXXXXXXX, payroll clerk, and XXXXXXXXXXXXXXXX, AP Manager for accuracy and appropriateness, The below explanations were given by XXXXXXXX. CLA deemed these explanations to be reasonable,

SUPPLIER	EXPLANATION
ABC HOMES LLC	ABC Homes and Linda Perkins – Linda has an apt #60 on her address. ABC Homes owns the apartment complex.
THE APT HOUSE	The APT House and John Davis – same as above. John rents an apt and The APT House is the apartment complex.
LEE JONES	Lee Jones – as a supplier received a private pay refund for a Nursing Home patient (typically family).
BOB HUNGRY	Bob Hungry – as a supplier received a private pay refund for a Nursing Home patient (typically family).
TED WILLIAMS	Ted Williams and Ned Williams – Ted received poll worker pay - relatives at same address.
ABC LAWN SERVICE INC	ABC Lawn Service Inc and John Doe – different apartment #'s at same street address.

## ZIP\_CODE\_AND\_NUMERIC\_ADDRESS

29579\_12343  
 29801\_929  
 29830\_1400  
 29830\_1500  
 29830\_5069  
 29850\_125  
 29880\_200  
 29880\_346  
 29880\_346  
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# Conflicts of Interest

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Entity Name:

Enter as: Last Name, First Name, Middle Initial. Partial names are acceptable.



# Procurement Method Errors

- Key Attributes:
  - Easy to audit with data analysis
  - Challenge with larger ERP systems is aggregating the data
  - Often times procurement data is not in the vendor module
  - Errors are as likely to happen as intentional fraud
  - Typically committed at the department level
  - Most systems do not provide preventive measures, typical audit measures are detective
  - More difficult if multiple forms of payments exist
  - Procurement officers only know what procurement officers know



# Procurement Method Errors

- Major Red Flags:
  - Weak internal controls over procurement
  - No detective controls currently being utilized
  - Decentralized purchasing
  - Turnover in procurement officer/department
  - Turnover in fiscal managers



# Procurement Method Errors

- Audit Tests:
  - Begin with meaningful planning meeting
  - Benford's Law analysis is useful
    - ◇ Single digit analysis for 1,000 to 10,000
    - ◇ Two digit analysis and other analysis over 10,000 transactions
  - Summarize purchases by vendor
    - ◇ Summarize review those purchases above/below procurement thresholds
    - ◇ Be aware of "pyramid purchases"
  - Focus on sole source, emergency procurements, higher dollar amounts, new vendors
  - Split purchases test



# Benford's Law Analysis

- What place does Benford's Law Analysis have for accountants and auditors?
- When do we utilize it?
- Do we over rely on automated tools to identify higher risk transactions?
- What is the typical "next step" after looking at Benford's?
- Are we performing a Benford's analysis to respond to a risk or to identify a risk? Or for a different purpose?

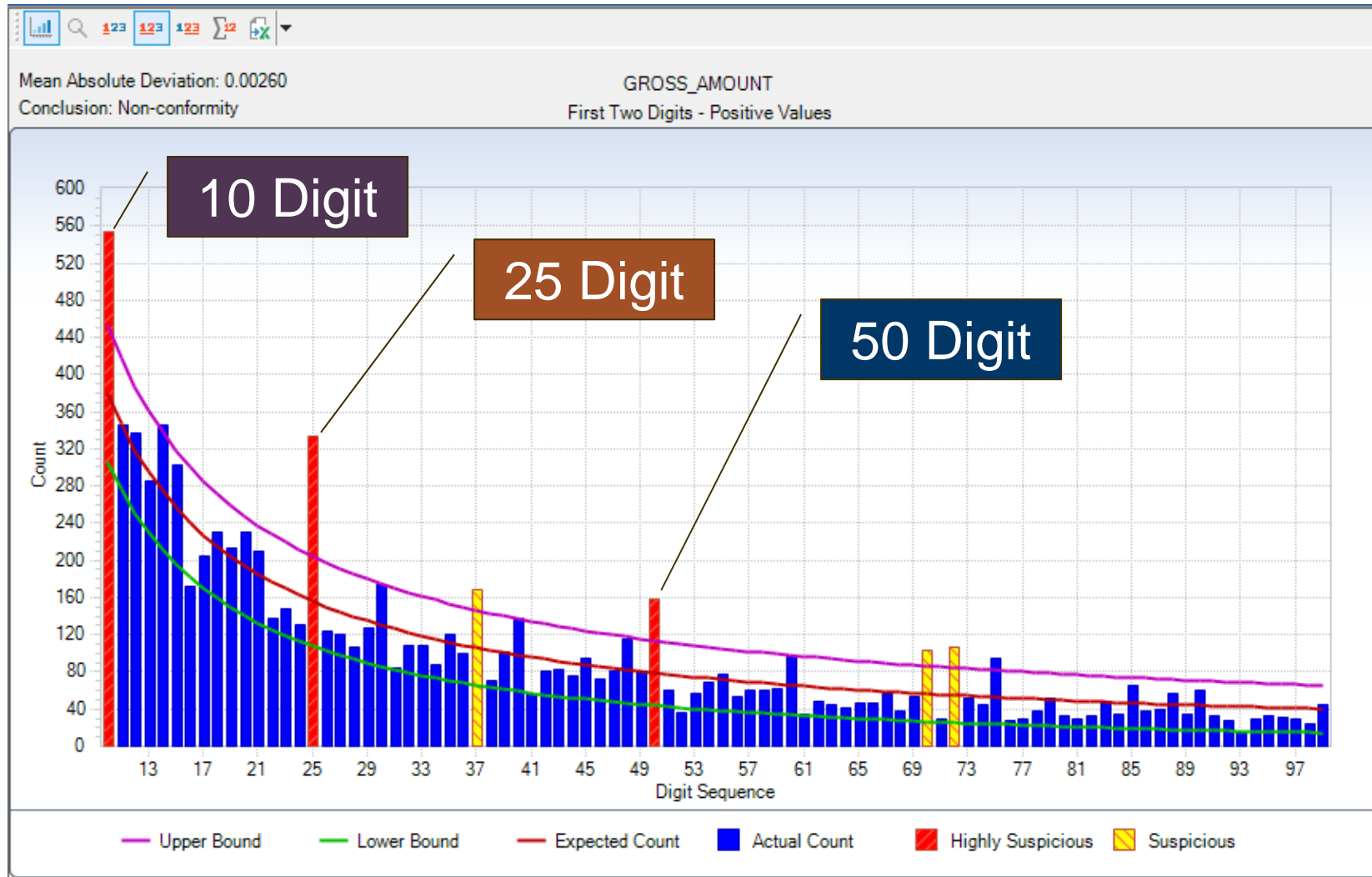


# Benford's Law Analysis

- Most useful to understand population, unless you have a specific risk identified
- Useful for any data set, not just procurement and journal entries
- High risk transactions identified by data analysis tools are not necessarily high risk
- Typical outcome is a deeper understanding of the data set
- Learn when to use Benford's



# Procurement Method Errors



# Procurement Method Errors

- Case Study in Risk Based Sampling:
  - Client uses a large ERP system
  - Some procurement data is in the same ERP, some data is maintained in a different system
  - AP department documents procurement method when known
  - Contract data is entered in a manual field (i.e. data is not structured and can be different each time)
  - No common identifiers between procurement data and AP data
  - No issues in the past with procurement, but had difficulty identifying higher risk procurements
  - Strong preventive internal controls, however, no detective controls





# Procurement Method Errors

- Designed test to uncover “pyramid purchases”:
  - Summarized vendors with purchases over \$25,000, but that did not have expenses charged to any one fund over \$25,000
  - Obtained a list of 61 vendors that met the above criteria, totaling over \$4 million in purchases
  - Of the list of 61 vendors, 6 vendors (10% variance rate) used unacceptable procurement methods.
  - Procurement method errors were primarily unintentional, however, did not comply with the procurement policy



# Procurement Method Errors

- Skills needed to perform this test:
  - Team used IDEA and specifically the following features and formulas:
    - ◇ Summarization
    - ◇ Joined databases
    - ◇ Pivot tables
    - ◇ Filtering
- Relatively simple analysis helped us identify “higher risk” vendors for testing



# Procurement Method Errors

- Case Study in P-Card Testing:
  - Obtained all purchases with all available information from p-card vendor
  - P-Card Vendor was Bank of America
  - Daily limits, monthly limited – fully automated controls
  - All procurement rules still apply
  - P-Card did not allow for IT purchases outside of the IT department
  - Concerned about terminated employees
  - Over 25,000 transactions and 900 users



# Procurement Method Errors

- Results P-Card Testing:
  - Noted numerous transactions where the procurement method was not filled out
    - ◇ Recommended this field become a required field
  - 73 terminated employees, 2 employees had activity after termination date
  - Performed word search on entire database and identified 2 instances of IT equipment being purchased that was not purchased by the IT department
  - Summarized purchases by vendor by P-Card, 5 instances of suspected split purchase fraud






# Analyses to Understand Data

## What comes first?



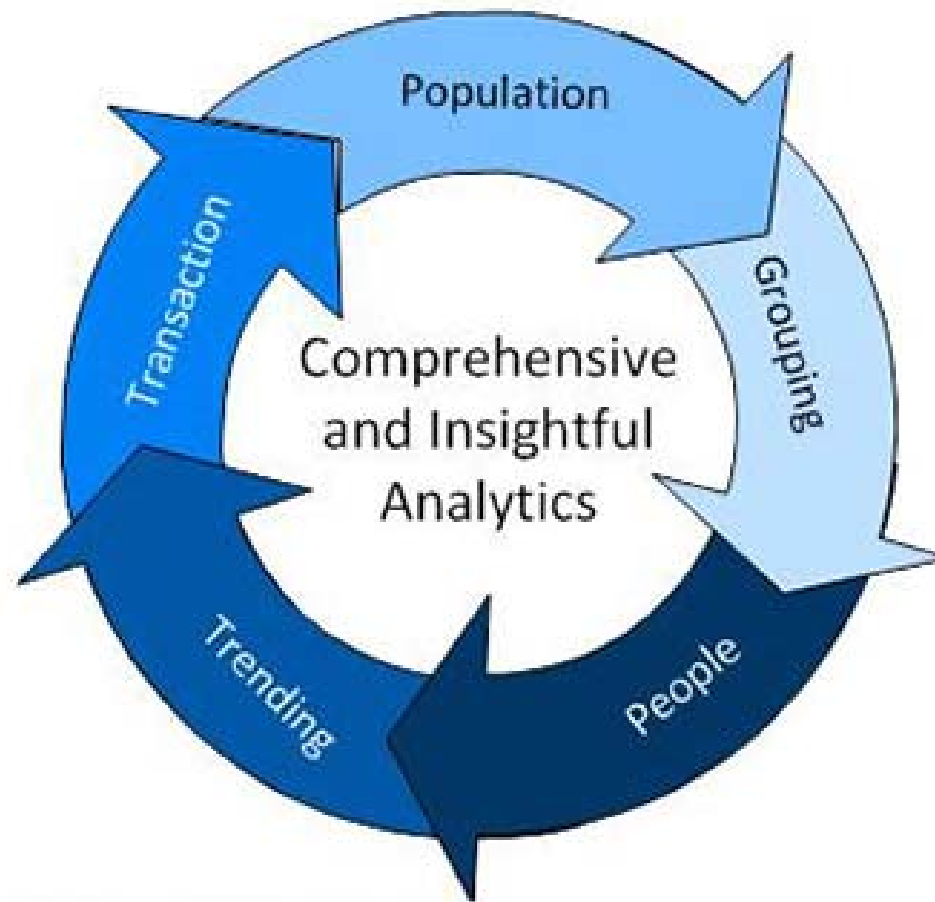
Risk /  
Question



Test /  
Analysis



# Types of Analytics



# Types of Analytics

- Population analytics — Understand the entire population
  - Example test: Stratification by \$10,000 increments
- Grouping analytics — Summarize transactions into meaningful groups
  - Example test: Summarization of manual journal entries by accounts
- People analytics — Garner insight into who benefits from and who is responsible for a transaction
  - Example test: Count and sum of journal entries by inputting user





## Types of Analytics

- Trending Analytics — Show results through time.
  - Example test: Sum cash disbursements by month
- Transaction Analytics — Isolate transactions exhibiting particular traits.
  - Example test: Transactions occurring on a weekend



## Field Statistics - Numeric

Numeric Statistics	DEBIT	CREDIT	NET_AMOUNT...	ABS_VAL
► Net Value	553,867,332.51	5,307,840.54	548,559,491.97	559,175,173.05
Absolute Value	553,867,332.51	5,307,840.54	559,175,173.05	559,175,173.05
# of Records	36,282	36,282	36,282	36,282
# of Zero Items	2,336	34,766	820	820
Positive Value	553,867,332.51	5,307,840.54	553,867,332.51	559,175,173.05
Negative Value	0.00	0.00	-5,307,840.54	0.00
# of Positive Records	33,946	1,516	33,946	35,462
# of Negative Records	0	0	1,516	0
# of Data Errors	0	0	0	0
# of Valid Values	36,282	36,282	36,282	36,282
Average Value	15,265.62	146.29	15,119.33	15,411.92
Minimum Value	0.00	0.00	-565,000.00	0.00
Maximum Value	24,018,362.00	565,000.00	24,018,362.00	24,018,362.00
Record # of Min	54	1	26,191	878
Record # of Max	4,908	26,191	4,908	4,908
Sample Std Dev	254,036.45	4,151.58	254,079.16	254,061.58
Sample Variance	64,534,516,620.94	17,235,629.62	64,556,218,913.13	64,547,285,587.98
Pop Std Dev	254,032.95	4,151.52	254,075.66	254,058.08
Pop Variance	64,532,737,928.57	17,235,154.57	64,554,439,622.61	64,545,506,543.67
Pop Skewness	54.448766	89.146947	54.422595	54.431230
Pop Kurtosis	3,660.344793	10,490.437048	3,658.008335	3,658.770831



# Field Statistics - Date

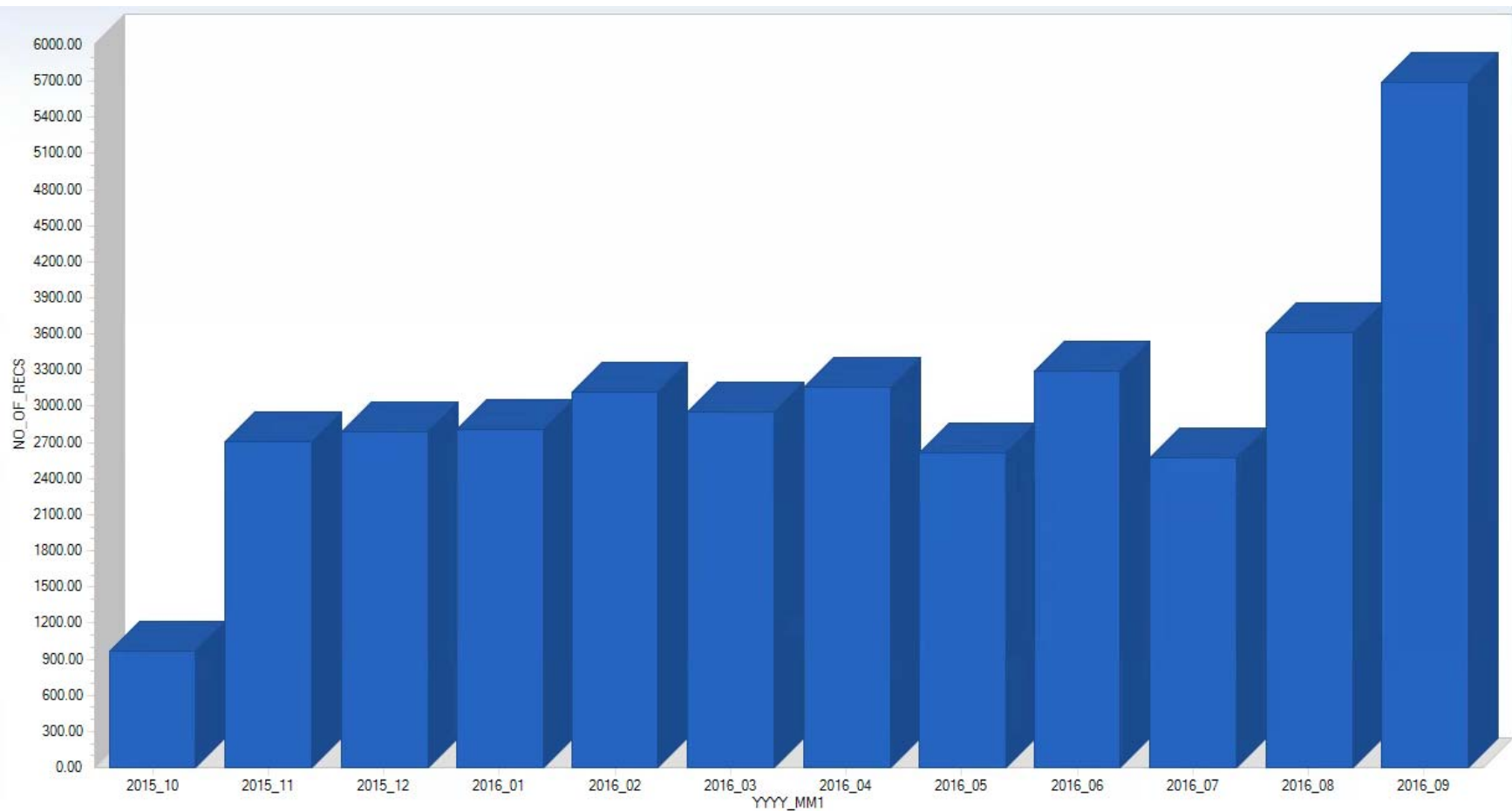
Date Statistics	GL_DATE
► # of Valid Values	36,282
# of Zero Items	0
# of Records	36,282
# of Data Errors	0
Earliest Date	10/1/2015
Latest Date	9/30/2016
Record # of Earliest	1
Record # of Latest	25466
Most Common Day	Wednesday
Most Common Month	September

Items on Sunday	7
Items on Monday	6267
Items on Tuesday	8701
Items on Wednesday	10944
Items on Thursday	3396
Items on Friday	6708
Items on Saturday	259

Items in January	2811
Items in February	3115
Items in March	2950
Items in April	3155
Items in May	2614
Items in June	3296
Items in July	2571
Items in August	3616
Items in September	5694
Items in October	965
Items in November	2707
Items in December	2788



# Field Statistics - Monthly



# Stratification – Sum by Net DR/CR

Totalled on: NET_AMOUNT_DR_CR						
Stratum #	>= L Limit	< U Limit	# Records	(%) # Records	NET_AMOUNT_DR_CR	(%) _AMOUNT_DR_CR
1	0.00	20,000.00	<a href="#">32,603</a>	89.86	51,074,751.27	9.31
2	20,000.00	40,000.00	<a href="#">844</a>	2.33	24,027,137.10	4.38
3	40,000.00	60,000.00	<a href="#">354</a>	0.98	17,410,977.02	3.17
4	60,000.00	80,000.00	<a href="#">203</a>	0.56	13,815,739.92	2.52
5	80,000.00	100,000.00	<a href="#">131</a>	0.36	11,812,450.93	2.15
		Lower limit exceptions:	<a href="#">1,516</a>	4.18	-5,307,840.54	-0.97
		Upper limit exceptions:	<a href="#">631</a>	1.74	435,726,276.27	79.43
		Totals:	36,282	100.00	548,559,491.97	100.00



# Summarization by Fund

	CHILD_FUND_DESC	NO_OF_RECS	SUM ▼	AVERAGE	VARIANCE	STD_DEV
1	G	<a href="#">9803</a>	267,707,053.00	27,308.69	222,346,508,384.00	471,536.33
2	Er	<a href="#">502</a>	51,735,816.45	103,059.40	89,555,289,287.82	299,257.90
3	In	<a href="#">937</a>	32,910,533.36	35,123.30	11,544,798,159.23	107,446.72
4	U	<a href="#">4656</a>	22,213,750.61	4,770.99	330,855,138.50	18,189.42
5	Tr	<a href="#">629</a>	19,766,605.14	31,425.45	10,686,675,256.13	103,376.38
6	U	<a href="#">123</a>	13,535,782.41	110,047.01	105,363,229,653.39	324,597.03
7	N	<a href="#">92</a>	13,327,728.51	144,866.61	87,195,898,183.35	295,289.52
8	N	<a href="#">58</a>	11,658,656.86	201,011.33	119,357,499,584.37	345,481.55
9	P	<a href="#">39</a>	7,894,101.28	202,412.85	162,005,878,131.53	402,499.54
10	Fi	<a href="#">138</a>	7,546,711.50	54,686.32	14,333,143,592.15	119,721.11
11	Fi	<a href="#">937</a>	6,297,238.66	6,720.64	480,362,162.50	21,917.17
12	N	<a href="#">605</a>	5,441,695.94	8,994.54	2,479,286,908.15	49,792.44
13	U	<a href="#">73</a>	4,783,712.27	65,530.31	16,672,994,197.00	129,123.95
14	Tr	<a href="#">4</a>	4,132,725.00	1,033,181.25	776,438,487,135.42	881,157.47
15	To	<a href="#">1041</a>	4,116,262.82	3,954.14	178,743,713.90	13,369.51
16	Zr	<a href="#">20</a>	3,913,341.66	195,667.08	90,212,363,271.91	300,353.73
17	Sp	<a href="#">12</a>	3,590,011.66	299,167.64	14,429,762,783.71	120,123.95
18	C	<a href="#">4</a>	3,437,195.63	859,298.91	1,712,586,674,080.44	1,308,658.35
19	Li	<a href="#">61</a>	3,301,605.39	54,124.68	39,331,455,582.99	198,321.60
20	Pu	<a href="#">4</a>	3,274,225.00	818,556.25	783,502,125,989.58	885,156.55
21	Fi	<a href="#">1354</a>	3,269,272.99	2,414.53	104,855,203.03	10,239.88
22	Ge	<a href="#">93</a>	2,984,457.83	32,090.94	6,183,396,186.06	78,634.57
23	C	<a href="#">4</a>	2,754,675.00	688,668.75	528,060,146,406.25	726,677.47
24	Le	<a href="#">1183</a>	2,463,280.61	2,082.23	47,322,515.32	6,879.14
25	T	<a href="#">6</a>	2,398,721.26	399,786.88	159,063,602,082.08	398,827.78

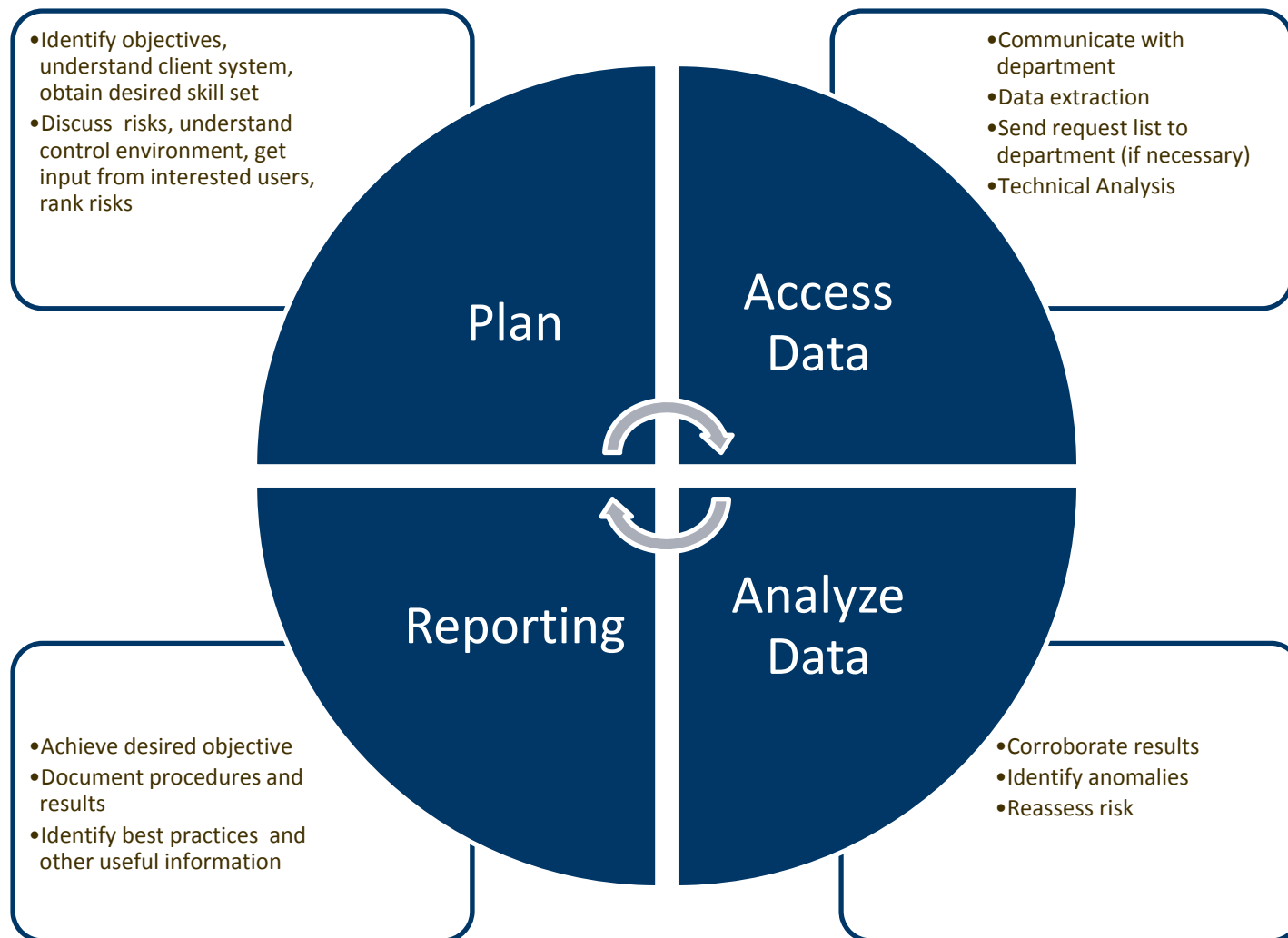






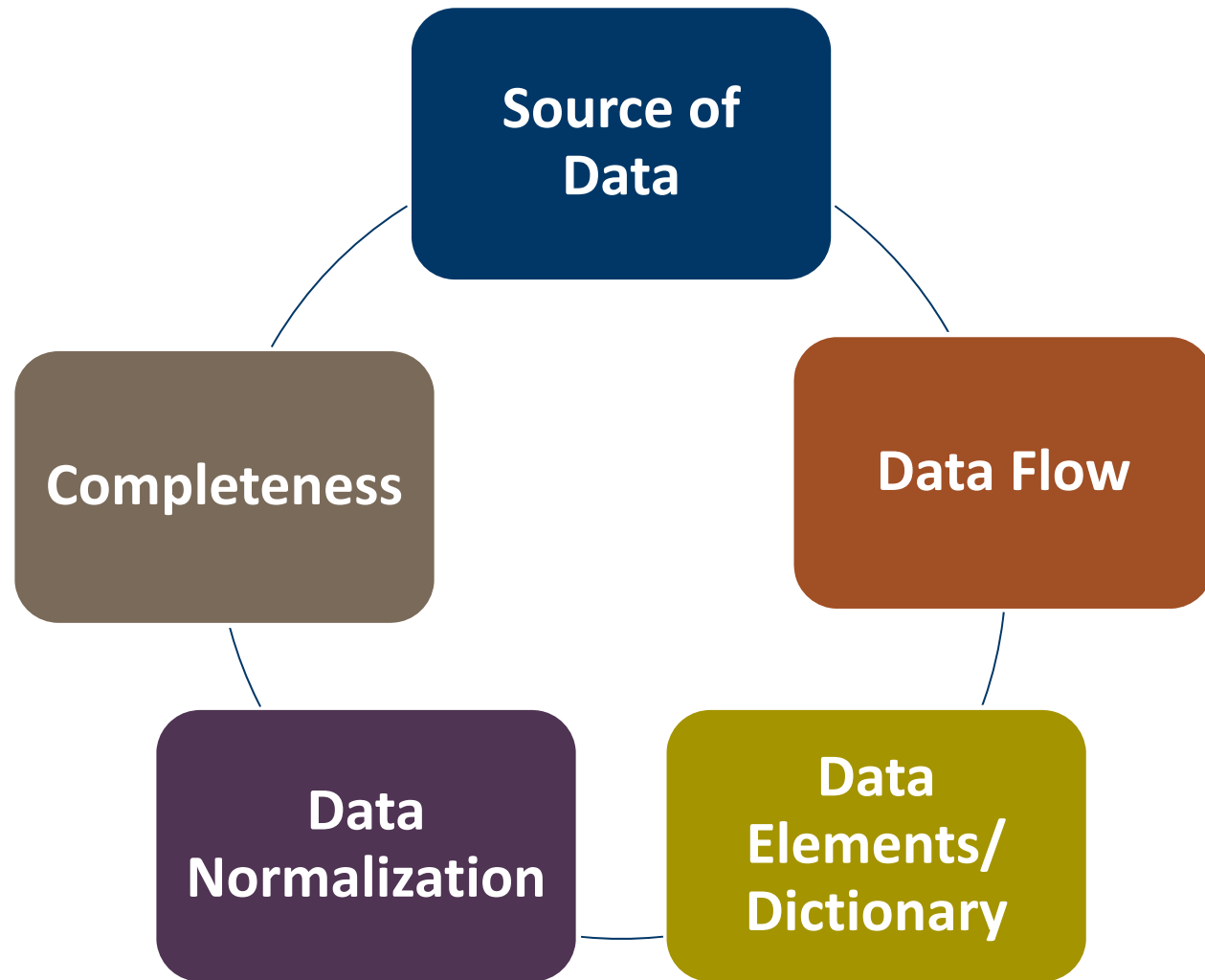
# Primer on Data Analysis

# Basic Data Analysis Methodology





# Data Integrity



## Data Integrity – Best Practices

- Flowchart for larger ERP systems (evaluate all known tables and databases)
- Maintain a data dictionary for data elements
- Identify data elements that can added to the ERP system to reduce time
- Completeness:

“Check twice, analyze once”



# Access Data

- Commonly requested information types include, but are not limited to:
  - General Ledger Detail
  - Journal Entries
  - Accounts Receivable
  - Accounts Payable
  - Contribution Records
  - Cash Disbursements
  - Procurement Records
  - Payroll
  - Credit Cards
  - Travel and Entertainment Expenses
  - Subsidiary Ledgers (Various)
  - Along with the above noted data sets, the following information is also needed to adequately interpret the data files:
    - ◇ Chart of Accounts
    - ◇ Data Dictionary
    - ◇ File Source Listing – indicating from which systems and locations the data was extracted
  - Vendor Master File (A/P, A/R, Sales)



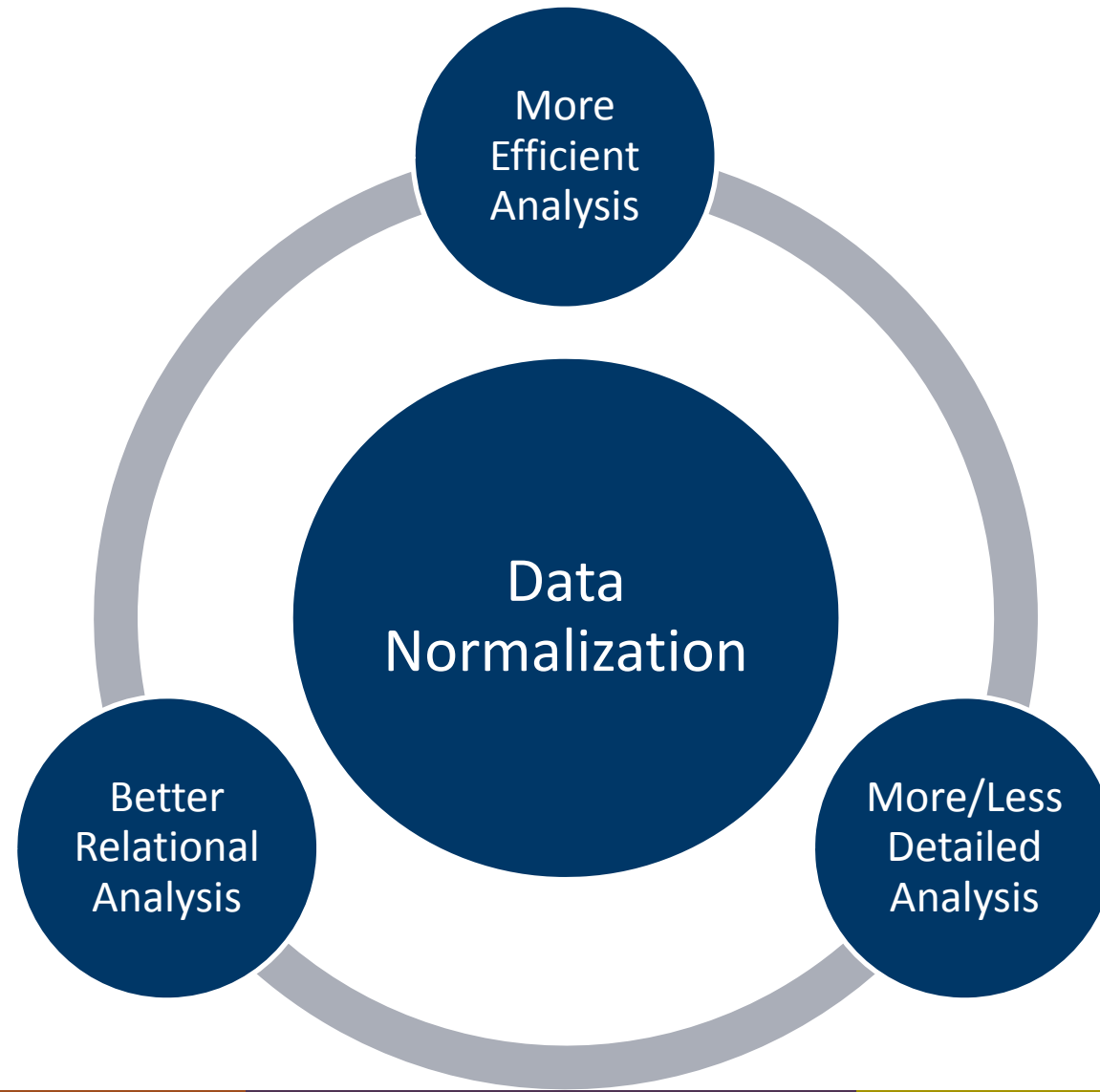
# Common Data Types

- Data Elements:

- **Character** – text data; this should be used for included data that is not, Numeric, Date, or Time. Also, if you are unsure whether a data field maintains the same structure throughout the entire database, character should be used as the “default” selection.
- **Numeric** – numeric data; generally, the rule of thumb is that if you are going to use (or may use) the field as a part of a mathematical calculation, it should be defined as Numeric, the field should contain only numbers (and commas, parenthesis, periods).
- **Date** – date data (a mask is required, such as “MM/DD/YYYY”); if the data field contains date information with a consistent mask throughout, it should be imported as a date.
- **Time** – time data (a mask is required, such as “HH:MM:SS”); if the data field contains time information with a consistent mask throughout, it should be imported as a time.



# Data Normalization

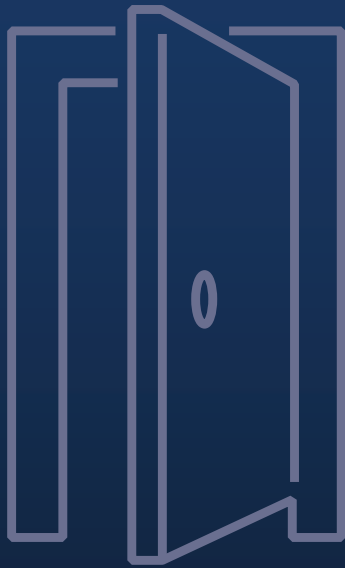


# Common Data Normalization Fields

- Absolute Value
- Month
- Year
- Month Year/ Year Month
- Account Number Segmented
- Fund (parent and child fund)
- Fund Type and Fund Subtype
- Financial Statement Class
- Subsidiary Ledger Identifier
- Functional expense allocation
- Workday / Weekend
- Day of the week
- Days to posted
- Balance Sheet/Income Statement
- CFDA / CFSA Number and Description
- Shortened version of account number or vendor field
- Statistics by vendor/line item description
- Usernames / user title / user department
- Creating data from data

Data Normalization Now =  
Significant Time Savings Later





# Questions?

**Lance E. H. Schmidt, CPA, CFE**  
**Principal**

**State and Local Government**

Direct 863-680-5634

[Lance.Schmidt@CLAconnect.com](mailto:Lance.Schmidt@CLAconnect.com)

**Let us know how we can help!**

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