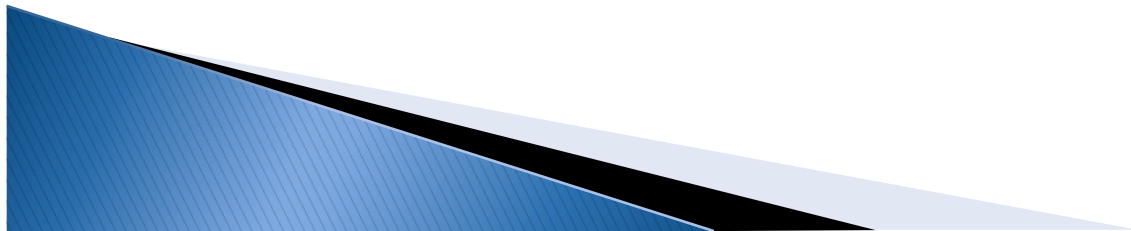# Data Analytics

Jonathan Shipman, Ernst & Young
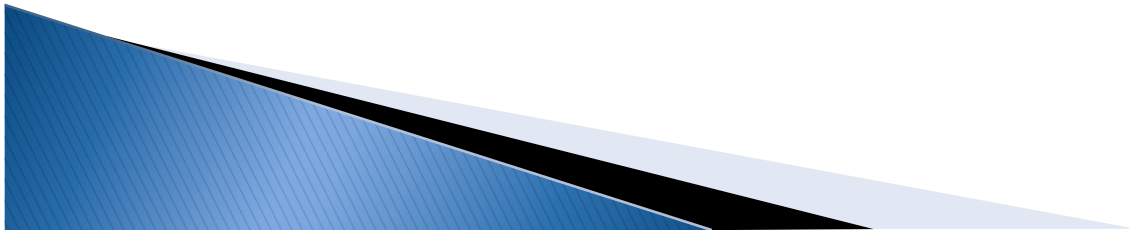David Morgan, Ernst & Young

Learning Objectives

- Understand how data analysis can impact/improve business
- Understand typical data analysis challenges
- Understand the various CAATs that can be employed in the audit
- Understand solutions beyond CAATs
- Understand typical technologies/approaches used to execute on data analytic projects

Agenda

- **Overview**
  - What is data analytics?
  - What we observe in the marketplace
  - When to use analytics
  - What do we need to deliver analytics?
  - What to look for?
  - How will analytics benefit my organization?
- **Computer Aided Auditing Techniques (CAATs)**
  - How can CAATs change my audit?
  - What are some examples of CAATs?
- **Beyond CAATs**
  - What else can we do with our data?
  - Where else can we use analytics?
  - What is an example of a cost analytic?
  - What is an example of a process analytic?
  - How do we deliver business insights?
- **Tools and Approaches**
  - What are some analytic tools to consider?
  - What is an example of statistical data analysis?
  - What is an example of visual data analysis?
- **Q&A / Discussion**

Overview

What is Data Analytics?

▸ **Data Analysis is…**
- ◦ Analysis of data to identify anomalies, trends and risk indicators
- ◦ Analysis is based on large population of transactions instead of sample
- ◦ Act of transforming data with the aim of extracting useful information and facilitating the achievement of factual conclusions.

▸ **In practical terms…**
- ◦ Data analysis is used to supplement or replace other procedures – including inspection, inquiry, observation, and re-performance
- ◦ Facilitates the identification and resolution of business process risks and inefficiencies through analysis of client data
- ◦ Coverage over complete populations of data
- ◦ Able to draw on multiple data sources and systems
- ◦ Objective and factual results

What we observe in the marketplace

▸ The expectation gap is widening on the topic of fraud, as well as the overall role of the financial statement audit

▸ The unprecedented cost of control and compliance is placing pressure on corporations and auditors to upgrade auditing techniques through technology

▸ Dramatic improvements are being made in the cost and advancement of technology to monitor business operations and create business intelligence

▸ SOX has resulted in heightened Audit Committee interest in fraud and process/control integrity

When to use analytics

Triggers	Questions
We have millions of records to analyze.	How can we get it done in time?
Our client recently underwent and accounting change.	How can we confirm the method is accurate?
We suspect inventory is improperly valued.	How can we test our suspicion?
Our systems contain data, but not in the format needed.	How can we get it in the right format?
My client has recently acquired several companies.	How can I get comfortable with the new organization? How do I confirm the converted data is reliable?
I have data in an unusable format.	How can I get the data in a format I can analyze?
I need to test an estimate.	How can I confirm the estimate is accurate?
My process is broken.	How do I quantify the cost?
I want to improve my forecasting.	How can I develop a model for my business?
My client has gone through a system change.	How do I get data out of this new system? How can I confirm a successful data conversion?

When to use analytics (cont)

Process & Controls Analytics

▸ Audits on transactional processes
▸ Need to quantify findings
▸ Account reconciliation challenges
▸ Reporting errors

Compliance Analytics

▸ New regulatory requirements
▸ Concern over integrity of existing compliance process

Fraud Analytics

▸ Suspect irregularities, fraud, or lack of controls – but need to collect hard evidence
▸ Internal investigations

Data Quality

▸ Planning to implement a new IT system or integrate additional IT systems
▸ Independent verification of data processing

Process & Functional Benchmarking

▸ Concerns over efficiency of a process or function
▸ Desire to improve a process or function

Decision Support

▸ Systems unable to provide relevant information
▸ Data acquisition challenges
▸ M&A due diligence

What do we need to deliver analytics?

- Competencies:
  - Data Analysis Expertise
  - Accounting and Technology
  - Business Process Understanding
  - Risk and Controls Expertise
  - Financial Audit Background
  - Deep Analytical Skills
 - Process Focused
  - Business Mindset
- Software
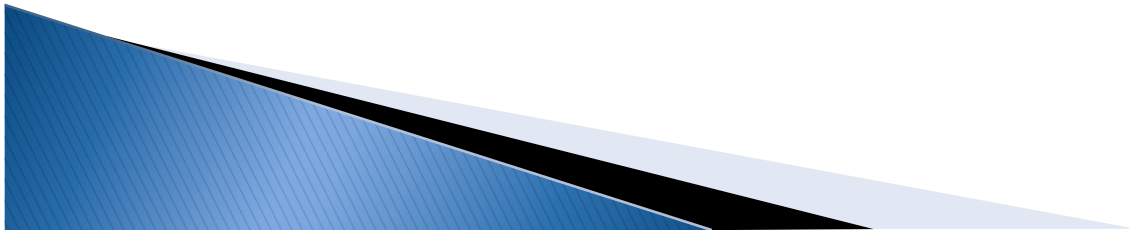- Hardware

How will analytics benefit my organization?

▸ Provides a more efficient analytical approach to typically manually intensive operations
▸ Specialized skill-sets focused around large and unstructured data sets
▸ Procedures can be performed on the entire population rather than on a sample (higher-level of assurance)
▸ Maximizing enterprise risk coverage
▸ Building sustainable and repeatable methods of control assessment
▸ Increasing the focus on fraud detection and monitoring
▸ Enhancing foundation and expert competencies (career opportunities)
▸ Achieve high management satisfaction and tangible business value

Summary

▸ Data analytics drive efficiency and increased value

▸ Potential opportunities can be identified by keeping an eye out for key indicators (triggers and questions)

▸ The market for data analytic projects is growing as more and more companies leverage more and more data on a daily basis
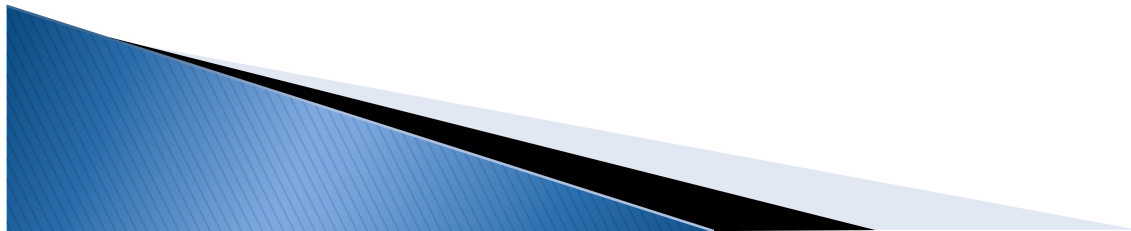
Computer Aided Auditing Techniques (CAATs)

How can CAATs change my audit?

▸ **Broader Audit Coverage** – Audit results are based on a significantly larger population than the traditional sample based approach

▸ **Flexible Approach** – Features and scope of services can be tailored to fit unique needs

▸ **Ability to Quantify Results** – Ability to easily quantify results in terms of Dollars and Frequency

▸ **Improvement in Efficiency** – Leverage technology to provide more efficient and cost-effective process for acquiring, managing, and analyzing data

How can CAATs change my audit? (cont)

▸ **Reduction in Overall Effort** – Data Analysis can be used to reduce manual substantive procedures

▸ **Understanding Root Causes** – Use of analytics facilitates a deeper and broader understating of the issues and root causes.

▸ **Enables Audit Re-performance** – Analytics are repeatable with minimal effort, enabling re-performance at regular intervals

▸ **Improvement in Audit Quality** – Regulatory agencies have been critical of audit firms for failure to further leverage technology to improve audit quality and efficiency

What are some examples of CAATs?

Accounts Payable

Accounts Receivable

Inventory

Journal Entry

Payroll

Employee Expense

Procurement Cards

Planning

Change in Process

Benchmarking

Recurring Audit
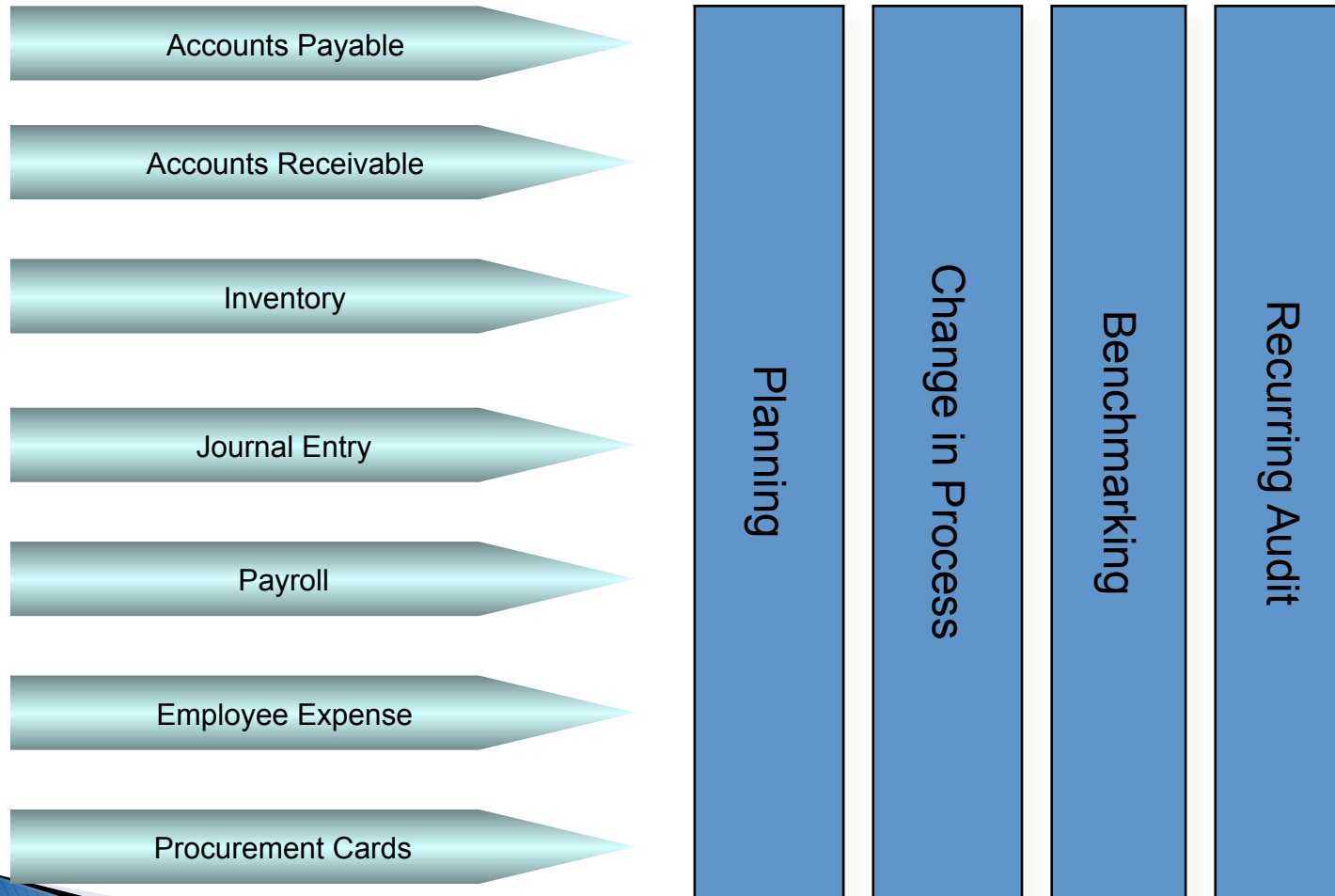
Summary

▸ CAATs offer a way to reduce substantive procedures and highlight potential areas of high risk

▸ CAATs are not isolated solely to journal entries but span across most of the common business processes

▸ CAATs can occur during the planning stages of an audit as well as later on when an area of risk is identified

Beyond CAATs

What else can we do with our data?

▸ Data from across the business can be used to perform value-add analytic procedures
▸ Rather than a compliance focus, analytics can be used to help make the business better by:
  ◦ Improving processes
  ◦ Identifying potential savings (e.g. procurement, travel & expense policies)
  ◦ Properly planning for a system migration (data mappings, quality, integrity)
  ◦ Clean up various master data (e.g. vendor, employee)

Where else can we use analytics?

▸ **Revenue Analytics**
- Profitability analysis
- Sales analysis
- Customer analytics
- Price optimization (price water fall)

▸ **Cost Analytics**
- Productivity analysis
- Supply chain management analysis
- Vendor performance analysis
- Spend optimization

▸ **Process Analytics**
- Procure to pay
- Order to cash
- Record to report
- Inform to drive
- FSCP
- Fixed assets
- Expense analysis

▸ **Information Management**
- Vendor risk analysis
- Security analysis and SOD
- Logical and Physical access convergence
- Data migration
- Data profiling
- Data quality assessments
- Data governance
- Log data analysis
- Knowledge Management

▸ **Strategic**
- Valuation analysis
- Tax analysis
- Market analysis
- IP portfolio analysis
- Operational dashboards
- Trend analysis
- Predictive analytics

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What is an example of a cost analytic?

- Scenario
  - Hypothesis of millions of dollars in unexercised/unclaimed contractual discounts
  - Inability to identify discrepancies between contracts and purchases
  - System limitations in transacting complex terms of vendor contracts

- Results
  - Developed and applied analytical logic to reconcile historic transactional data against contractual terms
  - Designed process and developed reporting engine which allowed buyers to identify and correct contractual discrepancies
  - Piloted process/tool at one division and identified over $13 million in recovery opportunities

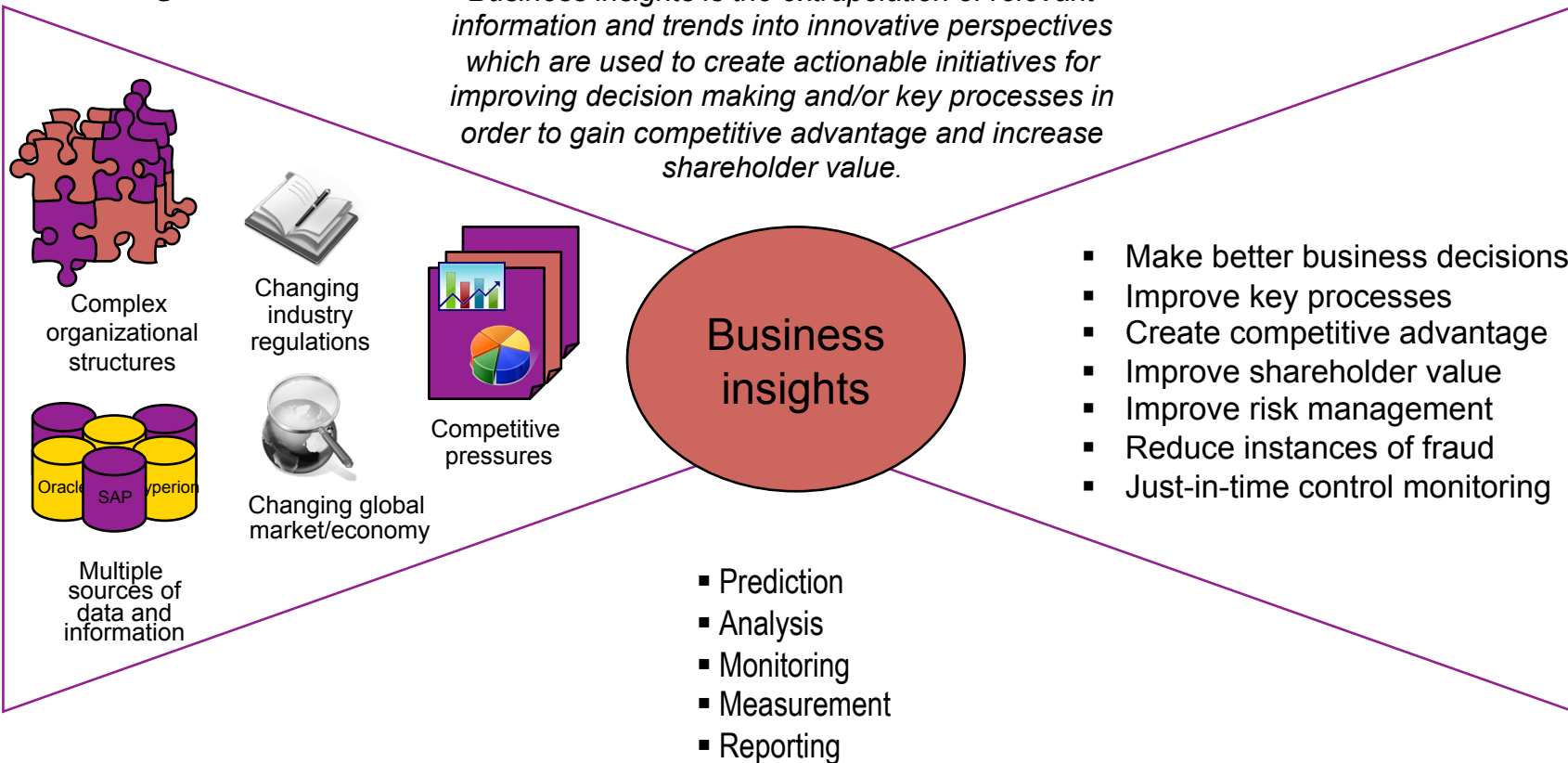# What is an example of a process analytic?

Scenario

- Conduct a Travel and Expense review
- *Traditional Approach* – Sample 25 individual employees out of the 200 employees at one business unit—evaluate compliance with company travel policy, adequate authorization for travel and reasonableness of expenses
- *Analytical Approach* – Analyze the T&E submissions of all 60,000 employees for a 12-month period—benchmark results against available industry T&E data, re-performance of analysis after 6 months to evaluate impact of remediation

Results

- *Impact of not using preferred Travel Partners – $2.3M*
  - $2M in higher per night hotel costs—50% of employees using hotels outside of network
  - $185K in rental car costs
  - Lost $125K in Earned Value Discounts
- *Use of online booking tool* – used by 10% of employees—if increased to 50%, could save **$2.5M**
- Benchmarking
  - Only 18% of tickets are non-refundable compared to 51% among other American Express clients
  - Company books 50% more trips within 3 days than other American Express Clients
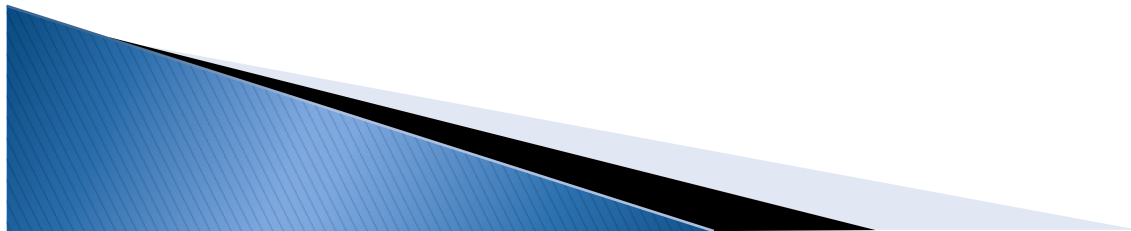
How do we deliver business insights?

Challenges

Benefits

Business insights is the extrapolation of relevant information and trends into innovative perspectives which are used to create actionable initiatives for improving decision making and/or key processes in order to gain competitive advantage and increase shareholder value.

Complex organizational structures

Changing industry regulations

Competitive pressures

Oracle SAP Hyperion

Changing global market/economy

Multiple sources of data and information

Business insights

- Make better business decisions
- Improve key processes
- Create competitive advantage
- Improve shareholder value
- Improve risk management
- Reduce instances of fraud
- Just-in-time control monitoring

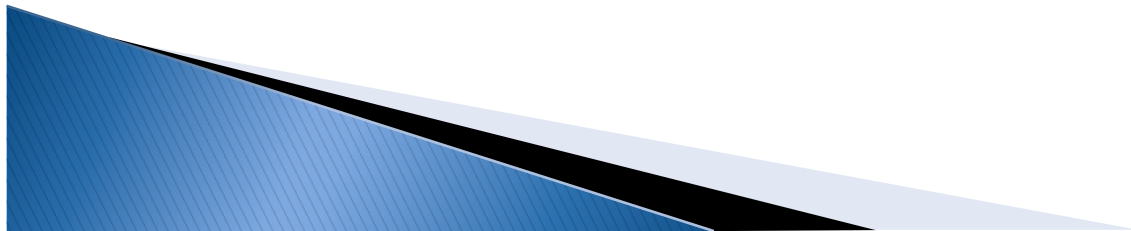- Prediction
- Analysis
- Monitoring
- Measurement
- Reporting

Summary

▸ Beyond just standard CAATs, analytic approaches can be leveraged across all areas of the business

▸ Analytics can be used to "make the business better", not just in compliance efforts

▸ Potential uses span from data quality and transformation to complex revenue and spending analysis

Tools and Approaches

What are some analytic tools to consider?

General Purpose

ACL

SAS

Microsoft SQL Server / Oracle

Microsoft Excel / Access

Data Acquisition	Analysis
▸ DataFlux ▸ Monarch	▸ Tableau ▸ Cognos, Proclarity, Oracle, Speedware (MDA) ▸ Unstructured Data Analysis Tools
Reporting ▸ Business Objects Crystal Reports & Xcelsius ▸ Microsoft Reporting Services ▸ Performance Point	

What is an example of statistical data analysis?

▸ Benford Analysis
  ◦ Used to compare actual occurrences to expected occurrences based on statistical probabilities
  ◦ Statistical analysis of 100% of transactions can identify issues that would unlikely be found through sampling

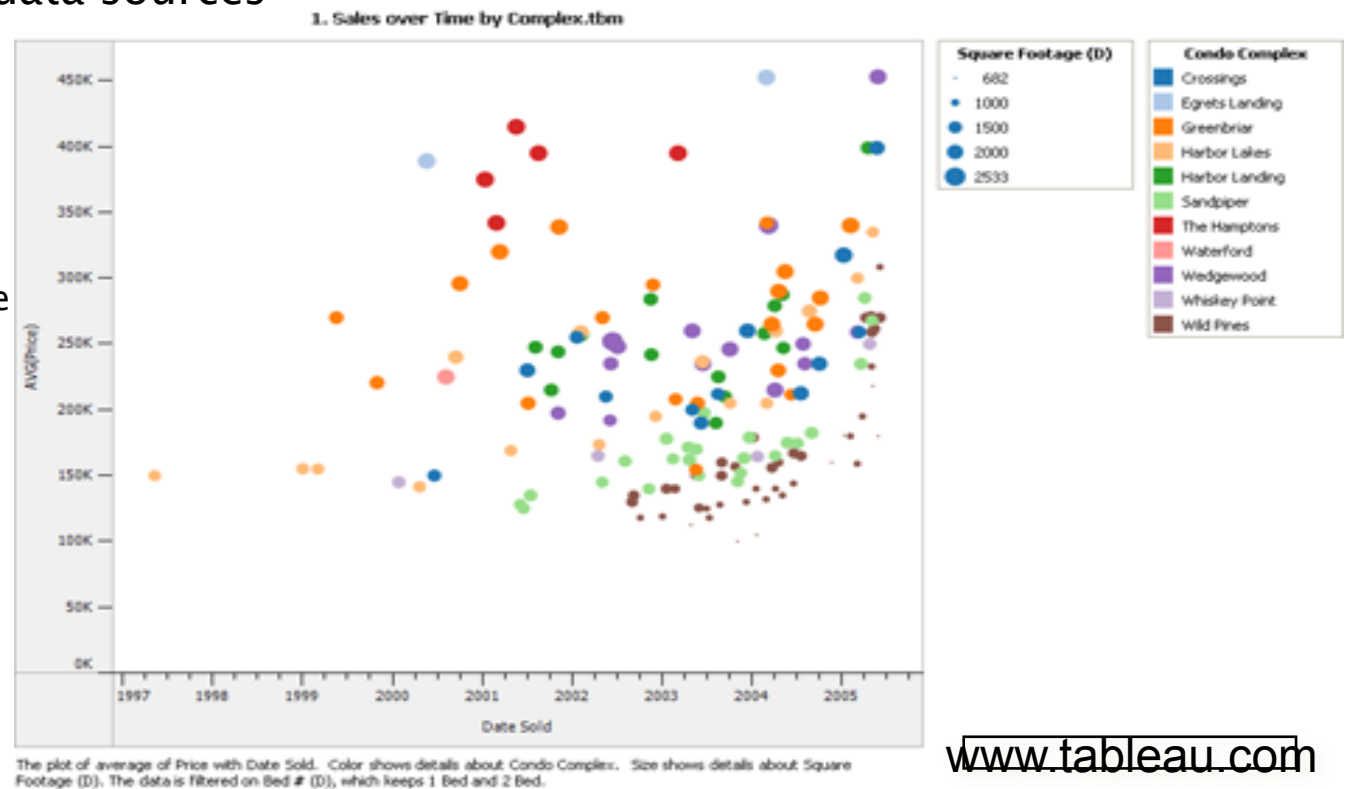**Benford - Checking for Out of Bounds Transactions:**

☐ Leading digits selected for further investigation

Leading	Actual	Expected	Zstat	Lower	Upper
10	10191	7885	26.526	7661	8108
11	6908	7198	3.488	6984	7412
12	6598	6622	0.298	6416	6827
13	5846	6131	3.698	5933	6329
14	5379	5708	4.417	5516	5899
15	6098	5339	10.534	5154	5524
16	4933	5015	1.179	4836	5195
17	4262	4729	6.872	4554	4903
18	4557	4473	1.273	4303	4643

What is an example of visual data analysis?

▸ What is it?
  ◦ Tableau is a visual analysis and reporting solution that allows people to explore and analyze databases and spreadsheets with simple drag and drop operations.

▸ Supports multiple data sources

▸ Capabilities
  ◦ See and Understand
  ◦ Pivot and Refine
  ◦ Search and Extract
  ◦ Browse and Explore
  ◦ Query and Summarize
  ◦ Publish and Present

1. Sales over Time by Complex.tbm

The plot of average of Price with Date Sold. Color shows details about Condo Complex. Size shows details about Square Footage (D). The data is filtered on Bed # (D), which keeps 1 Bed and 2 Bed.

www.tableau.com

Q&A / Discussion