

INFORMATION SYSTEMS AUDIT & CONTROL ASSOCIATION – EDMONTON CHAPTER

UNLEASHING THE POWER AND POTENTIAL OF YOUR DATA

WITH DATA ANALYTICS & CONTINUOUS MONITORING

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OVERVIEW

- Client Compliance Challenges
- Computer Assisted Audit Tools (and techniques)
- Data Analytics Maturity Level
- A Look At Embedded & Independent Solutions
- Product Tool Comparisons
- Areas for the Application of Data Analytics
- "How To" Guide For Data Analytics Automation
- Success Stories
- Q&A

CLIENT COMPLIANCE CHALLENGES

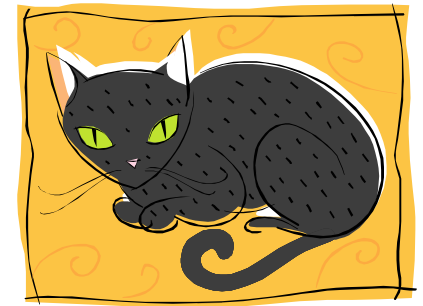
■ I need to...

- Be better assured that my existing controls are effective
- Know that control deficiencies have occurred, when they occur
- Be able to quantify the impact of deficiencies in dollars and cents to be able to make decisions about remediation or correcting systems
- **Work with complex systems, distributed around the world**
- Effectively sustain controls assessment and testing efforts in a cost effective manner
- Retain documented historical evidence for internal and external auditors

PRODUCT TOOLS COMPARISONS

■ Computer **A**ssisted **A**udit **T**ools (and techniques)

Term most often used to describe data extraction and analysis software developed specifically for Auditors. CAATs has become synonymous with incorporating Data Analytics into the audit process.

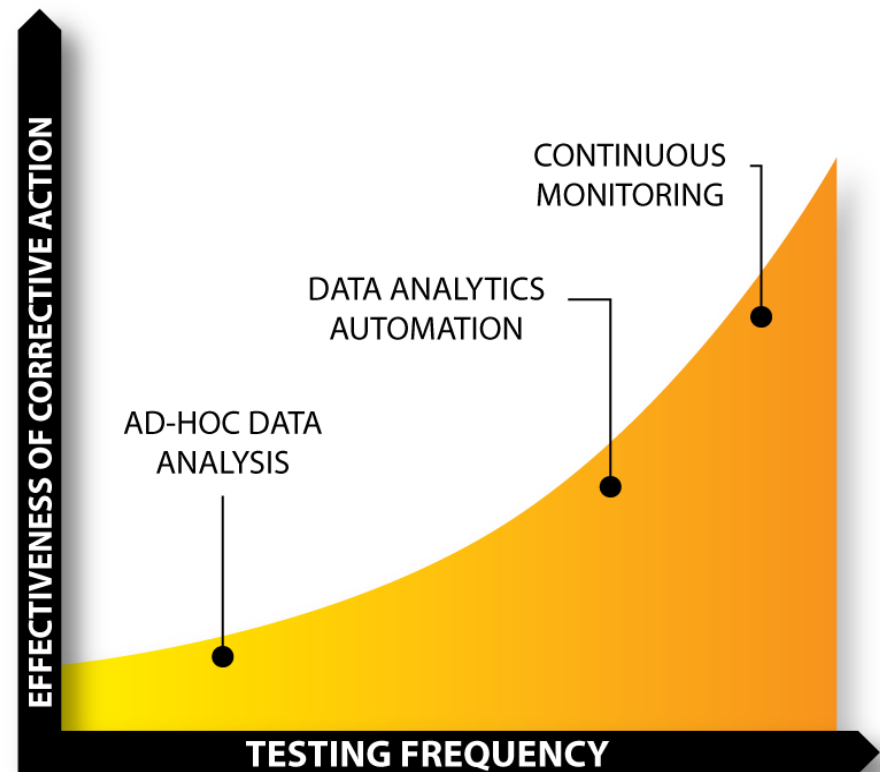


■ **Benefits of these tools include:**

- Access data from almost all sources
- Independent of the system being audited
- 100% transaction coverage with unlimited file sizes
- Read-only data access to ensure the integrity of the data
- Large collections of audit-specific routines:
 - Duplicates, Classify, Age, Sample, Summarize, etc.
- Automatic logging of all activities to preserve the audit trail
- Scripting/batching capabilities to capture test logic (like macros)

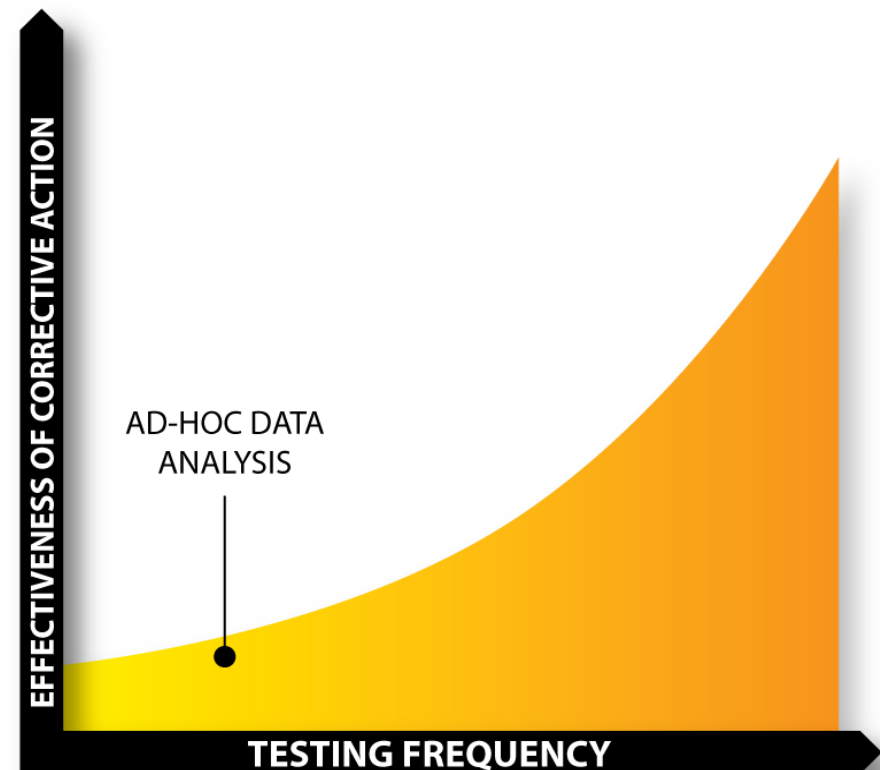
DA MATURITY LEVEL

- Ad Hoc Data Analysis
- Data Analytics Automation
- Continuous Monitoring



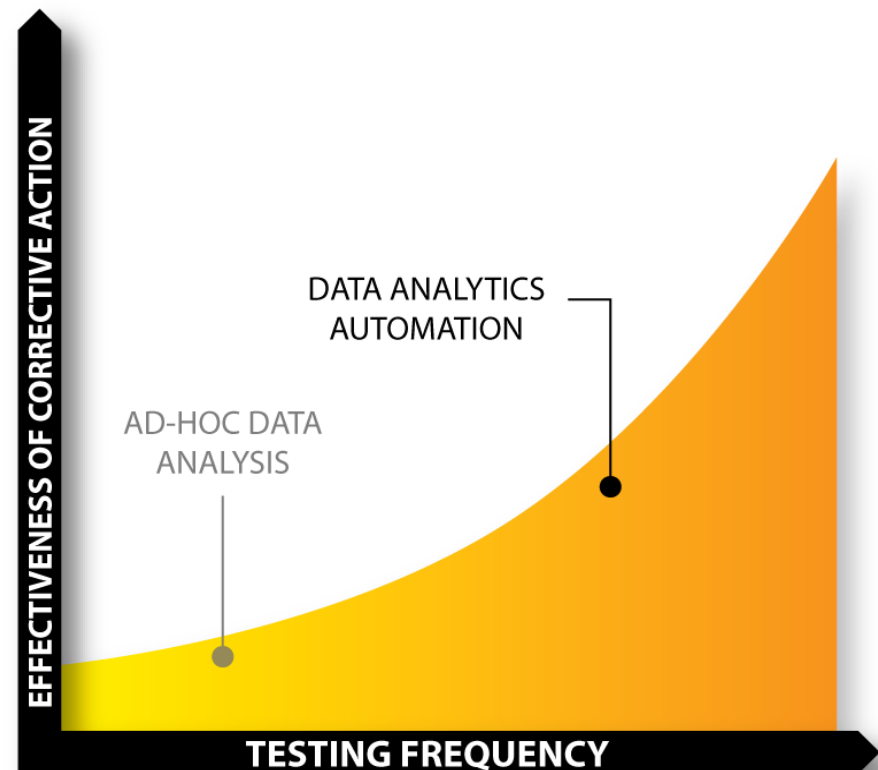
AD HOC DATA ANALYSIS

- Project based
- Iterative, Retrospective View
- 100% transaction coverage
- Investigative, detective
- Difficult to repeat analysis
- Staff turnover can negatively impact effective use of the tools
- Steep learning curve
- Without continuous use, how to use the tool is often forgotten



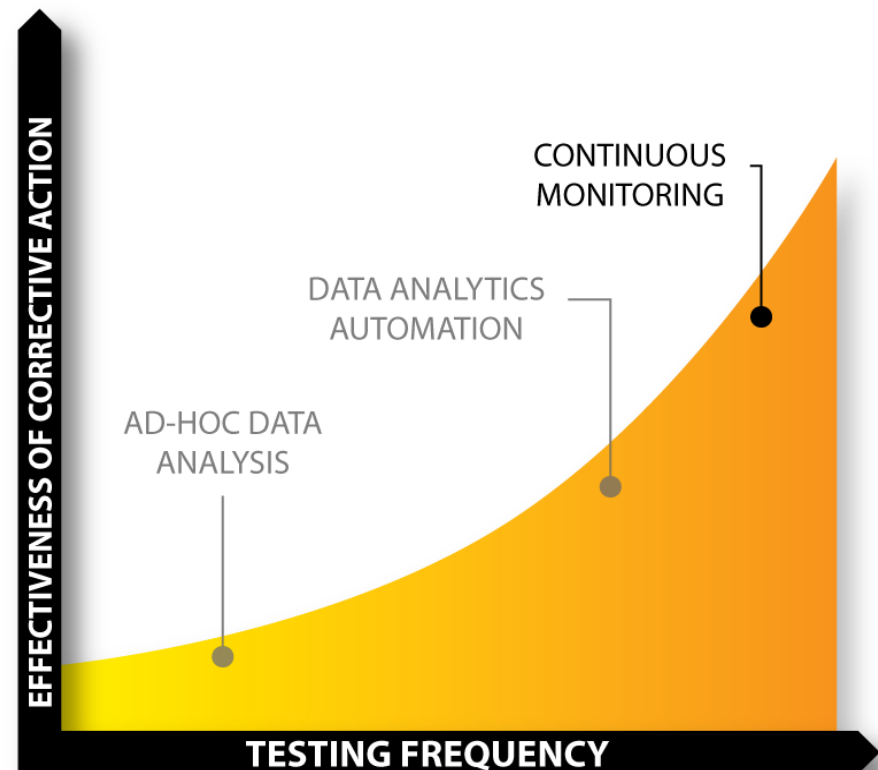
DATA ANALYTICS AUTOMATION

- Pre-defined scripted analytics
- Automated, Consistent & Repeatable
- Access data across multiple systems
- Data warehouse setup
- Leverage Technology to enable better allocation of skilled people
- Somewhat technical solutions most often used by Audit or IT



CONTINUOUS MONITORING

- Data Analytics are scheduled with increased frequency
- Full monitoring server setup
- Quantified exposure of business risk
- Provide prompt notification of control breakdowns
- Complexities of viewing results or modifying values concealed



THE POWER OF DATA ANALYTICS AUTOMATION

- **Embedded Monitoring Solutions**
- Independent Monitoring Solutions
- Preventative solution
- Pre-configured rules to identify segregation of duties violations
- Advanced management tools, simulations, test runs, workflow
- Real time monitoring of high risk transactions or ability to prevent transactions from completing
- Users work with the tools directly within the ERP environment
- Application setup and master data change control monitoring
- Track changes made to Access Rights

THE POWER OF DATA ANALYTICS AUTOMATION...

- Embedded Monitoring Solutions
- **Independent Monitoring Solutions**
- Detective solution
- Not tied to a single ERP
- Works across all systems, geographies, and languages
- Tests 100% of transactions instead of a sample or only high risk transactions
- Quantify the impact of deficiencies in dollars and cents
- Runs independent of the ERP which provides a more comprehensive view of the controls in place as all data sources are brought into the testing environment

THE POWER OF DATA ANALYTICS AUTOMATION...

- Embedded Monitoring Solutions
- **Independent Monitoring Solutions...**
- Not influenced by OS controls within the ERP environment itself
- Minimal impact on the ERP environment as testing is offloaded and takes place on independent servers
- Unlimited with the test logic that can be applied within the analytics

PRODUCT TOOLS COMPARISONS

Process and
Documentation
Controls

Audit Tools

Security &
Infrastructure
Controls

Financial
Transactions
Monitoring

Open Pages (FCM)	ACL	SAP GRC (Virsa)	ACL CCM (Audit Exchange)
Paisley Consulting (Risk Nav. AutoAudit)	IDEA	Approva	Approva
	Datawatch (Monarch)	Logical Apps	Oversight
	Arbutus		Symsure
	MS Excel / Access		SAP GRC

AREAS FOR THE APPLICATION OF DATA ANALYTICS

- **What controls are eligible for automated testing?**
 - Electronic data is available
 - Access to data through an automated process is possible
 - Rules can be documented or captured within test logic

- **What are the ideal conditions for automated testing?**
 - Large Number of Controls are in place
 - Large Volumes of Data
 - Multiple systems and data sources

AREAS FOR THE APPLICATION OF DATA ANALYTICS...

- User Management
 - Segregation of Duties
 - Changes to Access Rights
- Master Data Changes
 - Unauthorized Vendor Master changes
 - Employee Master changes Sensitive Fields
- Accounts Payable
 - Vendor/Employee Collusion
 - Check Fraud
 - Phantom vendors
 - Purchase Order splitting
- Purchase Cards
 - Personal Use of Procurement Cards
- Travel & Entertainment Expenses
 - Duplicate claims
 - Personal Use of Corporate Cards
- Inventory
 - Product Price Variance
- Payroll
 - Unauthorized Overtime
 - Fraudulent Payments to Non Existent Employees
- General Ledger
 - Unauthorized Journal Entry
 - Journal Entry just before or after period close
 - Journal Entry to Dormant Accounts

“HOW TO” GUIDE FOR DATA ANALYTICS AUTOMATION

■ Steps for Implementing Data Analytics Automation

1. Vendor selection and product evaluation
2. Assess controls
3. Scope and design system requirements
4. Data warehouse implementation
5. Data access requirements definition
6. Analytics script development
7. Results verification and review
8. Adjusting logic, parameters, and thresholds
9. Rollout

“HOW TO” GUIDE FOR DATA ANALYTICS AUTOMATION...

■ Project Team Skills

- Project Manager – Organize and manage all resources to complete the implementation project within the defined scope, time, and cost
- Business – Key owners of each business process to be monitored
- Audit – Process and control experts to identify areas of risk and test design
- IT – Key owners of the data and primary systems related to each of the processes
- Technical – Specialized experts to build, configure, and implement the monitoring tools

“HOW TO” GUIDE FOR DATA ANALYTICS AUTOMATION...

■ Test Design Considerations:

- File/Field mapping – Remove all file and field references from the script body to improve the re-usability of the script and simplify updates
- Editable parameters – Stored in a separate script and all values recorded in a log
- Commenting - All scripts should be heavily commented to increase the readability of the script logic
- Historical preservation of results – Using a date stamp inserted in each analytic result file name

DATA ANALYTICS

■ Example Analytic Logic

● Duplicates

- Exact Duplicate – All fields identical within investigation period
- Almost Duplicate Variance, Same-Different Duplicates
 - PO: Same Vendor and Similar Amount
 - Payments: Different Vendor Same Bank Account
 - Payments: Same Vendor Different Invoice Number Similar Amount

DATA ANALYTICS...

■ Example Analytic Logic

● Authorization Limits

- Single and multiple accumulated values exceeding limits
- Transaction amounts that exceed or are just below the authorization limit
 - Requisitions, Purchase Orders, Invoices, Payments
- Accumulated transaction amounts that exceed the authorization limit
 - Split Requisitions, Split Purchase Orders, Split Invoices, Split Payments

DATA ANALYTICS...

■ Example Analytic Logic

● Data Quality

- Identifying fields where critical data elements deviate from expected values and formats.
 - Invalid ID formats, missing key values, invalid characters, invalid values
 - Requisitions, Purchase Orders, Invoices, Received Goods, Payments

DATA ANALYTICS...

■ Example Analytic Logic

- Matching (Join) - Amounts over variance thresholds
 - PO Line Item vs. Invoice Line Item
 - PO Line Item Quantity vs. Goods Received Quantity
 - Accumulated Invoice Line Items vs. Payment
 - Accumulated Invoices vs. Bulk Payment
- Unmatched (Join) – Orphaned records or missing records
 - Unauthorized Users: Requisitions, Purchaser

DATA ANALYTICS...

■ Example Analytic Logic

● Aging

- Single Record Age
 - Days difference between Create Date and Approval Date
 - Stale Requisitions, Stale Purchase Orders, Stale Invoices
- Multiple Files Aging
 - Retroactive PO vs. Invoice (Invoice Create Date prior to PO Create Date)

DATA ANALYTICS...

■ Example Analytic Logic

- SOD Security Table Level
 - Comparing roles within ERP security tables to a conflict matrix
- SOD at Transaction Level
 - Single Record Create/Modify vs. Approve
 - Requisitions, Purchase Orders, Invoices, Payments
 - Multiple files
 - Create/Modify PO vs. Create/Modify/Approve Vendor Master Update
 - Create/Modify PO vs. Receiver ID for Goods Received
 - Create/Modify PO vs. Create/Modify Invoice

DATA ANALYTICS...

■ Example Analytic Logic

● Numeric Pattern Matching

- Benford digital analysis: Exceptions which reveal themselves as digital anomalies.
 - Higher than expected PO amount of \$49,000, bypassing controls on amounts over \$50,000.
- Numeric Sequence or Gaps: Exceptions which reveal themselves in a numeric sequence or gap.
 - Invoice Number Sequences (Suspect Invoices)
- Transactions with even dollar amounts based on a divisor number, minimum transaction count, and threshold value.
 - Expense Report Amounts with even dollar values

DATA ANALYTICS...

■ Example Analytic Logic

● Date Pattern Matching

- Suspect transaction dates occurred on a weekend or holiday
 - Expense Report transactions on weekends or holiday
- Period close dates
 - Journal Entries where the current entry date is within a specified number of days prior/after the period close

DATA ANALYTICS...

■ Example Analytic Logic

● String Pattern Matching

- Name Match (% word match)
 - Word exclusion lists to remove common words like: The, company, and, etc.
 - Invoice: Employee Vendor Name Match – (Phantom Vendor)
 - Invoice: Prohibited Vendors (Match to OFAC SDN list)
 - » Office of Foreign Assets Control - List of terrorists blocked from the United States
 - » <http://www.treas.gov/offices/enforcement/ofac/sdn/>
- Address Match (Numeric or Alpha Numeric match)
 - Match on zip/postal code plus numeric digits from address field.
 - Match on alpha-numeric values from the Address field (no spaces or special characters)
 - Invoice: Employee Vendor Address Match – (Phantom Vendor)

DATA ANALYTICS...

■ Example Analytic Logic

● String Pattern Matching...

– Soundslike Match (phonetic match)

- SOUNDEX algorithm

- SOUNDSLIKE algorithm NYSIIS Code

 - » New York State Identification and Intelligence Code

 - » <http://www.dropby.com/NYSIIS.html>

- Payroll: Similar Employee Names

- T&E: Different expense cards assigned to employees with similar names

DATA ANALYTICS...

■ Example Analytic Logic

● Variance Tests

- Count and amount variance as compared to a yearly average.
 - Invoice Vendor product price variance
 - Excessive Vendor Invoice counts

DATA ANALYTICS...

■ Example Analytic Logic

- Kitchen sink – Anything goes!
 - AP: Requisition 4 Eyes Approvals
 - Requisitions for raw materials require both a financial and technical approval.
 - T&E: Black Car Test
 - Matching Gym card data to Black Car expenses
 - T&E: Restricted Establishments
 - Cumulative spending by establishment used together with Restricted Establishments tests
 - PAYROLL: Personal Identification Number verification
 - Identify Employee PINs that deviate from expected SIN and SSN check digits or ranges
 - » SSN ranges: <https://ssa.gov/employer/highgroup.txt>
 - » SIN Luhn Algorithm: http://en.wikipedia.org/wiki/Social_Insurance_Number
 - » Social Security Death Index (SSDI): Can be purchased from a number of websites.

CM CASE STUDY: FORTUNE 100 INVESTMENT BANK

■ Client

A leading global investment banking, securities and investment management firm, based in New York

■ Client Challenge

- Solution
- Results

- Monitor transactions in their Travel & Entertainment Expense (T&E) and Purchase-to-Payment (P-to-P) processes
- Multiple data sources including 6 disparate systems with 39 different tables
- Daily transactions amounting to 3 Gigabytes of data
- 83,000 vendors
- 3 Global offices with 16 different transaction currencies
- Multilingual results reporting requirements – including Japanese

DA CASE STUDY: FORTUNE 100 INVESTMENT BANK

■ Client

A leading global investment banking, securities and investment management firm, based in New York

■ Client Challenge

■ **Solution**

■ Results

■ Implementation of Continuous Monitoring for P-to-P and T&E

■ Daily CM analysis of 3 GB of data in less than 45 minutes

■ E-mail notification alerts to key global management personnel to highlight significant deficiencies found

DA CASE STUDY: FORTUNE 100 INVESTMENT BANK

■ Client

A leading global investment banking, securities and investment management firm, based in New York

■ Client Challenge

■ Solution

■ Results

- Immediate identification of a single expense fraud worth a total value of US\$30,000
- Identification of 244 occurrences of abuse in corporate late night expenses in a single month
- Identification of system segregation of duties conflicts among accounts payable personnel

DA AUTOMATION CASE STUDY: PAYDAY LOAN PROVIDER

■ Client

A leading payday loan provider with approximately 3,000 centers in 37 states, employing nearly 7,000 people.

■ Client Challenge

■ Solution

■ Results

■ Quarterly process to produce Loan Loss Calculation

■ Over several years various parties attempted to create procedures using various applications

■ Past processes required:

- Several months to be developed
- Results usually took several days to a couple of weeks to run with multiple manual steps
- Data had to be sent and process run off site

DA AUTOMATION CASE STUDY: PAYDAY LOAN PROVIDER

■ Client

A leading payday loan provider with approximately 3,000 centers in 37 states, employing nearly 7,000 people.

■ Client Challenge

■ Solution

■ Results

- Customized ACL application to calculate loan loss ratios for each state
- Single dialog to control entire calculation
- Adjustable parameters to allow for changes in the calculation
- Automatic download of calculation data directly from productions systems
- Solution took approximately three weeks to develop and test

DA AUTOMATION CASE STUDY: PAYDAY LOAN PROVIDER

■ Client

A leading payday loan provider with approximately 3,000 centers in 37 states, employing nearly 7,000 people.

■ Client Challenge

■ Solution

■ Results

- Calculation run on-site at Advance America with latest production data
- One single step to access and prepare data, run the calculation, and produce results
- Calculation runs within 24 hours
- Savings of approximately two weeks of manual effort each quarter to run the analysis over previous solutions

DA CASE STUDY: SUPERMARKET CHAIN

■ Client

One of the largest supermarket chains in the United States, operating 1,300 supermarkets, either directly or through affiliated entities

■ Client Challenge

■ Solution

■ Results

- Vendors provide price deals for volume purchases. Off invoice and bill back allowances are provided where the order dates are within a specified period of days prior to, during and after the deal date
- Many of the deals prior to or following the deal dates were getting missed
- Data was all contained within a mainframe based application with high volume purchases
- 21 separate claim types each with a separate set of deal thresholds

DA CASE STUDY: SUPERMARKET CHAIN

■ Client

One of the largest supermarket chains in the United States, operating 1,300 supermarkets, either directly or through affiliated entities

- Client Challenge
 - Solution
 - Results
- Develop an automated Data Analytics application to assist in the recovery of vendor allowances
 - Overall goal was to find approximately 15,000 to 20,000 in missed vendor allowances for the year

DA CASE STUDY: SUPERMARKET CHAIN

■ Client

One of the largest supermarket chains in the United States, operating 1,300 supermarkets, either directly or through affiliated entities

- Client Challenge
 - Solution
 - Results
- The application allowed internal resources to recover the most significant vendor allowances which will resulted in tangible savings in commissions paid to the outside recovery firms
 - Application was run within 90 days of data amounted to approximately \$550,000 in missed vendor allowances
 - Missed vendor allowances for the year resulted in just under \$1 million

MORE INFORMATION?

- Thank you!



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