

Continuous Auditing with Data Analytics

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Overview

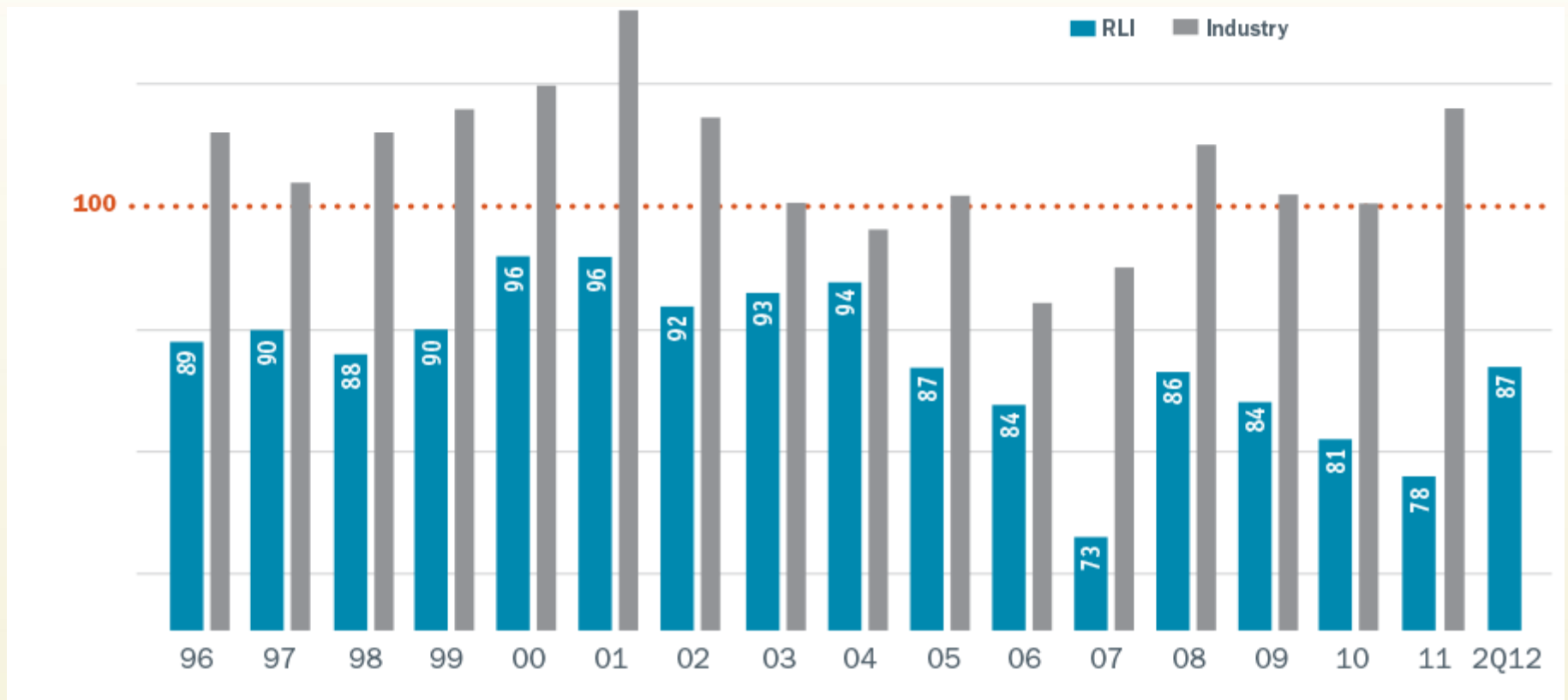
- Understand embedding data analytics in the audit process
- Migrate to continuous fraud auditing
- Recognize fraud data analytics in payables, claim payments, journal entries, procurement cards, and T&E cards
- Implement a red flag approach to reduce false positives in continuous fraud auditing

RLI Profile

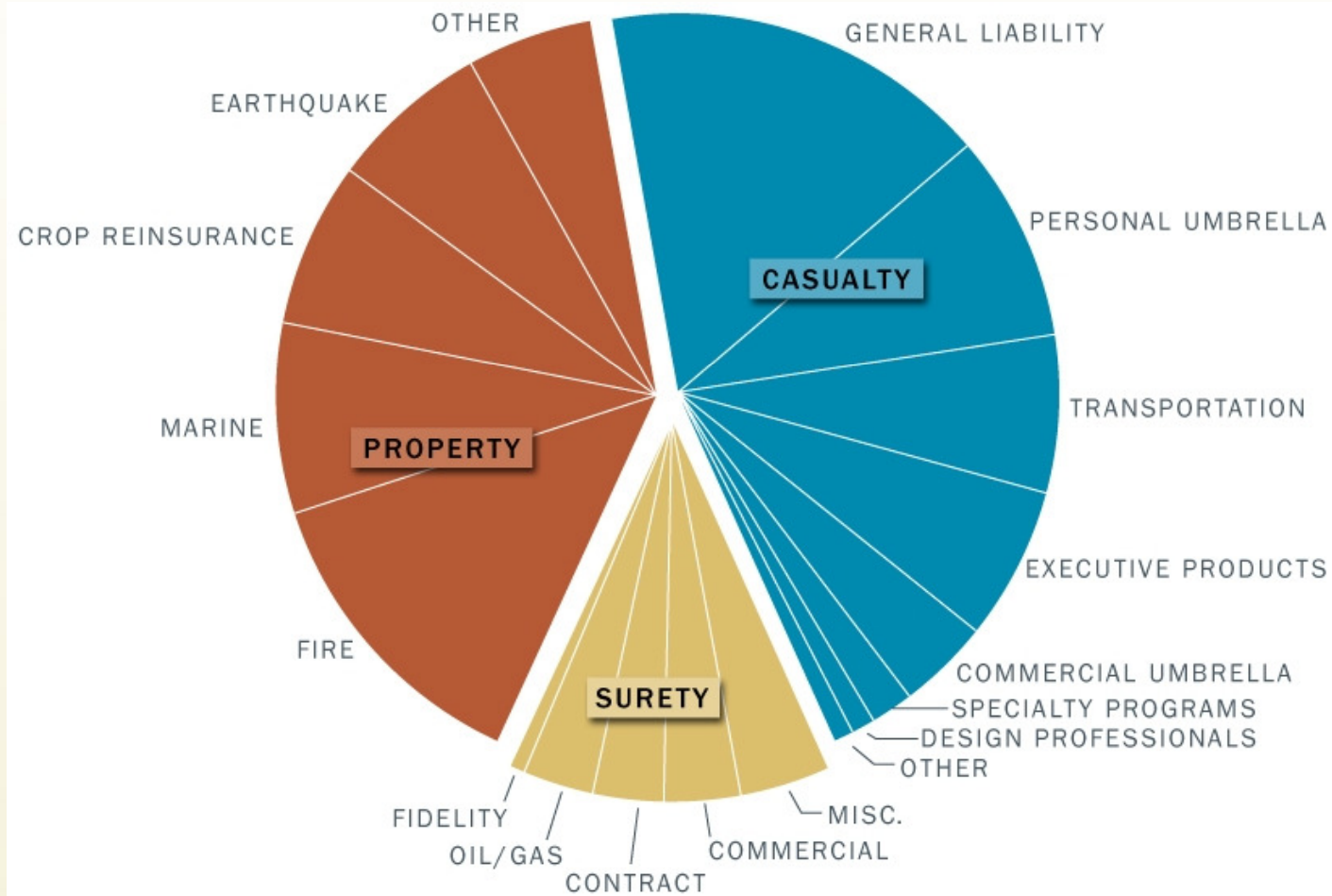
- Specialty Property/Casualty Insurance company serving “niche” or underserved
- Traded on NYSE (RLI) – Sox compliant
- Operates primarily in the United States with over 35 locations and more than 800 employees
- 2011 Financial Status
 - Revenues of \$702M
 - Assets of \$2.7B
 - Outperforms industry profitability over last 10 yrs

Underwriting Profit

RLI has achieved 15 straight years of a combined ratio below 100, and has beaten the industry ratio by an average of 15 points



Products We Offer



RLI Internal Audit

- Established in 2003
- Used Data Analytics since late 2004
- Adhere to IIA Standards and completed QAR in early 2008
- 2010 ACL Impact Award winner for the North American Region



2010 ACL Impact Award

- RLI Internal Audit Services was selected as the 2010 ACL Impact Award winner for the North American Region
- We were one of four award winners chosen for demonstrating how ACL technology is leveraged to achieve quantifiable business results.



Data Analytics

Data Analytics

- Definition: processes and activities designed to obtain and evaluate data to extract useful information
 - Data analytics help:
 - Identify areas of risk, fraud, errors, and/or misuse
 - Improve efficiency and verify effectiveness of business processes
 - Provide information for business decisions

Source: *Data Analytics – A Practical Approach*, ISACA White Paper, August 2011

Data Analytics

- CAATs: Computer Assisted Audit Techniques
 - Broad Definition: Tools that automate or simplify the audit process
- In practice: Incorporate data analytics into the audit process
- Example tools: ACL, IDEA, SAS, Excel, Access, Crystal Reports, Business Objects
- Key definitions:
 - Extract: Using a scenario to pull data from the population
 - Script: A way to save all commands relating to importing data, scrubbing data, extracting data, and exporting data

Data Analytics – Why use?

- Data allows us to do it – more is captured electronically
- Increase scope/decrease sampling risk
- Increase productivity/efficiency
- Increase understanding of data and processes

Embedding Data Analytics in the Audit Process

- Management buy-in
- Select a tool
- Training
- Import data
- Data scrubbing
- Manipulate/extract data
- Export data
- Validate/review output

Management Buy-In

- Audit management and auditee management needs to support the approach of using CAAT tools on audits
- Some expense for the tool, although minor
- May require initial training on using the CAAT tool
- Initial time investment

Select a CAAT Tool

- We chose to use ACL because
 - Good Support – Offers a help line with Premium Support package
 - We had some familiarity in previous companies
 - Ease of importing
 - Ease of use
 - Ease of exporting

Training

- Self-taught
- ACL Helpdesk and web-based training
- Created hands-on training manual for new employees
- All employees from intern to CAE trained in ACL
- Incorporate creation of new extracts into performance goals

Import the Data

- Often the most challenging step
- Involves coordination with IT
- Obtain data in its rawest form
 - ODBC
- Validate with source system or management reports

Data Scrubbing

- Necessary to perform data manipulation
- ACL Help Desk was invaluable
- Example uses:
 - Adjusting field lengths to do comparisons
 - Changing date fields from “Print” to “Date”
 - Removing unwanted characters such as hyphens
 - Pulling out numeric only characters to compare addresses
- Take good notes as data scrubbing steps are not recorded in the log!

Data Scrubbing

Example of “Numeric Address” –

	Address1	Address2	City	State	Zip
Record 1	125 Western		Peoria	IL	61615
Record 2	Attn Bob Jones	125 Western	Peoria	IL	61615

Results: Record1 = 12561615
Record2 = 12561615

Data Scrubbing

- Example functions:
 - Find – Searches for a string inside a field or record
 - Soundlike – Indicates whether two strings sound phonetically alike
 - Alltrim – Removes leading and trailing blanks from character string
 - Recoffset – Returns the value of a field at a specified number of records from the current record

Manipulate/Extract Data

- Commands/Functions
 - Summarize
 - Join
 - Merge
 - Extract
 - Count/Total
 - Sort
- Make sure you have descriptive naming conventions (not extract1, extract2, etc.)

Export Data

- Excel
- Access
- Word
- Text

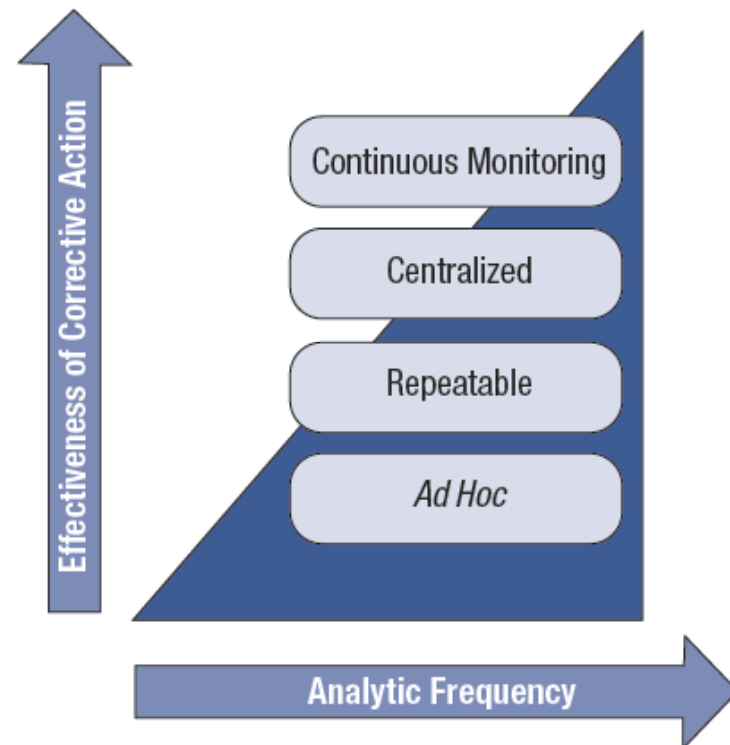
Validate/Review Output

- Validate results with source systems or SME's
 - Revise extracts as needed
- Review/work output
 - Eliminate false positives
 - Follow-up on remaining items

CAATs to Continuous

Evolution of Data Analytics

Figure 1—Evolution of Data Analytics Techniques



Source: *Data Analytics – A Practical Approach*, ISACA White Paper, August 2011

Continuous Monitoring vs. Auditing

- Management is responsible for operations including monitoring and assessing risks and controls to adequately mitigate financial, compliance, and operational risks.
- Internal Audit also monitors and assesses risks and controls but they do it to provide an independent attestation of the environment.

Factors to Consider

- Ability to obtain data
 - Access to raw data
 - Form of data/level of detail
 - Amount of data
 - Quality of data
- Ease of validating results
 - Access to support (electronic vs. paper)
- Time to review

RLI's Story

- Initially wanted to run each extract developed during audits on a monthly basis as data was available
- Initial challenge was the ability to easily create the outputs for review as we were creating the extracts each time

RLI's Story

- Attended first ACL training which was an Advanced ACL class and became aware of scripting which solved problem of time needed to create extracts
- Still faced with challenge of reviewing the output and completing other audit work
- Decided to focus efforts on fraud and revenue leakage – both are still the primary responsibility of management but felt risk/reward of us auditing continuously meant effort was worth it

RLI's Story

- Continuous audit extracts continue to evolve from:
 - Performance of audits
 - Fraud Risk Assessment
- Currently running over 100 continuous audit extracts focusing on fraud/revenue leakage in:
 - Claims
 - Payables
 - Procurement card
 - Journal entries
 - T&E card

Claims and Payables Extracts

- Identifies possible internal and external fraud and revenue leakage
- Examples:
 - Employee match on name, address, phone, or TIN
 - Same vendor different phone, address or TIN
 - Payments made to credit cards
 - Duplicate payments
 - Missed subrogation
 - Reasonableness

Procurement Card Extracts

- Identifies possible fraud and revenue leakage with procurement cards
- Examples:
 - Cardholder and approver is same
 - Inappropriate procurement (MCC codes)
 - Transaction Splitting
 - One Employee
 - Two or more employees
 - Reasonableness review

Journal Entry Extracts

- Focuses on financial reporting fraud
- Examples include:
 - JE's by/per Executives
 - JE's for Premium
 - “Write-off” JE's

T&E Script

- Focuses on reviewing employee travel and expenses
- Examples Include:
 - Weekend Purchases
 - Mileage and Gas on the same expense report
 - Flight with no hotel or hotel with no flight
 - Same Meal expensed multiple times
 - By same employee
 - By different employee

Challenges

- Time to review output
- How to focus our efforts
- Completing continuous auditing in addition to overall audit plan

“Red Flag Theory”

- Allows you to focus on transactions or vendors that have multiple “red flags.”
- Allows you to include a weighting system to the results
- Reduce sampling risk
- Improve efficiency while staying risk-focused

Red Flag Concept

Vendor Name	Red Flag Weighting Total	Blank Tax ID (weight = 3)	PO Box (weight = 1)	Same Address Different Payee (weight = 2)	Weekend Invoice (weight = 1)
Vendor1	7	3	1	2	1
Vendor2	2	0	0	2	0
Vendor3	4	3	0	0	1
Vendor4	1	0	1	0	0

Q-Grams

- Looks at a sequence of characters rather than individual letters. It requires three pieces of information:
 - How many characters are in common
 - How close these characters are to one another
 - Threshold for percentage match
- Can increase accuracy
 - May miss items if doing exact match (duplicate on payee)

Q-Gram Example

If comparing 125 Western with 126 Western

12	25	5W	WE	ES	ST	TE	ER	RN
12	26	6W	WE	ES	ST	TE	ER	RN
Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
1	0	0	1	1	1	1	1	1

There were 7 segments that matched out of a possible 9 segments = 78% match

Scripting

Conversion to Scripts

Converting extracts to scripts is done in three easy steps:

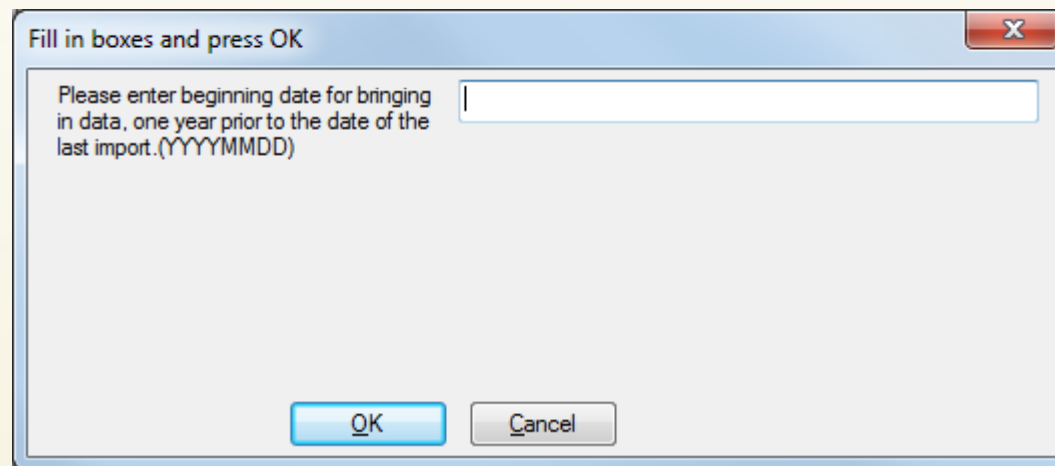
1. Create dialog box with variable commands
2. Create define commands for data scrubbing
3. Copy and paste extract commands from log

Conversion to Scripts

```
1 SET SAFETY OFF
2
3 comment **This is the most current script - any changes should be approved by Patrick Ferrell prior to
4 comment **Before running script, you must first run DWXF014 table in ONEDAYTEMP folder. To do this, go
5
6 SET SAFETY OFF
7
8 ACCEPT "Please enter beginning date for bringing in data, one year prior to the date of the last import
9 comment pause "%V_Date%"
10
11 com --- changes 03/17/10
12
13 SET DATE "YYYYMMDD"
14
15 com Beginning date for duplicate testing and claimant master. Five years is recommended.
16 v_mydate=V_Date
17 v_numdays=1460
18 DO SCRIPT SubtractDays
19 v_date2=v_mydate
20
21 com Beginning date for the testing period. One month is recommended.
22 v_mydate=V_Date
23 v_numdays=-365
24 DO SCRIPT SubtractDays
25 v_date3=v_mydate
26
27 com --- end changes 03/17/10
28
29 ACCEPT "Please enter the name of the month used for testing." to V_monthname
30 comment pause "%V_monthname%"
31
32 ACCEPT "Enter User ID:" to V_UserID
33 PASSWORD 1 "Please enter your WINS password"
34 comment pause "%V_UserID%"
35
36 COMMENT REFRESH WINS PASSWORD 1
```

Conversion to Scripts

Example dialog box, or prompt, in the script to prompt for a login and a date range



Conversion to Scripts

```
1 IMPORT ODBC SOURCE "root" TABLE "DBAPVEN" OWNER "LAWAPP9PDB" UserID "%V_UserID%" Password 1 TO "DBAPVEN.FI
2 OPEN DBAPVEN
3
4 IMPORT ODBC SOURCE "root" TABLE "DBAPVDR" OWNER "LAWAPP9PDB" UserID "%V_UserID%" Password 1 TO "DBAPVDR.FI
5 OPEN DBAPVDR
6
7 IMPORT ODBC SOURCE "root" TABLE "APINVOICE" OWNER "LAWAPP9PDB" UserID "%V_UserID%" Password 1 WHERE "INVOI
8 OPEN APINVOICE
9
10 IMPORT ODBC SOURCE "root" TABLE "APPAYMENT" OWNER "LAWAPP9PDB" UserID "%V_UserID%" Password 1 WHERE "CHECK
11 OPEN APPAYMENT
12
13 IMPORT ODBC SOURCE "Excel Files" TABLE "ProcessInstruction$" QUALIFIER "X:\Continuous Audit\Employee Data\
14 IMPORT ODBC SOURCE "Excel Files" TABLE "ProcessInstruction$" QUALIFIER "X:\Continuous Audit\Employee Data\
15 IMPORT ODBC SOURCE "Excel Files" TABLE "Sheet1$" QUALIFIER "X:\Continuous Audit\Credit Card Zips .xls" Use
16
17
18 OPEN APINVOICE
19 DELETE APINVOICE_COMPANY1 OK
20 DEFINE FIELD APINVOICE_COMPANY1 COMPUTED STRING( COMPANY , 6 )
21 DELETE NEW_INVOICE OK
22 DEFINE FIELD NEW_INVOICE COMPUTED SUBSTR( ALLTRIM( INCLUDE( INVOICE, '0123456789') ), 1, 20)
23 DELETE NUMERIC_INVOICE OK
24 DEFINE FIELD NUMERIC_INVOICE COMPUTED VALUE( NEW_INVOICE, 0)
25 DELETE DAY_OF_WEEK OK
26 DEFINE FIELD DAY_OF_WEEK COMPUTED CDOW( INVOICE_DTE, 3)
27
28 OPEN APPAYMENT
29 DELETE APPAYMENT_COMPANY1 OK
30 DEFINE FIELD APPAYMENT_COMPANY1 COMPUTED STRING( COMPANY , 6 )
31
32 OPEN APVENADDR
33 DELETE ADDRESS_NUMBERS OK
34 DEFINE FIELD ADDRESS_NUMBERS COMPUTED SUBSTR( ALLTRIM( INCLUDE( ADDR1, '0123456789') ) + ALLTRIM( INCLUDE(
35 OPEN APVENMAST
```

Script Tips

- Ensure record layout has not changed
- Think through logic of extracts
 - Example: When running duplicate payments, you will want to compare payments to more than just those in the month
- Embed comments within the script to document changes or other important information
- Import all fields and do not eliminate any until the export step
- Hands-on training/experience for new employees

Review, Reporting, and Maintenance

Monthly Review

- Output worked by interns
- Detailed review by assigned auditor
- High-level review by Audit Director
- Monthly audit report for each area with sign-offs and potential issues noted
- Monthly trending of total number of hits and total number reviewed

CONTINUOUS AUDIT CLAIMS REPORT FORM								
DATES AUDITED: January 7 - February 3								
START:				COMPLETED BY		DATE		
END:				TRENDING ANALYSIS		SB	2/14/2012	
AUDITOR: Robin Fisher								
COMPLETION DATE: 3/27/12								
NAME OF EXTRACT		NUMBER OF RECORDS	RECORDS REVIEWED	ISSUES	Completed By	Date		
RED FLAG - BLANK ADDRESS		39	5	None	JB	2/6/2012	RF	
RED FLAG - BLANK CITY		138	91	None	JB	2/6/2012	RF	
RED FLAG - BLANK PAYEE		0	0	N/A	JB	2/6/2012	RF	
RED FLAG - BLANK PHONE		486	1	None	JB	2/29/2012	RF	
RED FLAG - BLANK TAX ID		486	1	None	JB	2/29/2012	RF	
RED FLAG - BLANK ZIP		486	1	None	JB	2/27/2012	RF	No issue - but we
CLAIM PAYMENTS TO CREDIT CARDS		5	5	None	JB	2/6/2012	RF	
CLAIM WITHIN 5 DAYS OF ENDORSEMENT		33	33	None	SB	3/14/2012	RF	
CLMT ADD 60 DYS OR MORE AFTR CLAIM		0	0	N/A	SB	2/14/2012	RF	
CURR EMPL ADD SAME AS PAYEE ADD		0	0	N/A	SB	2/14/2012	RF	
DON'S EXP AUTHORITY		0	0	N/A	SB	2/14/2012	RF	
DON'S IND AUTHORITY		7	7	2 potential issues	SB	2/16/2012	RF	Need to discuss
DUPLICATE INVOICES		314	314	2 potential issues	SB	3/14/2012	RF	Need to discuss
DUPLICATE PAYMENTS		140	140	1 potential issue	SB	3/14/2012	RF	Agree one potential iss
EMPL SS MATCH VENDOR TAX ID		0	0	N/A	SB	2/14/2012	RF	
RED FLAG - INVALID EIN		3	0	No RF hits	JB	2/6/2012	RF	
INVALID PAYROLL SSN		0	0	N/A	SB	2/14/2012	RF	
RED FLAG - INVALID SSN		68	2	None	JB	2/22/2012	RF	
INVALID TAX ID		0	0	N/A	SB	2/14/2012	RF	
JOINT VENDOR FOR REASONABLENESS (Sort on Payee, Amount, Claim Number, Examiner, and City)		2,861	2,861	None	JB	2/29/2012	RF	
MISSED SUBROGATION		33	33	None	SB	2/16/2012	RF	
MULTIPLE CLAIMS SAME PAYEE		9,300	274	None	JB	2/27/2012	RF	Tickmark H
PAYEE LAST NAME EQUALS CURR EMPL (Eliminate								

2011 Summary.xls [Compatibility Mode] - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Developer Add-Ins

From Access From Web From Text From Other Sources Existing Connections Refresh All Connections Sort & Filter Filter Clear Reapply Advanced Text to Columns Remove Duplicates Data Validation Consolidate What-If Analysis Group Ungroup Subtotal Outline

P4

	A	B	C	D	E	F	G	H	I	J	K	L
1	RLI Insurance Co.											
2	Continuous Audit											
3	Claims Record Counts											
4												
5	NAME OF EXTRACT											
6		January	February	March	April	May	June	July	August	September	October	November
7	RED FLAG - BLANK ADDRESS	22	47	58	51	54	50	50	67	61	69	70
8	RED FLAG - BLANK CITY	225	193	228	229	250	238	153	306	170	355	243
9	RED FLAG - BLANK PAYEE	0	0	0	0	0	0	0	0	0	1	0
10	RED FLAG - BLANK PHONE	625	464	639	486	581	569	462	631	613	792	510
11	RED FLAG - BLANK TAX ID	625	464	639	486	581	569	462	631	613	792	510
12	RED FLAG - BLANK ZIP	625	464	639	486	581	569	462	631	613	792	510
13	CLAIM PAYMENTS TO CREDIT CARDS	23	13	19	35	13	13	8	16	13	31	27
14	CLAIM WITHIN 5 DAYS OF ENDORSEMENT	32	35	45	29	46	43	13	45	20	45	18
15	CLMT ADD 60 DYS OR MORE AFTR CLAIM	0	0	0	0	0	0	0	0	0	0	0
16	CURR EMPL ADD SAME AS PAYEE ADD	0	0	0	0	0	0	0	0	0	0	1
17	DON'S EXP AUTHORITY	2	2	3	3	2	3	1	2	2	3	3
18	DON'S IND AUTHORITY	4	2	5	4	5	6	2	2	4	5	4
19	DUPLICATE INVOICES	315	201	299	296	303	263	191	380	327	473	300
20	DUPLICATE PAYMENTS	128	127	148	55	84	111	160	166	155	216	136
21	EMPL SS MATCH VENDOR TAX ID	0	0	0	0	0	0	0	0	0	0	0
22	RED FLAG - INVALID EIN	3	3	5	2	7	5	6	0	3	3	4
23	INVALID PAYROLL SSN	0	0	1	1	1	1	1	1	1	0	0
24	RED FLAG - INVALID SSN	72	78	72	84	80	73	45	78	76	87	64
25	INVALID TAX ID	25	0	0	0	0	0	0	0	0	0	0
26	JOINT VENDOR FOR REASONABLENESS (Sort on Payee, Amount, Claim Number, Examiner, and City)	3528	3179	3,248	3206	3,329	3,799	2,322	3765	3,371	4,682	2,944
27	MISSED SUBROGATION	30	29	45	38	26	56	23	50	49	42	14

Total # of Records Total # Reviewed

Ready 130%

Reporting

- Revenue leakage brought to attention of management with response/resolution requested
- Fraud generates investigation in cooperation with General Counsel
- Monthly summary report of findings goes to Audit Committee Chair, CEO, and General Counsel

Maintenance

- Log of issues, questions, and enhancements to scripts as they arise
- Script change control
 - Create test script
 - Approved by script owner
 - Embed into full script
 - Tested
- Quarterly meetings to review script changes and discuss enhancements
- Scripts backed up and Word document comparison performed to ensure changes are appropriate

Other Uses of Data Analytics

Trending Analysis

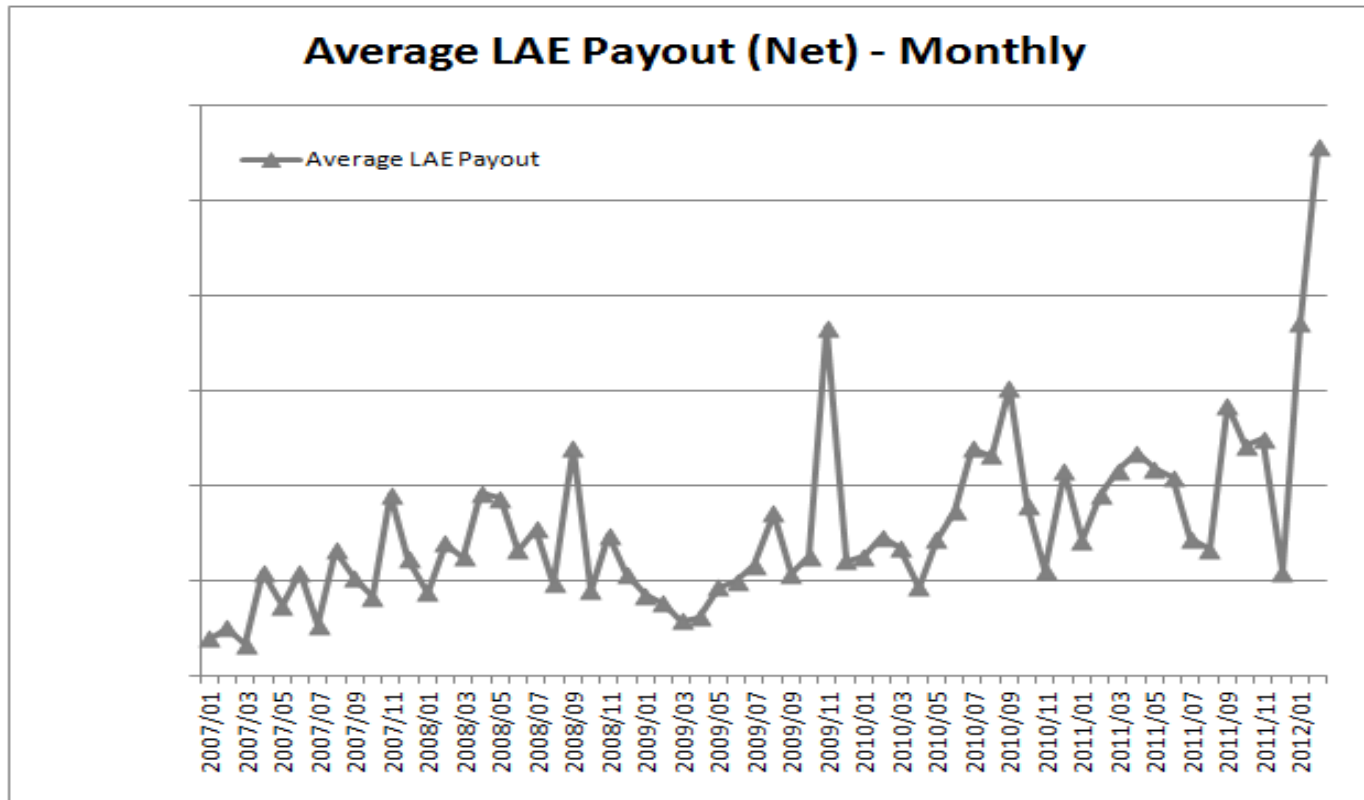
- Macro risk assessment
 - Areas of the Company to be audited
- Micro risk assessment
 - Areas of a specific audit to focus on
- Obtain an understanding of auditee and their processes

Trending Analysis

- Establish an expectation
- Run trending analysis and export results
- Review for anomalies

Trending Analysis

Expectations: For XXXX's (specific product's) claims, IAS would expect net LAE to be fairly consistent over time with minor differences.



Evaluate Results: IAS evaluated the spike for 2009/11 and determined that during this month there were X claims out of the XX claims that closed in 2009/11, which closed with an expense total of nearly \$XXXXXX. After reviewing the monthly data, the total of these X claims resulted in higher monthly total than most months. Therefore, it appears that 2009/11 is an outlier based on these X large claims closing in the same month, which drove up the average for 2009/11. For 2012/02, there were claims that closed with higher expense payments. Also, the data only goes through the middle of February 2012, which causes the average to be higher as well, as the claim count is lower.

Other Uses

- Reperformance of queries
- Perform calculations over large amounts of data
- Interface testing
- Sampling

Successes

ROI

- Cost for ACL Network version for 5 licenses:
 - < \$5K/year
- Time spent:
 - < 800 hours/year mostly by interns @ \$14/hour
- Identify ~ \$100K/year in revenue leakage
- ROI: ~ 400%

Findings

- Exceeding authorities
- Data Integrity
- Time-service concerns
- Validating queries – Identified \$4 million error

Findings

- Conflicts of interest resulting in an enhanced disclosure process
- Annual revenue leakage identified: ~\$100k
 - Duplicate payments/invoices
 - Missed subrogation

Assurance

- Even if no findings, still provides continuous assurance that controls are operating effectively

Keys to Success

- Management support
- Idea sharing
- Networking
 - Conferences/Seminars: IIA, CACS
 - Industry-specific: IIAG
- Training
- “Use it or lose it”
- Make mistakes
- Continuously enhance and maintain scripts

Questions?

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