PEER REQUEST
Audit Technology Tools
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SUMMARY

All CAEs have faced the challenge of finding the right technology tools to meet their needs. What is the balance between ease of use, capability, and cost? Which tools are best suited for different activities?

This Peer Request provides honest feedback from CAEs about the benefits and downsides of the tools they are currently using for

- Data analytics.
- Sarbanes-Oxley testing.
- Continuous auditing/monitoring.
- Robotic process automation (RPA).
- Artificial intelligence (AI).

In addition, CAEs rated their level of satisfaction with tools in general and indicated the amount of money their functions spend on tools annually. Finally, respondents were invited to describe which tools they use for each of the activities listed above. General findings include:

Less than half are “very satisfied” with their audit technology tools.

About 4 in 10 say they are very satisfied with their tools for data analytics, Sarbanes-Oxley testing, and continuous auditing/monitoring. Much fewer say they are very satisfied with their RPA and AI tools (less than 20%) (Exhibit 1).

The majority spend less than $25,000 per year on audit technology tools.

In terms of spending per year for audit technology tools, about a quarter spend less than $10,000, another quarter spend $10,000 to $25,000, and 37% spend between $25,000 and $100,000. Few spend more than $100,000 (Exhibit 2).

There are many options for data analytics tools.

While some respondents simply listed ACL (now known as Galvanize), Excel, IDEA, or Tableau as their tool, many described using a combination of tools to accomplish different tasks. Additional tools include (in alpha order) ActiveData for Excel, Alteryx, Arbutus Analyzer, Business Analytics, Data Access Studio (DAS), HighBond Analytics, Microsoft Power BI, Microsoft SQL Server, Oracle BI, PwC, Python, QlikView, R, SAP (Cloud Analytics), SAP HANA, SAS, Spotfire, SPSS, TeamMate Analytics, and Thoughtspot, among others.

On the positive side, CAEs described some tools as powerful, easy to learn, and cost effective. On the flip side, the downsides of some tools were high cost per license, steep learning curves, and lack of use outside of internal audit.
Continuous auditing/monitoring is handled with data analytics tools.

The tools used for continuous auditing/monitoring were similar to the data analytics tools. Several mentioned that continuous auditing was a new venture.

Sarbanes-Oxley testing is often managed with simple Word/Excel tools.

Word/Excel tools are still relied upon by many respondents, even among companies that spend more than $100,000 per year on data analytics. Dedicated tools included, in alpha order, Alteryx, Arbutus, AuditBoard (SOXhub and WorkStream), BlackLine, Comensure, Connect, Data Access Studio (DAS), JD Edwards, MK Insight Onspring, Pentana, Protiviti’s GRC tool, Resolver GRC Cloud, RSAM, SAP GRC, Smart Solutions, TeamMate Analytics, Workiva (Wdesk), and Workpapers CS, among others.

Some functions are taking first steps toward robotic process automation.

Much fewer responses were received for internal audit use of RPA compared to data analytics, saying this area is new to their environment. Tools used include Alteryx, Automation Anywhere, Blue Prism, Galvanize Robotics System, Pega, UiPath, and TeamMate+, among others.

Artificial intelligence for internal auditing is still in the exploratory stage.

Respondents generally said use of AI by internal audit is only in the exploratory stage. Tools under consideration include Galvanize (formerly known as ACL), MindBridge Al, Oracle’s BI Cloud Services, and SAP Analytics Cloud, among others.

Appendices A to E offer survey participants’ detailed comments, edited for clarity. Responses are grouped according to the amount of money spent on tools annually and generally listed in alphabetical order according to the first brand name tool mentioned in the comment. One brand name note: ACL is now known as Galvanize, so either may appear as submitted by the survey participants. Readers are encouraged to browse this extensive collection of comments.

The IIA does not endorse any particular tool for any particular use, but does have sponsor and advertiser relationships with a number of the organizations mentioned in this report.
RESULTS

Exhibit 1: Satisfaction with Audit Technology Tools

- **Data analytics**:
  - Very satisfied: 44%
  - Somewhat satisfied: 41%
  - Neutral or somewhat/very dissatisfied: 15%
- **SOX testing**: 42%
  - Very satisfied: 32%
  - Somewhat satisfied: 26%
  - Neutral or somewhat/very dissatisfied: 26%
- **Continuous auditing/monitoring**: 37%
  - Very satisfied: 40%
  - Somewhat satisfied: 23%
  - Neutral or somewhat/very dissatisfied: 23%
- **Robotic process automation**: 16%
  - Very satisfied: 8%
  - Somewhat satisfied: 76%
- **Artificial intelligence**: 10%
  - Very satisfied: 20%
  - Somewhat satisfied: 70%

Legend:
- Very satisfied
- Somewhat satisfied
- Neutral or somewhat/very dissatisfied

Note: Questions 2, 4, 6, 8, and 10: Indicate your level of satisfaction with your ____ tool(s). Those who chose "not applicable" were not included in the percentages. $n = 111$ for data analytics. $n = 62$ for SOX testing tool. $n = 68$ for continuous auditing/monitoring. $n = 25$ for robotic process automation. $n = 20$ for artificial intelligence tools.

Exhibit 2: Internal Audit Annual Spend on Audit Technology

- **Less than $1,000**: 6%
- **$1,000 to $4,999**: 11%
- **$5,000 to $9,999**: 10%
- **$10,000 to $24,999**: 26%
- **$25,000 to $99,999**: 37%
- **$100,000 to $249,999**: 8%
- **$250,000 or more**: 2%

Note: Q11: How much money does your department spend on audit technology on an annual basis? $n = 98$. 

3
DEMOGRAPHICS

Organization Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Publicly traded</td>
<td>54%</td>
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<tr>
<td>Privately held</td>
<td>20%</td>
</tr>
<tr>
<td>Public sector</td>
<td>15%</td>
</tr>
<tr>
<td>Nonprofit</td>
<td>11%</td>
</tr>
</tbody>
</table>

Note: For which type of organization do you currently work? n = 101.

Internal Audit Function Size

<table>
<thead>
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<th>Size Range</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>1 to 5</td>
<td>24%</td>
</tr>
<tr>
<td>6 to 10</td>
<td>31%</td>
</tr>
<tr>
<td>11 to 25</td>
<td>32%</td>
</tr>
<tr>
<td>26 to 50</td>
<td>8%</td>
</tr>
<tr>
<td>51+</td>
<td>5%</td>
</tr>
</tbody>
</table>

Note: What is the size of your internal audit function? n = 102.
Note: What is the primary industry classification of the organization for which you work (or your primary client if you are a service provider)? Total may not equal 100% due to rounding. n = 102.
Survey question: Which technology tool(s) does your internal audit function use for data analytics? What are the benefits and downsides of each system?

Less than $10,000

1. ACL.
2. ACL. It is easier to find internal audit team members who know ACL vs. other software tools.
3. ACL enables processing to happen on a server vs. my desktop, which is a benefit. However, ACL is not used widely outside of audit, which makes it difficult to transition analytics to others in the business.
4. ACL, Excel.
5. We use ActiveData for Excel. It is an add-on to Excel providing an additional ribbon menu. The vendor is www.informationactive.com. We download data from our ERP system into Excel and then manipulate it with ActiveData. The tool makes it much easier to utilize data analytics and allows us to focus on auditing instead of administering a complex tool. It is also very inexpensive.
6. Arbutus Analyzer.
7. We use Business Analytics, which is a tool that works with Fiserv mainframes (banking).
8. We use Crystal and ACL. We only have one user license because of the price. The process is good for handling large amounts of data.
9. MS Excel (2 responses).
10. Only Excel currently. We are researching tools such as Tableau.
11. Excel and Tableau.
12. IDEA (5 responses).
13. IDEA and Excel. IDEA has built-in functions/formulas to do analytics while with Excel you can do similar things but you have to write the formulas, etc.
14. Microsoft Power BI and IDEA. We are in the process of moving to Power BI from IDEA. It has the same functionality; we can learn additional queries; and it is more like Excel. We are making the move to save on licensing costs because Power BI is on our company’s standard platform.
15. MS SQL Server, SAP, (SAP) HANA, Tableau, Alteryx, Excel, ACL.
16. Python, R, ACL.
17. SPSS, SAS, R, Python, SQL, Tableau, ACL.
18. Tableau (3 responses).
19. We are a new audit function and are in the process of identifying the appropriate tool. I have prior experience with Tableau and it is great for visualization.
Using technology to save time for EHS auditing

We primarily use Galvanize (ACL) to help create automated scripts for data manipulation and analysis that is recurring. For example, we have used ACL to help automate the CO₂ reporting performed semiannually by the environmental, health and safety (EHS) function.

Prior to implementing automated scripts, the EHS team would spend many days downloading, formatting, and summarizing a group of reports and then performing manual calculations to determine overall CO₂ emissions. Using ACL, scripting automatically performed the same steps that were previously done manually. What used to take days to compile information now takes minutes to complete.

TM Analytics (TMA) is also used by internal audit to perform a lot of the same data analysis that ACL performs but at a much reduced individual cost per license. TMA includes a lot of underlying audit documentation within the tool itself that is not available with ACL.

TMA is Excel-based and easy to use (and learn). The key is to bring clean data into TMA to facilitate generation of further analyses. Among other things, the software has some very useful auditing functionality such as:

- Fixing undesirable data formats – removing leading/trailing spaces and alphabetic characters; splitting a single column with debits/credits into two separate columns, etc.
- Performing analytics/statistics – record counts, number of positive or negative numbers in data, mean, mediums, count transactions for any given period, etc.
- Joining worksheets – identifying potential fraudulent vendors by combining employee/vendor master files.
- Generating exception reports – duplicates, gaps in numeric document sequences, Benford’s testing, data outliers based on standard deviations from the mean, etc.
- Creating charts.

$10,000 to $24,999

1. ACL. Easy to use, powerful.
2. ACL. Used for pulling in full data population and performing data analysis. Also used for sampling when it makes sense.
3. ACL/Galvanize: Cumbersome to write scripts for a small department. Teammate Analytics: Easy to use but limited to Excel.
5. ACL: Recognized audit software tool, but start-up time greater than anticipated. Need SAP knowledge and understanding of data fields to leverage benefits over time. Excel: Broader general knowledge of tool, which allows for easier immediate use and experimentation; however, Excel has no inbuilt queries and is difficult to document, replicate, and control.
7. ACL. We have just begun the use of this tool, so experience is limited. The tool has powerful capabilities to analyze data and has the ability to set up scripting so that key tasks can be repeated on a regular basis. The tool does take time to understand and so there is a learning curve as the team uses the tool. In addition, the
team is having to learn the data sets in the company’s data warehouse. Gaining and understanding the data and making sure it is valid and usable has been a challenge.

8. We use ACL. Benefits are we have used the tool for a long time and feel comfortable with it. Downside is the tool is not user-friendly.

9. We use ACL/Galvanize/Robotics for scheduled and ad hoc analytics. Excel is another tool used frequently. The first tool mentioned requires training and access while the second cannot be scheduled to run routinely. The first can be used successfully to analyze data from disparate systems while the second is designed to work with one data set.

10. Alteryx data analytics…user friendly, although expensive.

11. Alteryx and Tableau. Easy to use and publish dashboards; however, licenses are expensive.


13. Excel, Power BI.

14. Excel, TeamMate Analytics. Benefits: Easy to learn and use; low cost; integrated in our audit workflow; not dependent on specialized skills and the risk of turnover; all audit staff are able to use it. Downsides: Not visual, but this has not caused any inability to provide the data analytics insights.

15. Traditional tools used are primarily Excel and Access. Our current initiative is to employ SQL Server and Server Management Studio.

16. IDEA: good for quickly managing very large data sets and filtering for exceptions, etc. Tableau: Good for visualization. Excel: Good for everything else.

17. We use IDEA. Benefits: One of the industry leaders; very powerful tool; fairly easy to use. Downside: Need a data analytics specialist to use it to its full capabilities.

18. Oracle BI. Benefits: Enterprise-wide system. Downsides: Not owned by internal audit, restricted to company-developed analytics. In the past I have used other tools including IDEA and ACL. IDEA benefits: user-friendly and cost beneficial. IDEA downside: Obtaining the data to perform timely inquiries. ACL downsides: Costly, obtaining data.

19. Power BI: Great data visualization tool; not hard to use; great for matching two files and finding discrepancies in the overlapping data; free if you don’t need to share scripts with other teams. ACL: Great for sampling, can also find data anomalies, inexpensive. Qlik: Free. We are now looking at MindBridge Ai Auditor, an artificial intelligence tool for reviewing general ledger entries, accounts payable, and accounts receivable. MindBridge is adding employee expenses to their toolset in November.

20. We have been most successful with Tableau for data visualization. We are exploring RPA for testing of Model Audit Rule (MAR) controls (comparable to SOX for insurance).

21. We use Tableau and ACL principally. We have three dedicated data analysts in a department of 23. Our analysts use a variety of tools/languages, e.g., SQL to extract the data needed. Our auditors work very closely with the data analysts in the audit planning phase to determine what is needed.

22. TeamMate Analytics, ACL, Power BI, Altyrex.

23. TeamMate Analytics and an Excel plug-in tool offered by Wolters Kluwer/TeamMate. Benefits: Very easy to use; robust functionality; all-around good data analytics tool for both advanced data analytics users and novices (i.e., financial/operational auditors). Downsides: Have not experienced any downsides.

24. ThoughtSpot, Tableau, TeamMate Analytics. We are transitioning from ACL to Arbutus.
$25,000 to $99,999

1. Access, Excel, Tableau (minimal).
2. ACL.
4. ACL. Can crunch large amounts of data; not the easiest to use.
5. ACL. Does what we need, but there is a steep learning curve.
6. ACL. Easy to use.
7. ACL. We have used ACL for years and have well-established processes for retrieving and managing data. We are currently in the process of migrating to Alteryx because ACL requires a dedicated IT support person in order to build or modify data extractions. Alteryx is robust and user friendly. It can handle data retrieval from a variety of sources, costs less, and provides a better audit trail. For the purposes of the survey, I’ve responded based on Alteryx.
8. ACL and Tableau. Benefits are we have been able to do some visualization with travel and expense, gifts, hospitality, travel, and compliance monitoring. Because we are still in early stages, we haven’t really had time to identify downsides or significant benefits.
9. ACL, Arbutus, Tableau.
10. ACL, dab:Exporter, Tableau.
11. ACL, Alteryx, Tableau, Excel.
12. ACL. Downsides: It is not user-friendly; access to the data tables is challenging.
13. ACL/Galvanize.
15. Galvanize (ACL) and Tableau.
17. We used HighBond Analytics (formerly ACL Analytics). Benefit: Tool is a long-standing leader in audit analytics capability. Downside: Cost per license.
18. Alteryx (data blending tool): Very visual and easy to use. Tableau (visualizations): Versatile and widely used, easy to learn.
19. Arbutus: Less expensive than ACL, a bit more difficult to use.
20. Arbutus and Excel. Arbutus is inexpensive and easy to use for lots of data. Excel is limited by the amount of data and fields it can analyze effectively.
22. We currently use a bolt-on tool to JD Edwards called Data Access Studio (DAS). It is basically a report writer, so it is good for extracting data from JDE into Excel. It does have some data analytics capabilities, but not much. We typically use it for our respective location audit when analyzing procure-to-pay data and making sample selections.
23. Excel: Certain inherent limitations. ACL: recently adopted; new to tool; more powerful than Excel. Spotfire: for visualization purposes.
25. Excel: Easy to use for simple analytics, cannot do more complex analysis. ACL: For more complicated analytics does a great job, does not have visualization and a bit more training required to use. Qlik: Business uses for business analytics and we leverage for our visualizations, especially to share with management, cannot do complex analysis, though.

26. Excel with ActiveData plugin: Low cost and easy to use as added to Excel ribbon. IDEA: Moderate cost with training needed for proficiency but is made for auditors and records a log of all steps for workpapers; very comparable to ACL but an easier interface. Tableau: a little pricey but key for visualizing large data sets and easily drilling down into populations.

27. Excel with BI add-in: quick and easy to use. Alteryx: Powerful and once you have the data feed set up, you are pretty much set to do any analytics you want. Tableau: Used as a front-end for some Alteryx output to allow visualization and drill down capabilities; board and leadership love the output.

28. IDEA.

29. IDEA: Advantage: Price, ease of use, limited in size of data to be analyzed. Disadvantage: Requires training and expertise to have efficiencies; cleaning/scrubbing data takes time. PwC tools: Advantages: Data expertise from PwC; large amounts of data. Disadvantages: Dependency, costly. SAP Cloud Analytics: Advantage: Integrated, continuous analytics. Disadvantage: Setup takes time; decentralized data is problematic.

30. Internally developed software to generate store-level transaction exceptions.


32. Primarily Excel and Tableau.

33. Qlikview, Alteryx, Excel.

34. Tableau.

35. TeamMate Analytics and IDEA.

36. We use a variety of systems. Primarily we use the systems used in our individual business units in order to access data.

$100,000+

1. ACL: Data Analytics SQL, retrieving the data.
2. ACL: Limitations in dashboard graphics.
3. ACL: Direct link to SAP data. QlikView for visualization.
4. ACL and XLS.
5. ACL: Large population analysis, trending, and outliers; requires training but also best utilized for those with proclivities for analysis and critical thinking and, to some extent, technology. Excel: More accessible to all auditors but limited to size of data to analyze.
9. A dedicated internal audit SQL data mart with Informatica for ETL. Pro: Allows for internal audit to independently source data and process data to build automated testing and self-service data extract solutions. Cons: Time-intensive to build/establish due to collaboration with many teams (architecture, InfoSec, data owners, etc.). Tableau for visual analytics and dashboards. Pros: Easier to identify anomalies and provides for
a more data-driven conversation with our clients; great trending capabilities to monitor/review key control. Cons: Not the best for linear type of reporting (i.e., cross tabs, and list reports), TOAD Data Point for selected query tool. Pros: Provides the drivers to connect to multiple data sources such as SQL, Oracle, DB2, as well as BI data sources such as Google Analytics and Azure. Cons: n/a. Excel. Pro: Easily accessible and the auditors are fluent with the application. Cons: Not able to analyze large data sets or to perform total population testing.
APPENDIX B: SOX TESTING TOOL

Survey question: Which technology tool(s) does your internal audit function use for Sarbanes-Oxley testing? What are the benefits and downsides of each system?

Note: The insurance industry is subject to the Model Audit Rule, which is similar to SOX. Their responses are included in this summary.

Less than $10,000
1. Comensure.
2. Connect.
3. Excel.
4. We use Excel but are considering Audit Board and TeamMate.
5. We use Workpapers CS (Thomson Reuters) for organizing workpapers, leaving review notes, and documenting sign-off evidence. It addresses our needs in compliance with Sarbanes-Oxley.
6. We use a combination of Word documents (process memos), Excel files (key control matrices), and MK Insight (for workpaper repository).
7. All testing is performed manually and documented using Word/Excel tools. We are moving toward audit management software with some integration capabilities. This may enable some automation down the road.
8. We do MAR (Model Audit Rule). We use spreadsheets currently.
9. We have Model Audit Rule testing and use RSAM to keep track of testing results.

$10,000 to $24,999
1. ACL.
2. Alteryx.
3. Our organization uses AuditBoard for SOX testing, which is handled outside of the internal audit function. From what I understand, AuditBoard's SOX compliance tool has been a useful to administer the SOX testing, which is completed by the business units. It houses all SOX documentation.
5. AuditBoard/SOXHub. Benefits: Smooth and easy implementation; central repository across organization (not just IA); archived records of prior year controls/tests. Downsides: No real downsides, but some reporting could be enhanced.
6. We use Excel now, but we plan to move to the MetricStream GRC tool.
7. MS Excel. Benefits: Cheap, easy to train, customize, share, roll forward, etc. Downsides: Version controls, change tracking/linking/embedding. I probably won't change from this. Every tool I have looked at for SOX wants way too much money for what they provide in my opinion, and any administrative time saved by moving to a tool that links everything together will have added time for managing/administering the tool. To me it is not
worth it. It would be better to spend money on Alteryx instead and provide value to the organization with analytics.

8. Pentana.

9. We utilize Protiviti for workpaper documentation, which works well for our needs. We are exploring RPA for some testing efforts.

10. Teammate Analytics. Benefit: Custom modules and ability to create consistent analytics to run for each project, low cost, easy to use. Downside: Doesn't facilitate easy ongoing monitoring, limited on file size.

11. TeamMate Analytics is integrated into the electronic workpapers (Excel).

12. TeamMate, TeamMate Analytics Benefits: Facilitated our audit workflow, documentation sharing of test plans, and built-in analytics scripts. Downsides: Not integrated with SOX process owner testing.

13. TeamMate+ Controls.

14. We are a not-for-profit organization. Although we had adhered to SOX 404 since 2005, in 2018 the company decided to no longer obtain an opinion on controls over financial reporting from our independent audit firm. Internally we still adhere to much of SOX 404, but the costs were increasing too much. We still use Protiviti's GRC tool for our internal control monitoring program.

15. We don't have a specific tool; we use Excel.

16. Workiva (Wdesk) is used as a repository for managing RCMs (risk/control matrices), SOX process/control narratives, and testing results. Benefits: End-users/business process owners can update/certify their SOX process narratives online. Overall, it's a good centralized database for managing/updating SOX process narratives. Downsides: We enter "limited" testing results into Workiva. It's not a fully robust tool for uploading/documenting SOX testing workpapers. We have a separate audit management system (TeamMate) to document SOX testing audit workpapers.


$25,000 to $99,999

1. ACL GRC for workpapers. Excel for analytics.

2. ACL, TeamMate+.

3. ACL, Alteryx, Excel.

4. We are moving to Alteryx, which can easily extract the data from our ERP system as well as from Microsoft Excel spreadsheets. We still have a lot of testing that is performed manually in Excel, but we continue to migrate as much as we can to Alteryx.

5. Arbutus and Excel.

6. Audit Board. We are satisfied.

7. AuditBoard (SOXHub and Workstream). We love it! Benefits: Great company, great application, cost is good (based on number of controls rather than users). No downside. This was by far the best option for us.

8. We are implementing AuditBoard (from Workiva).


10. Excel.

11. Excel and Onspring. Excel has the plus of familiarity and flexibility but needs to be monitored closely to ensure it is achieving the goal. Onspring is still relatively new to the department, and we are deliberately trying to increase its usage. We benefit from having it integrated with program management.
12. We use JD Edwards, an associated report writer (DAS), and a combination of SharePoint, Microsoft Teams, and AuditBoard (Ops Audit Module) for SOX testing and program management.


14. Resolver GRC Cloud, MS Excel, MS Word. GRC Cloud is our database library to track the linkages between risks and controls. We generally use MS Office for walkthroughs and testing.

15. TeamMate. It’s fairly user-friendly, but we just implemented (it) so we are still working through what we like and don’t like. Some things could be better designed such as: 1) Not duplicating controls when they are assigned to more than one financial statement risk. 2) Making it easier to expand embedded components (i.e., risks are embedded into objectives, controls are embedded into risks, and so forth). 3) If you have a change to a control's description, frequency, or other property, it must be updated in two places in the software (in the TeamStore database and in the current year Assessment of Controls).

16. TeamMate. Testing is integrated into internal audit testing.

17. Internal audit is not responsible for SOX testing. We have a global financial controls team that handles SOX implementation and testing. They use TeamMate. I can't comment on the benefits or downsides.

18. Workiva. It’s super easy to use and does a great job of linking control wording to all the various documents, so there is no need to worry about where all to update. It does a great job of automating our PBCs and management’s quarterly control self-assessments by leveraging emails and automated follow-up and linking to control testing, QSAs has automated emails and a link to the survey for management and consolidates responses. A downside is that we cannot easily alter the format, so we are locked in to the current set up and we have to adapt to it. We rely on Workiva to help with tech issues (for example, sometimes there are outages at inopportune times as they do an upgrade).

19. Workiva (recently implemented).

20. Workiva SOX module.


22. We have newly implemented Workiva’s Wdesk tool this year to facilitate our administration of SOX testing and documentation.

$100,000+

1. ACL and Excel.

2. We are moving to AuditBoard for tracking of our SOX-related testing.

3. Excel only. Much of the needed evidence is paper-based or random sampled (not statistically based selection).

4. Excel (2 responses).


6. SAP GRC. It’s cumbersome but fully integrated, which gives us keen insight into segregation of duties testing.

7. The Controls and Compliance group within Finance is responsible for SOX testing in our organization (not internal audit). They use SMART Solutions.

8. TeamMate.
APPENDIX C: CONTINUOUS AUDITING/MONITORING

Survey question: Which technology tool(s) does your internal audit function use for continuous auditing/monitoring? What are the benefits and downsides of each system?

Less than $10,000

1. ACL (3 responses).
2. We use MS Excel and MS Word, plus ERP system Oracle Financials.
3. IDEA.
4. We use IDEA. You have to know which data sets have the information you need. You also need to know how complete, accurate, and relevant the data is to the goal. It is a time-consuming process upfront, and you need ongoing review of the process to ensure changes don't have an adverse effect on the results.
5. MS SQL - SSIS and other ETL logic Tableau.
6. We are going to use Python and R Python and R. We are just starting the program, so we haven't identified the benefits or downsides yet. These are free resources, and we are finding the college graduates we have talked to have experience in Python and R so we are migrating that way.
7. We will use Power BI.
8. SQL and Cognos.
10. We are a new audit function and are building out the continuous monitoring. It is likely to be a combination of testing scripts and ongoing report analysis.
11. We use a business analytics tool that is already embedded in Fiserv mainframes (banking).

$10,000 to $24,999

1. ACL (2 responses).
2. ACL and Tableau.
3. ACL. Benefit: A predefined script/audit program to use for testing. Downsides: Employee turnover created additional training costs. The client department may not see value in this type of auditing.
4. ACL. We use a script written in ACL to complete monthly fraud and funds leakage tests over AP payments, claim payments, T&E and procurement card payments, and also manual journal entries. Benefits include ease of use and documentation of commands in the logs. There are no real negatives with the tool.
5. Alteryx and Tableau.
6. Alteryx.
7. Altyrex. Advantages are integration and accessibility to data.
8. We are converting to Arbutus.
9. Core FIS reports, Business Intelligence Center.
10. Core banking and other systems.
11. Excel/IDEA.

12. We have very limited continuous auditing. It is typically audit passing to management filters/scripts used in prior audits for them to rerun monthly/quarterly. Typically they are IDEA or Excel-based.

13. We are using SQL Server and Management Studio. We are just beginning, but it seems promising.


$25,000 to $99,999
1. ACL (4 responses).
2. ACL, Alteryx, Excel.
3. ACL and Tableau.
5. Excel.
6. Galvanize (ACL) and Microsoft BI.
7. IDEA. Benefits: Evaluating 100% of a high risk transaction population rather than a sample. Downside: Having clients dedicate sufficient resources to address the outliers that the DA filters kick out.
8. Monitor. It's practical and works well. The downside is the management of the process around it (case management).
9. Robotics in Galvanize from our data analytic system.
10. SAP, ACL, Tableau.
11. See SAP Analytics Cloud Adv and Disadv.
12. SQL queries against Oracle tables.
13. SQL, Alteryx, and Tableau (works well together to generate exceptions for management)
14. Data sets are stored in SQL servers with scripts running to identify possible exceptions and visualized with Tableau. It is a labor-intensive process to create a new area for continuous auditing/monitoring and then testing the output to ensure it is working as intended. We haven’t identified the best way to share the information broadly outside of our office with our decentralized organization.
15. Tableau.
16. We have a third-party tool for T&L monitoring but not really any solution that is constant.
17. Management metrics and management reporting.
18. Again, we are migrating to Alteryx because the monitoring is easy to build. We are also looking at Celonis to help identify outliers in key processes so that we can focus our efforts on the exceptions.
19. Various. We use various enterprise systems for automated monitoring through exception reports.
20. We don’t have a specific tool, but we have set up some reports to run through IDEA to support continuous monitoring.

$100,000+
1. ACL–Data Analytics.
2. Alteryx and Tableau.
4. ACL. A downside to consider: It takes some tweaking to reduce the number of false positives, and it doesn't seem to have an easy built-in process to close the loop to make sure people close out all positives from the last report.

5. IDEA Enterprise Threat Monitor. (This is a custom third-party tool for fraud monitoring in the SAP ERP environment.)

6. We use a dedicated internal audit SQL data mart with Informatica for ETL. Advantages: It allows for internal audit to independently source data and process data to build automated testing and self-service data extract solutions. Disadvantages: It is time-intensive to build/establish due to collaboration with many teams (Architecture, InfoSec, Data Owners, etc.)

7. We use Tableau for visual analytics and dashboards. Advantages: Easier to identify anomalies and provides for a more data-driven conversation with our clients; great trending capabilities to monitor/review key controls. Disadvantages: It is not the best for linear types of reporting (i.e., cross tabs, and list reports).
APPENDIX D: ROBOTIC PROCESS AUTOMATION

Survey question: Which technology tool(s) does your internal audit function use for robotic process automation? What are the benefits and downsides of each system?

Less than $10,000
1. Robotic process automation is not used by internal audit, but the finance organization is implementing robotics, and we hope to be able to use the technology once available in the organization.

$10,000 to $24,999
1. We use Alteryx for some automation.
2. We are piloting RPA using Automation Anywhere. It is too early to identify benefits or downsides.
3. While we have audited the RPA implementation across the company, we have not identified sufficient repeatable activity that it would make sense to apply RPA within our audit work. There is just too much variability in the audits we complete.

$25,000 to $99,999
1. We use ACL, UiPath, and TeamMate+.
2. We've been using ACL and Excel Macros. It's not exactly RPA, but it's pretty close. Using software we already have is a plus.
3. We use Galvanize.
4. Will be implementing Galvanize Robotics System in quarter 1 of 2020
5. A few areas have been identified and designed to provide assurance on 100% of the population, using SQL queries, scripts, and establishing workbook in IDEA. Systems and data requires periodic tweaking and review to ensure it continues to work as designed
6. We use UiPath.
7. The company is starting to move forward with RPA within the finance function.

$100,000+
1. Our company has purchased a license to Blue Prism but it has not yet been widely implemented. We do not currently use RPA within audit services.
2. Our company is in the process of onboarding Pega as the RPA technology of choice. We anticipate leveraging the technology within the next year.
APPENDIX E: ARTIFICIAL INTELLIGENCE TOOLS

Survey question: Which technology tool(s) does your internal audit function use for artificial intelligence? What are the benefits and downsides of each system?

Less than $10,000
1. Artificial intelligence is on the strategic plan for 2022–23.

$10,000 to $24,999
1. We are looking at doing a pilot of Mindbridge. This uses machine learning to identify high-risk GL entries, vendor payables, and employee expenses. We expect to do the pilot in the next few months.

$25,000 to $99,999
1. We use Business Intelligence Cloud Services.
2. Galvanize (ACL) will be used. We are just starting to explore how to use AI.
3. We use SAP Analytics Cloud. Advantages: Expertise in house. Disadvantages: Cannot include metrics easily that are not integrated.
4. We currently do not deploy artificial intelligence within the third line because we have not identified a good use-case to date, but we are still researching. The tool available to us is SAS Data Miner for AI and Machine Learning.
5. Testing results from continuous monitoring are recorded back into SQL/Tableau that has scripting built in to enable the data set to learn from audit results. We are in the early phases of this but hope to keep improving the accuracy of records flagged for continuous monitoring.
6. We haven’t selected a tool yet, but we are looking.
7. We are not yet using artificial intelligence, but we will soon.
8. We don’t have sufficient volume to justify a tool for AI at this time.
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