



DATA IN THE DARK: Organizational Disconnect Hampers Information Security

2010 PASS Database Security Survey

By Joseph McKendrick, Research Analyst
Produced by Unisphere Research, a division of Information Today, Inc.
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RESEARCH
Thomas J. Wilson,
President

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EXECUTIVE SUMMARY

A culture of complacency hampers information security efforts, and as a result of lax practices and oversight, is leaving sensitive corporate data vulnerable to tampering and theft. A new survey of database administrators and managers at Microsoft SQL Server sites reveals that these professionals often are working in the dark when it comes to overall information security, lacking effective organizational support and tools to better identify and prevent potential problems.

The survey was conducted by Unisphere Research among 761 members of PASS, the Professional Association for SQL Server. The survey, conducted in partnership with Application Security, Inc., was conducted in September 2010. Survey respondents were directed to a web-based survey instrument via email notification.

Respondents to the survey have a variety of job roles and represent a wide range of company types and sizes. The largest segment of respondents has the title of database administrator, followed by IT managers and developers. About one-quarter come from larger organizations with more than 5,000 employees, and another one-quarter from smaller companies with fewer than 100 employees. In terms of industry groups, the largest segments seen in this survey are financial services, software development, IT services/consulting, healthcare, and government. (See Figures 35-37 at the end of this report.)

Key highlights of the survey's findings include the following:

- While few organizations are cutting back on data security spending, there is great uncertainty as to the depth of organizational support. Database managers and professionals—the group most likely to be charged with data security—are largely unaware of the scope of budget support, suggesting a critical disconnect between corporate management and technology teams about data security priorities.
- One in five respondents fear that their organizations will experience a major data breach over the coming months, but few are aware of the potential costs to their organizations. Among those respondents that are aware of where data security breaches have occurred, they cite a pattern of inside abuse and errors.
- While there is a considerable amount of personally identifiable information present at respondents' sites, many respondents report there are few controls to protect the data. In many instances, multiple copies of this data—including live production data—is frequently sent offsite.
- These days, data security is far more than just a technical issue. A majority of respondents say their organizations are affected by government and state mandates that require more judicious data management practices. However, respondents report that they don't have or aren't aware if security audits are in place to meet more rigorous standards.
- There is little monitoring for security issues going on, and few respondents report they are adopting security patches as they become available.

On the following pages are the detailed survey results, which explore the challenges of data security from a variety of angles. Demands from the business are constantly pushing security to the limit. “The tug of war between empowering the user and securing the data is of concern to me,” says one respondent. “The user who discovers that he can ‘back-door’ a connection from Excel to Access to a production SQL Server is scary. The organization is supportive, but addressing this kind of threat is an iterative process.” However, adding to the challenge, a number of respondents report that organizational support is not always forthcoming. As another participant observed, echoing the tone of the survey findings, “I seem to be more concerned about security than my management.”

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DATABASE ENVIRONMENTS

While few organizations are cutting back on data security spending, there is great uncertainty as to the depth of organizational support. Database managers and professionals—the group most likely to be charged with data security—are largely unaware of the scope of budget support, suggesting a critical disconnect between corporate management and technology teams about data security priorities.

First, a few data points about the scope of survey respondents operations. Many are charged with managing large data stores. Sixteen percent of the group report managing than 50 terabytes (TBs) or more of online (disk-resident) data managed, taking into account production data along with all clones, snapshots, replicas and backups. (See Figure 1.) In addition, more than one out of five report their companies run more than 100 instances of SQL Server. (See Figure 2.) Most respondents manage in the range of 100 to 500 instances of databases within their environments. (See Figure 3.)

Database administrators (DBAs) and managers—who comprise the majority of respondents to this survey—take on the greatest responsibilities for data security within their organizations. Three out of four organizations assign DBAs these tasks, while close to half rely on a dedicated IT security group to handle data security. (More than one-third of organizations, 36 percent, assign data security responsibilities to both database and IT security groups, as the question allowed for multiple overlapping responses.) (See Figure 4.)

When it comes to information security spending levels, a mixed picture emerges. Fewer than a third, 29 percent, report increases in their security budgets over the past year, and a similar amount report no change. One thing is certain—very few are cutting back on this crucial area, as only four percent report

cutbacks. However, surprisingly, a large segment of respondents, 40 percent, admit they are unaware of the extent of their company's information security spending. This suggests that there is a strong disconnect between IT operations and business management. Such a disconnect may also exacerbate management complacency toward information security. (See Figure 5.)

Even among those respondents identifying themselves as DBAs in companies where the database teams are directly responsible for data security, there is a notable lack of awareness of security budgets—39 percent still say they are unaware of the funding available.

At some organizations, data security may come as an afterthought, and thus is not formally addressed in corporate budget planning. “Security issues for database access have always been the last thing that is brought to mind during the change management process,” according to one respondent. “We have been trying to push this up the design process much earlier than after-the-fact when time becomes a factor.” Another respondent echoed this challenge: “Is my organization supportive of efforts to address security issues? Within the group I work in, only after the fact.”

Where do respondents spend the most time each week in terms of information security? The most time, reported by 21 percent, is engaged in database configuration and patch management. Another 17 percent of respondents report spending the most time in database audit and threat management/database activity monitoring. These results suggest there is little automation now seen among data security operations, and as shown later in this report, there is little automation. (See Figure 6.)

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Figure 1: Total Amount of Data Managed
(Including production data, clones, snapshots, replicas and backups)

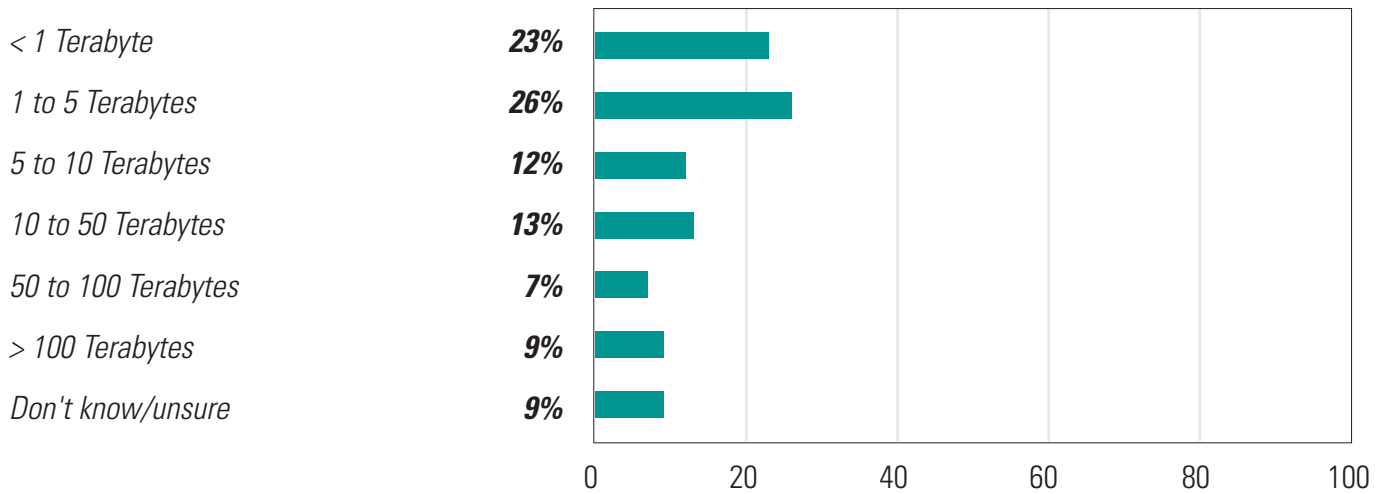
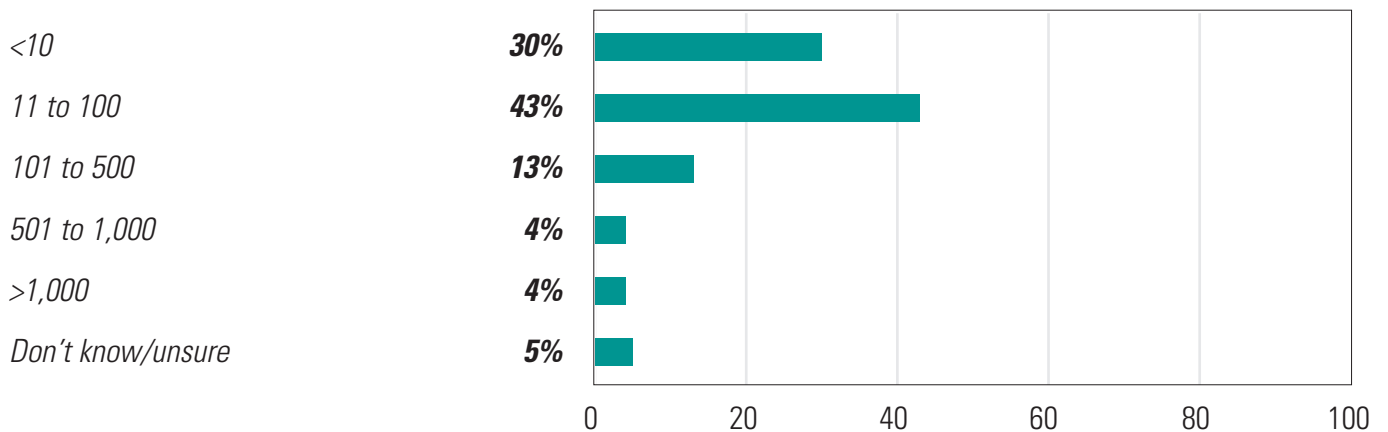


Figure 2: Number of SQL Server Instances



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Figure 3: Number of Database Instances

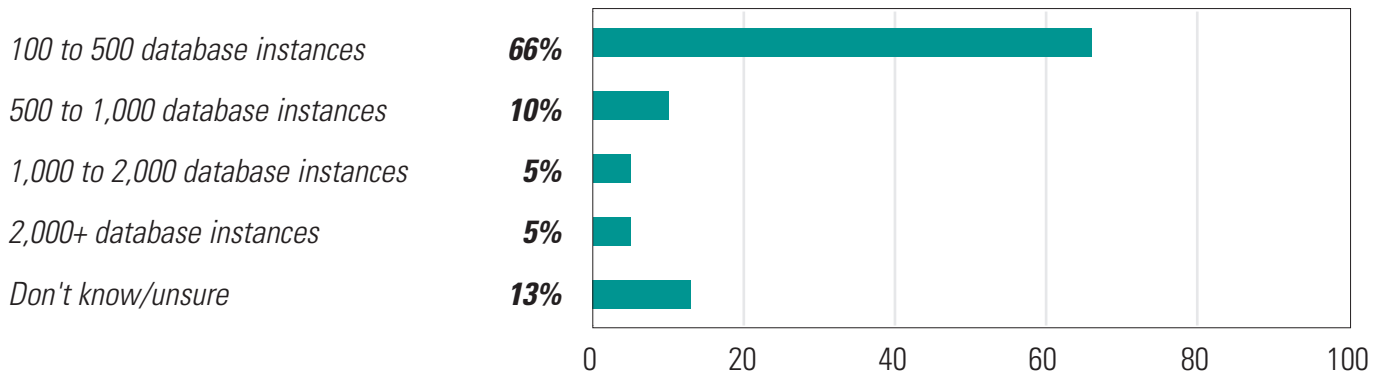
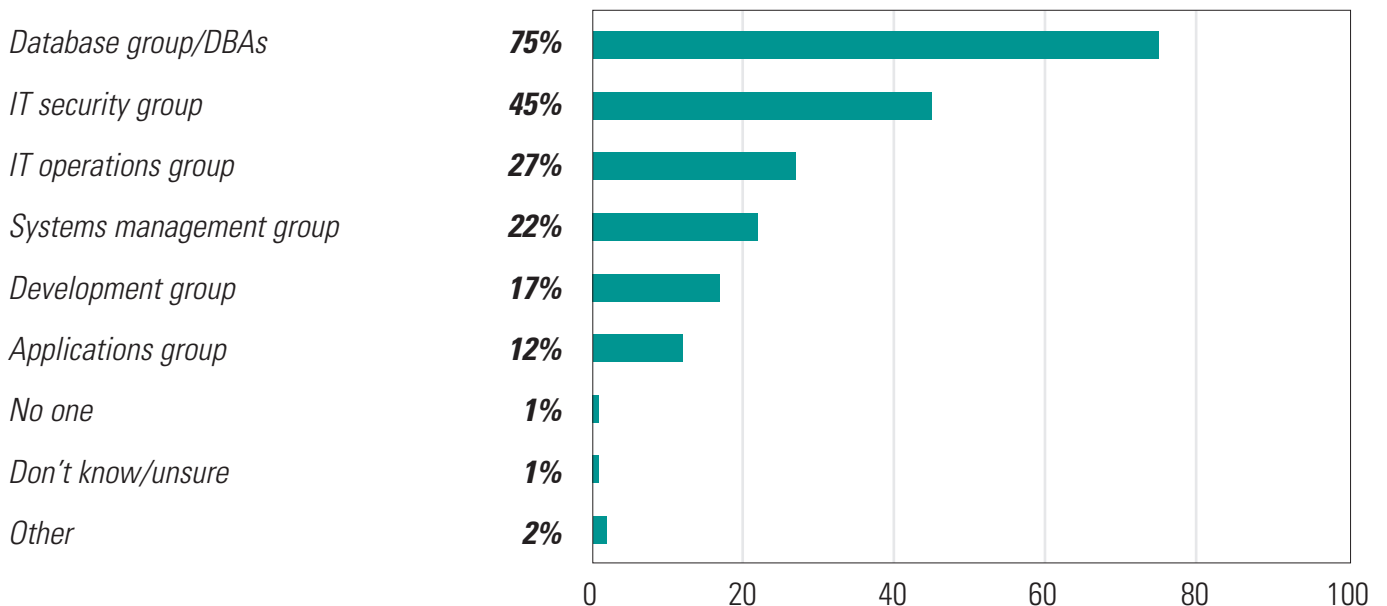


Figure 4: Who is Responsible for Database Security?



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Figure 5: How Information Security Spending Has Changed Over Past Year

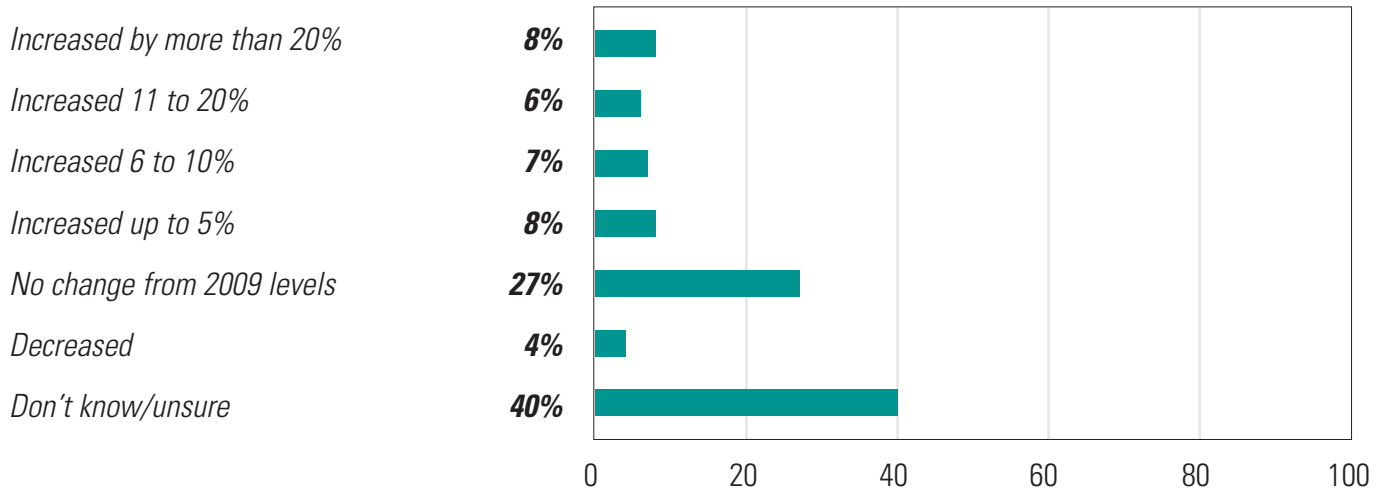
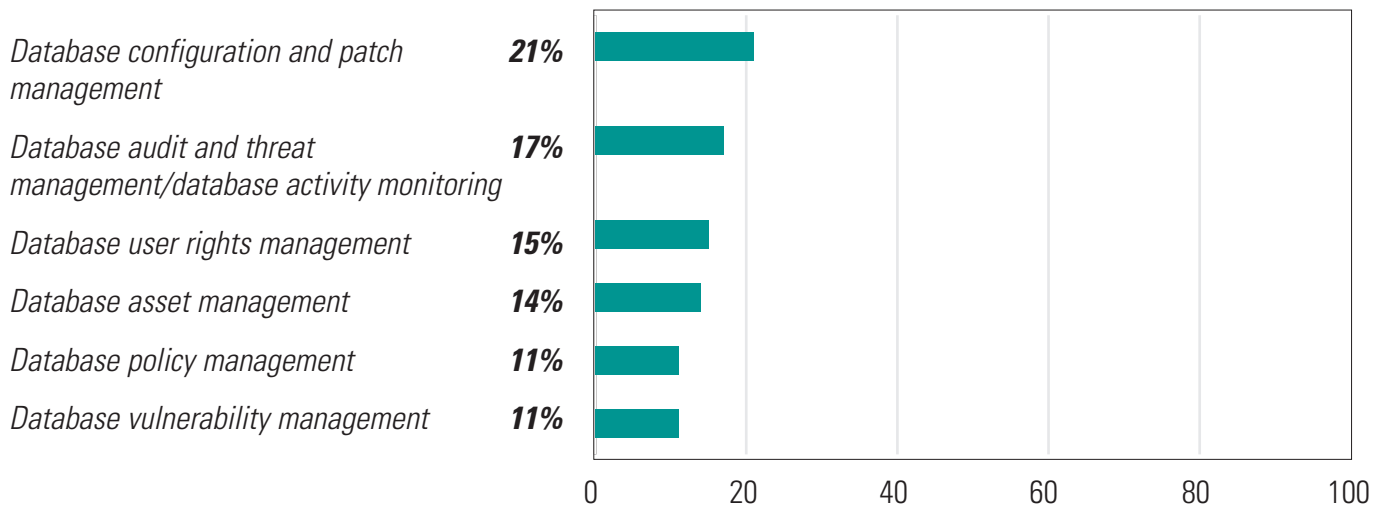


Figure 6: What Percentage of Database Security Time Spent Doing Following Activities? (Percent reporting more than 25% of time per week)



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DATA BREACHES

One in five respondents fear that their organizations will experience a major data breach over the coming months, but few are aware of the potential costs to their organizations. Among those respondents that are aware of where data security breaches have occurred, they cite a pattern of inside abuse and errors.

The lack of clarity pertaining to organizational support for information security initiatives also is seen in ability to monitor and track incidents when they happen. While the percentage reporting known confidential data breaches is relatively low (seven percent), it's notable that another 18 percent indicate that they have no idea if their organizations had suffered a breach. (See Figure 7.)

While few respondents are fully aware of the extent of data breaches in their organizations, about one in five say they fear they may experience some type of breach in the coming months. (See Figure 8.)

Among those respondents that are aware of where data security breaches have occurred, they cite a pattern of inside abuse and errors. While an external attack against data is still the single most common type of security event, this only accounts for one-third of the breaches that have occurred. Most of the other incidents that occurred at respondents' sites were the result of insider abuse or mistakes. For example, 29 percent of respondents cite human errors as the root cause of their data

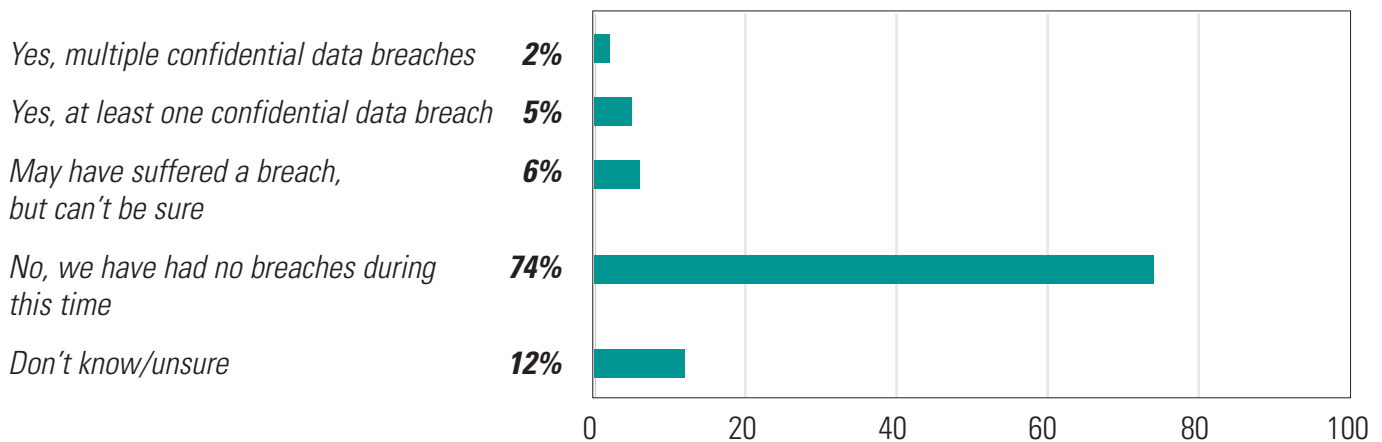
breaches in the past year. One out of five respondents say they were subject to an insider attack. (See Figure 9.) In many cases, these attacks were carried out directly against a database. (See Figure 10.)

In fact, inside incidents are more likely than anything else to be keeping DBAs and managers up at night. Two out of three say they are concerned about human errors mucking up their data operations, while more than two out of five worry about abuse or outright hacking by individuals with inside privileges. (See Figure 11.)

Respondents had difficulty pinning an exact cost to the business when data breaches are experienced. Close to three out of five, in fact, say that they simply don't know what the costs are. The largest segment of respondents, 29 percent, say that the costs are at the low end, not exceeding \$10,000. However, with so many unknowns, it's difficult to gauge the full cost and true extent of unknown breaches, some of which could potentially fester for months and years without being discovered. (See Figure 12.)

Still, as one respondent observes, management is complacent about such possibilities. "I don't think our organization will take security seriously until something serious happens," says the respondent. "Right now, the risk of not doing something about our lack of security is viewed as a 'calculated risk,' the perception is that the cost of any problem will be balanced by the cost we saved in time."

Figure 7: Organization Suffered Confidential Data Breach Within Last 12 Months?



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Figure 8: Likelihood of Data Breach Within Next 12 Months (Internal or External)

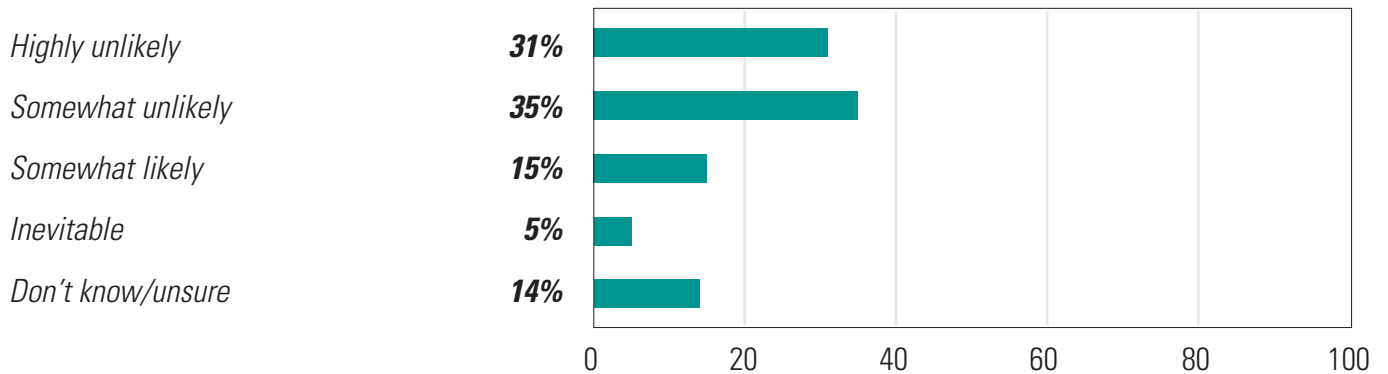
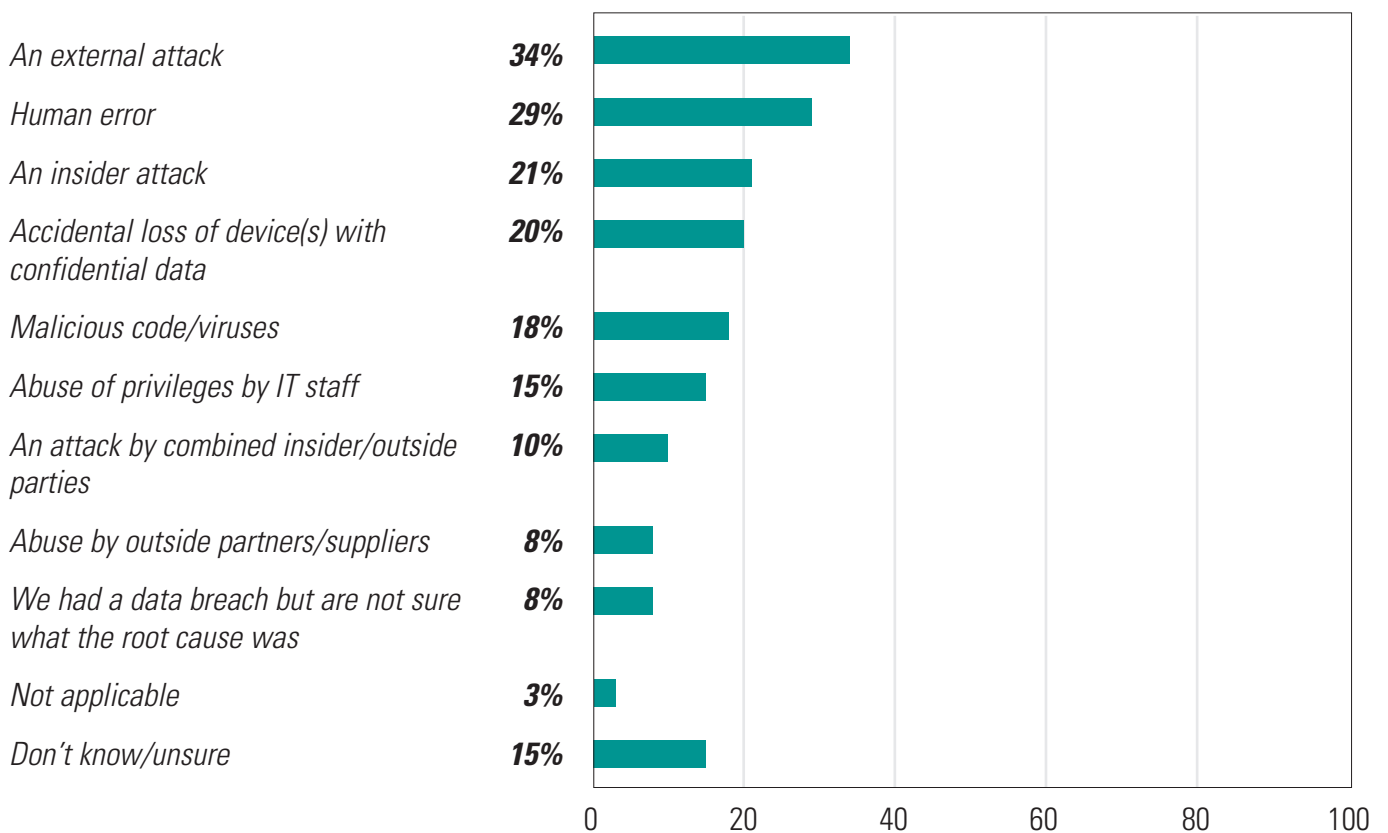


Figure 9: Root Causes of Confidential Data Breach(es) Over Past Year

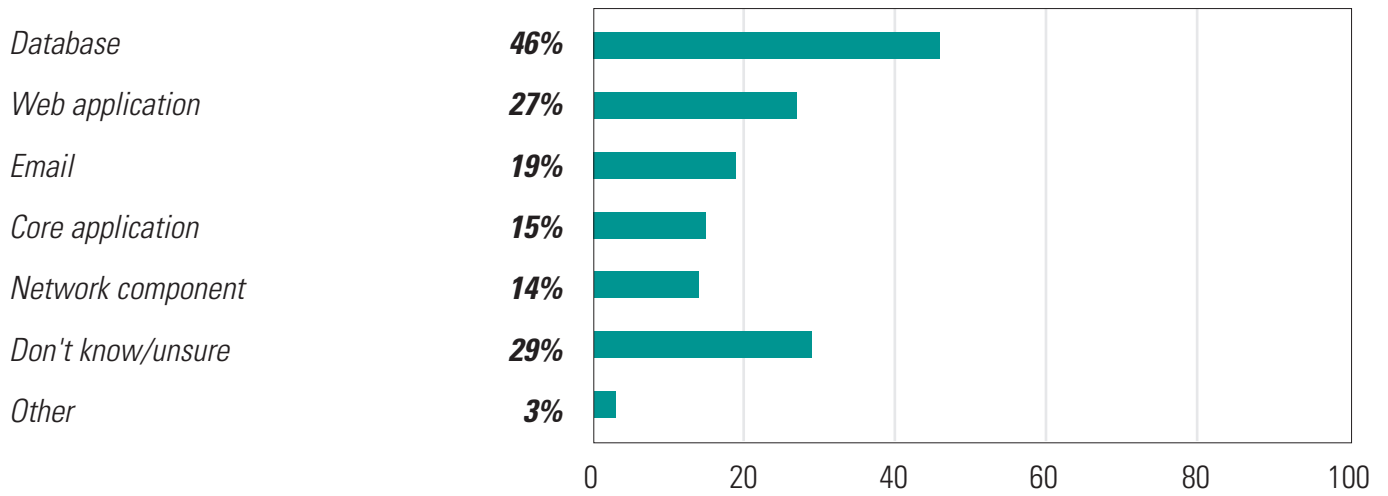


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Figure 10: Functions Impacted by Data Breach(es) Over Past Year

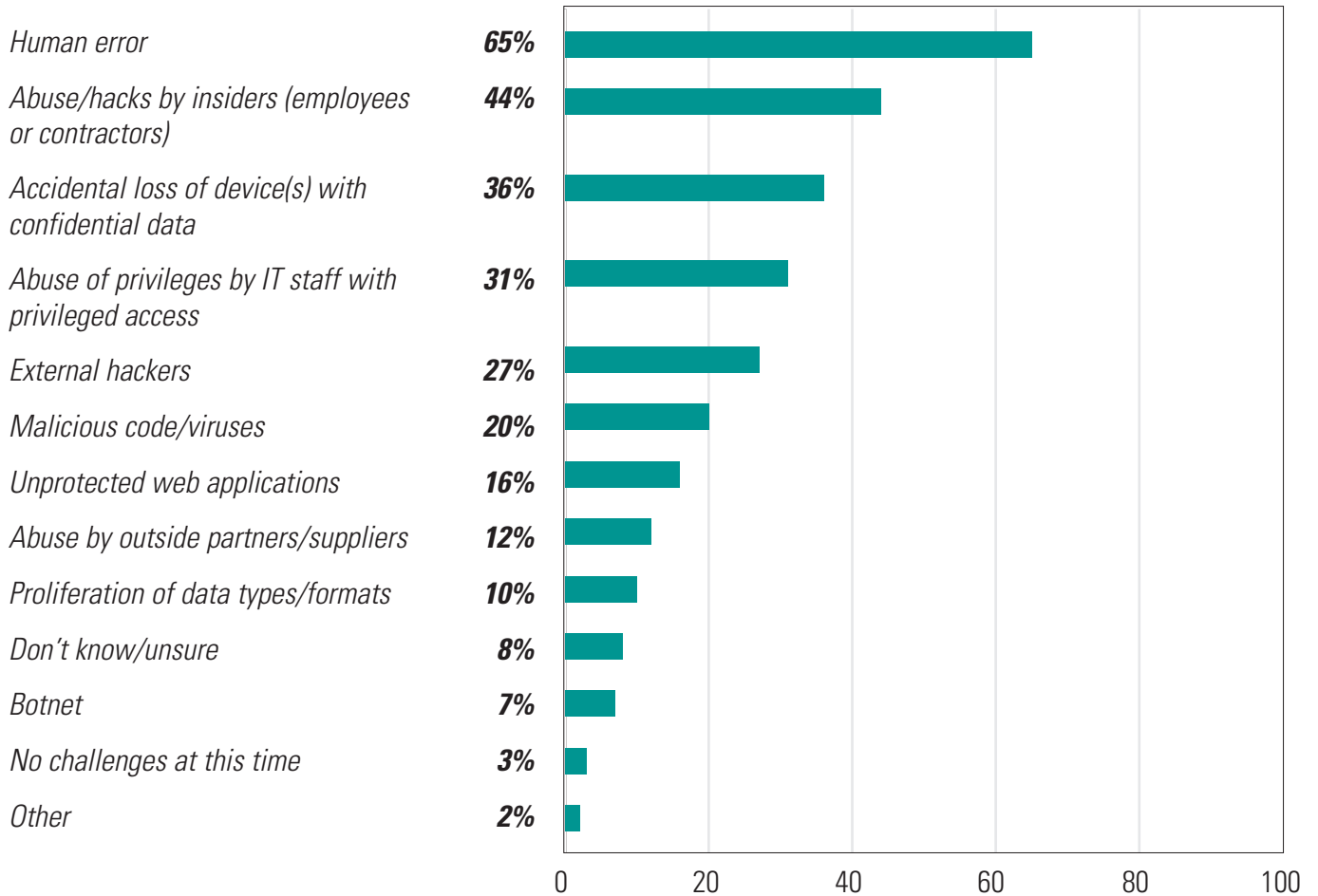


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Figure 11: Greatest Challenges or Risks to Database Security

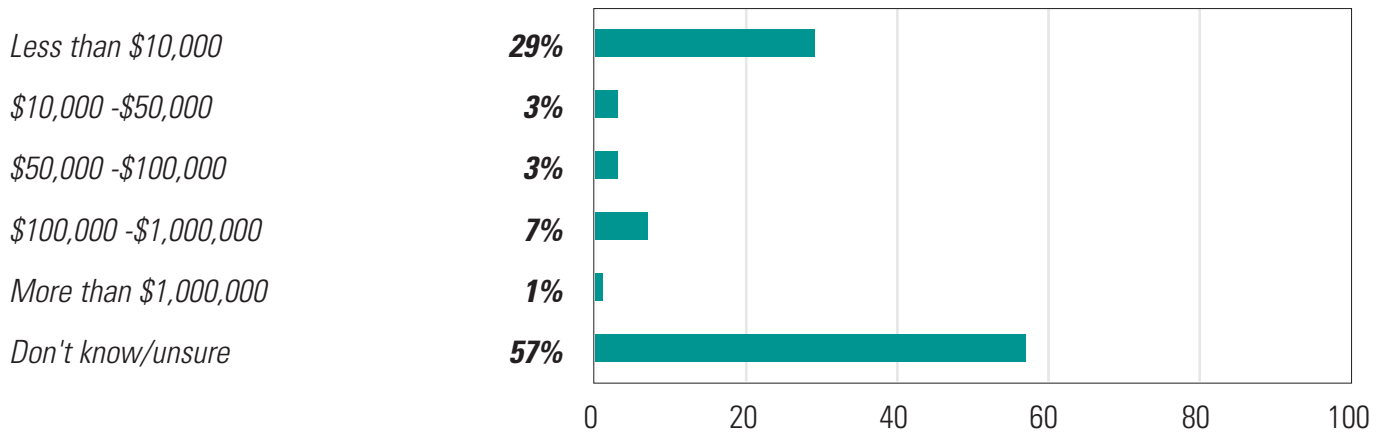


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Figure 12: Total Cost of Data Breach(es) to Business Over Past Year



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DATA VULNERABILITIES

While there is a considerable amount of personally identifiable information present at respondents' sites, many respondents report that there are few controls to protect the data. In many instances, multiple copies of this data—including live production data—is frequently sent offsite.

Information security is a challenge, but a substantial portion of corporate data is specific to processes or internal systems, and thus essentially useless when removed from its context. However, as found in this survey, there is also quite a bit of personally identifiable information (PII) or confidential data—such as Social Security, credit card, and national identifier numbers—being managed at respondents' sites. About 13 percent report that the majority of their data is PII, and a total of 24 percent say this comprises more than one-quarter of their data stores. (See Figure 13.)

Close to one-third of respondents say that they have little or no protection for their data stores via current controls, or they simply aren't aware if the controls are enough. (See Figure 14.) Adding to the challenge is the fact that this data often gets duplicated and sent to other parts of the organization and beyond, where it falls out of the control of the IT or data department that originally oversaw its security. Close to two out of three respondents say that their organizations have multiple copies of production data outside their enterprises—including offsite backup and storage, and partner sites. In two out of five cases, more than three copies are outside the enterprise walls. (See Figure 15.) "Principle of least privilege is not practiced," says one respondent. "Staffers both inside and outside IT have inappropriate access that may lead to loss or misuse."

Adding fuel to the fire is the fact that much of the data sent out to other sites may be live production data. Two out of five respondents admit they use live production data within non-production settings, such as staging, development, or backup environments. A majority, 54 percent, say they use what they consider to be old or outdated production data. (See Figure 16.)

In many cases, in fact, these copies of production data are outside the control of IT departments, the survey finds. A majority, 54 percent, report that there are copies out of their direct control, or don't know if such copies exist. (See Figure 17.) "We have rampant duplication of production databases through multiple environments with less stringent security safeguards," one respondent admits. Another points to a related problem: "There are a lot of different vendors that have access to the same SQL server," says one respondent. "Management needs to see the value in having separate servers for each application."

There is also a high propensity to send a range of data administration functions out beyond the firewall as well. More than one-third of respondents report that their companies outsource database/application administration functions,

application development, or data mirroring to a third party. (See Figure 18.) This may open additional vulnerabilities. As one respondent noted, "We have too many outsourcing consultants and vendors who may or may not follow company standards and there are very few checks on these activities."

About 27 percent of respondents say that they either do not feel that their organizations' existing data security controls provide an adequate level of protection for confidential data, or they are not sure if they do. (See Figure 19.) In addition, a majority of organizations fail to take advantage of tools and methodologies to render data useless or unreadable to outside or unauthorized parties. Only 30 percent say that that PII is encrypted across their entire database environment. Another 37 percent say that none of their corporate PII data is encrypted, or they simply don't know whether it is. (See Figure 20.) Likewise, only 20 percent report they take measures to mask or de-identify data across their database environment. A majority, 53 percent, have no such methodologies or simply don't know whether they do. (See Figure 21.)

What are the greatest impediments holding back efforts to address information security? Organizational issues dominate. A majority of respondents are concerned with budget constraints that may be holding back their information security efforts. Two out of five said their efforts were hampered by a lack of understanding of the threats. One-third, in fact, talked about a disconnect between their corporate management and the IT department. (See Figure 22.) "The number and complexity of systems we have prevents us from having a cohesive policy," one respondent observed. "People with high-level security expertise lack the time and money allocation clout to truly secure things from an IT perspective."

Some respondents expressed frustration at their management for failing to act appropriately to the challenges. "We depend on our network security and operating system security and physical security to protect our databases—but this is still not adequate," says a respondent. "Our databases are badly designed and there are many, many, many interdependencies. It is very hard to restrict access to anyone without breaking something. I am sounding the alarm, but the response I get from management is tepid, at best."

Ultimately, effective education is the key, as one respondent points out. "I see our greatest vulnerability as a lack of best practices for database security among our development organization," the respondent says. "While we do have a strong security in our network and application architecture, I do see our database security as lacking. The knowledge base is simply insufficient to adequately protect us from threats. With sufficient training of our personnel, our organization would be supportive of efforts to address these issues."

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Figure 13: Percentage of Enterprise Data Comprised of Confidential or Personally Identifiable Information (e.g., Social Security, credit card, and national identifier numbers)

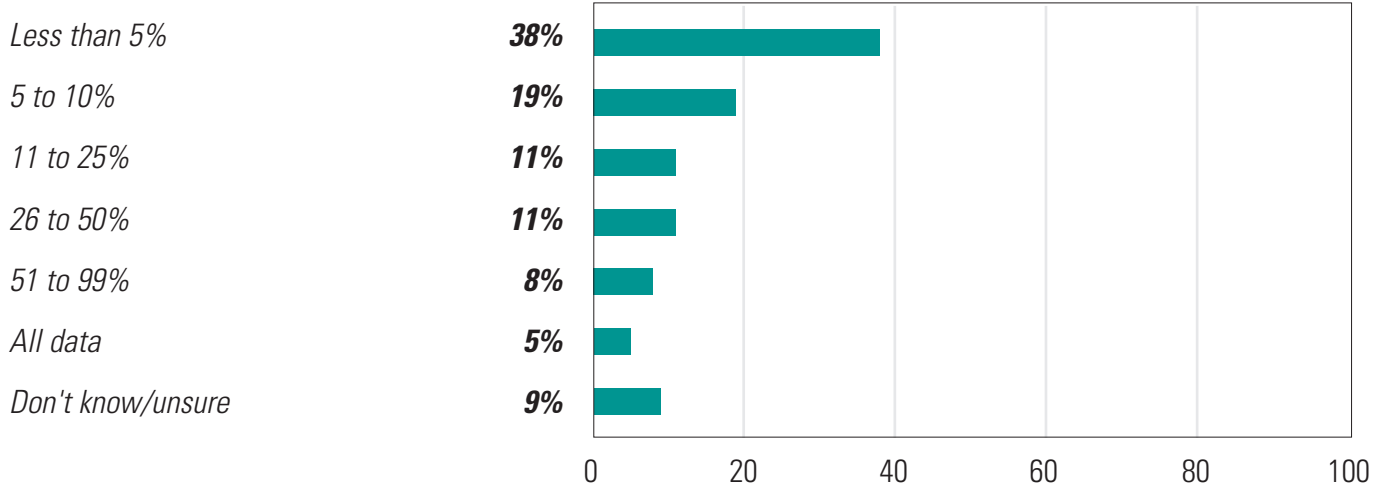
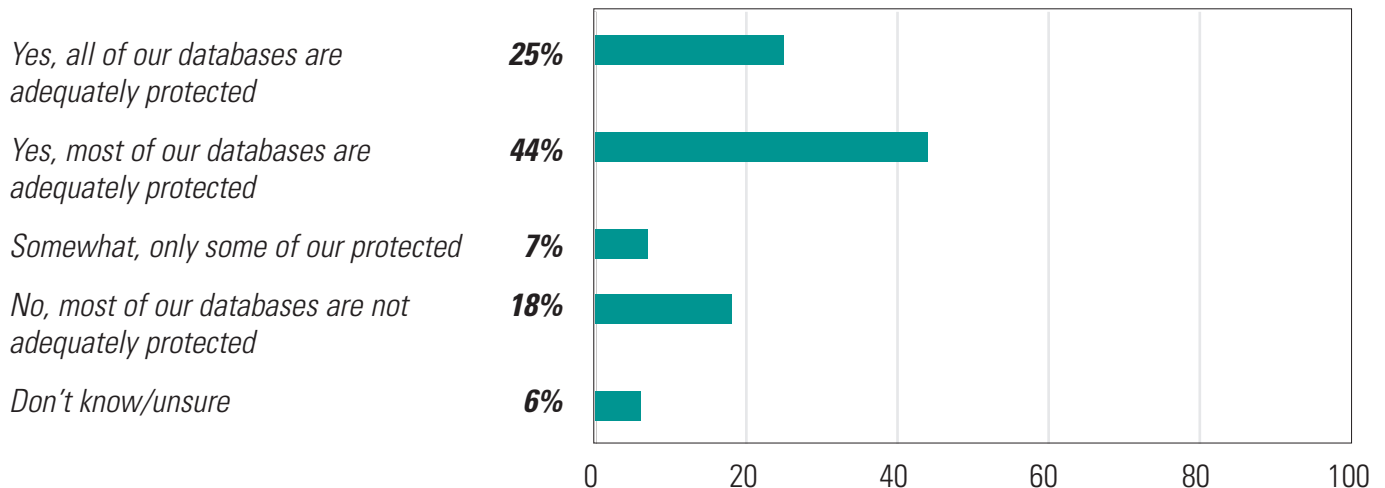


Figure 14: Existing Database Security Controls Provide Adequate Protection Against Database Breaches and Attacks?



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Figure 15: Number of Copies of Production Data Across Enterprise
(including offsite backup and storage, partner sites)

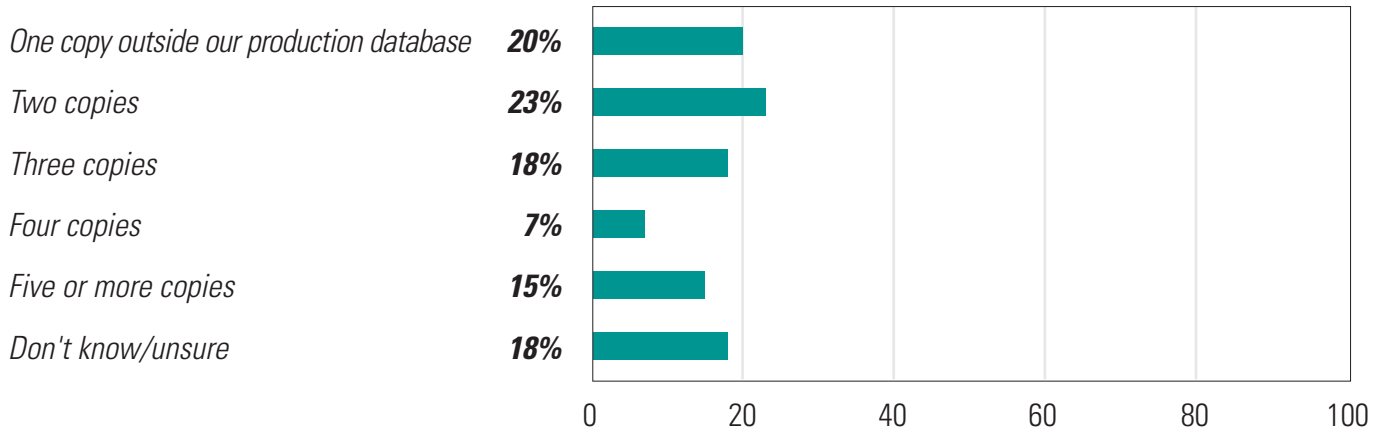
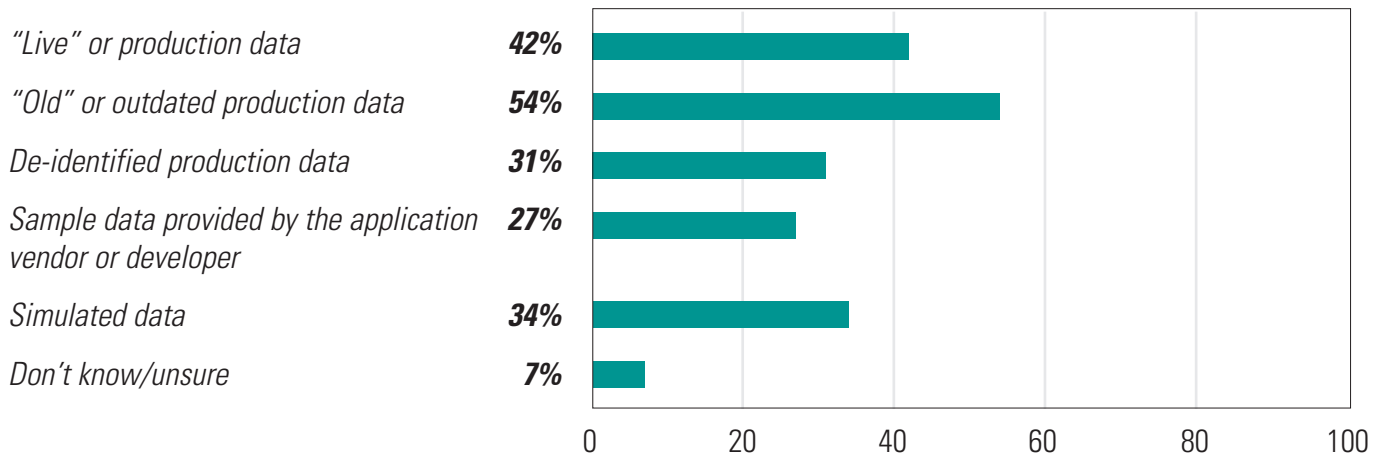


Figure 16: Types of Data Used Within Non-Production Environments
(e.g., staging, development, backup environments)



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Figure 17: Non-Production Copies of Data Within Direct Control for Security and Monitoring Purposes?

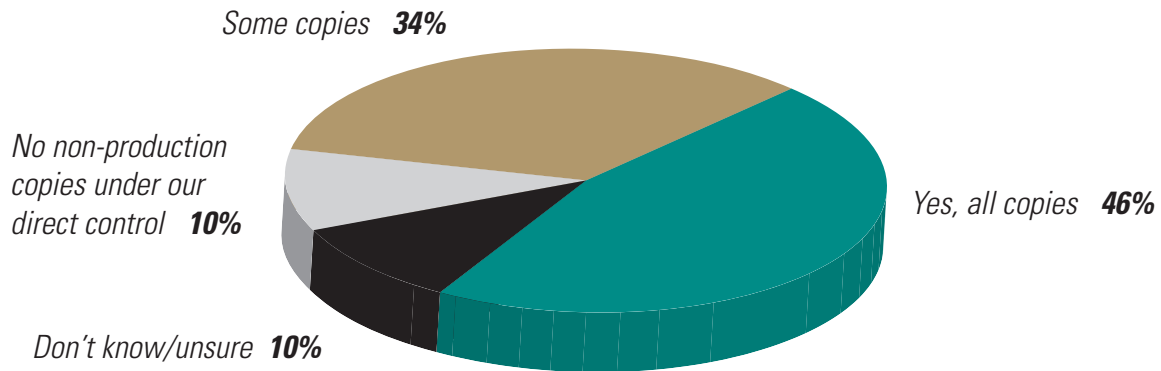
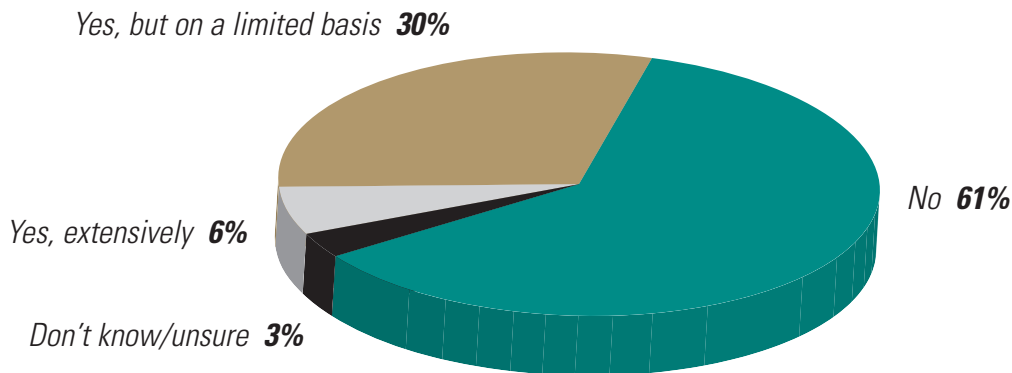


Figure 18: Company Outsource Database/Application Administration Functions, Development, or Data Mirroring?



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Figure 19: Existing Data Security Controls Protect Confidential Data?

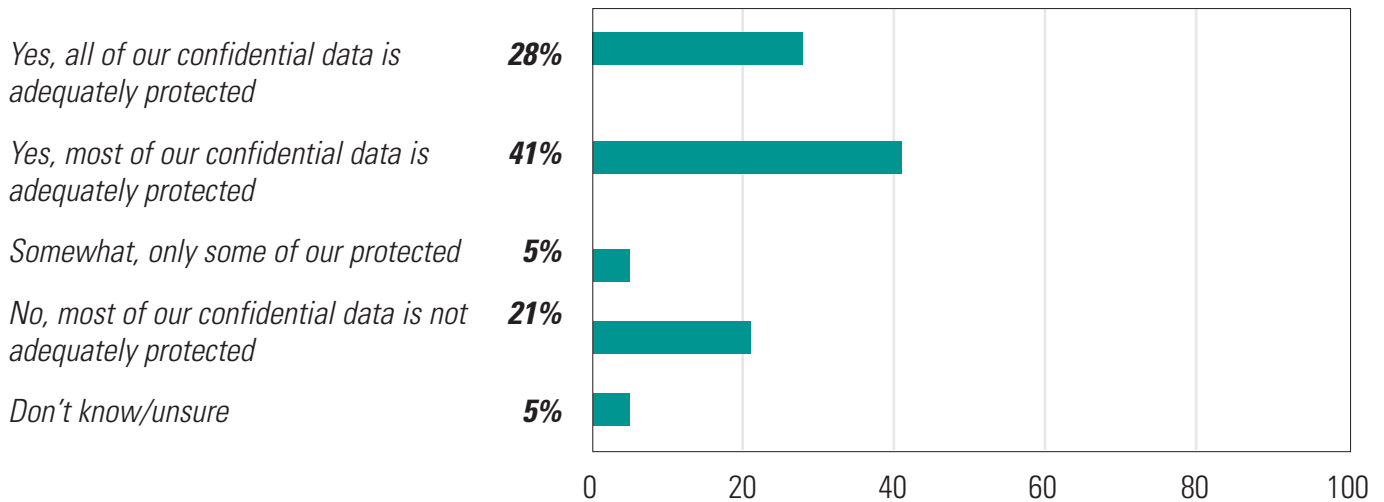
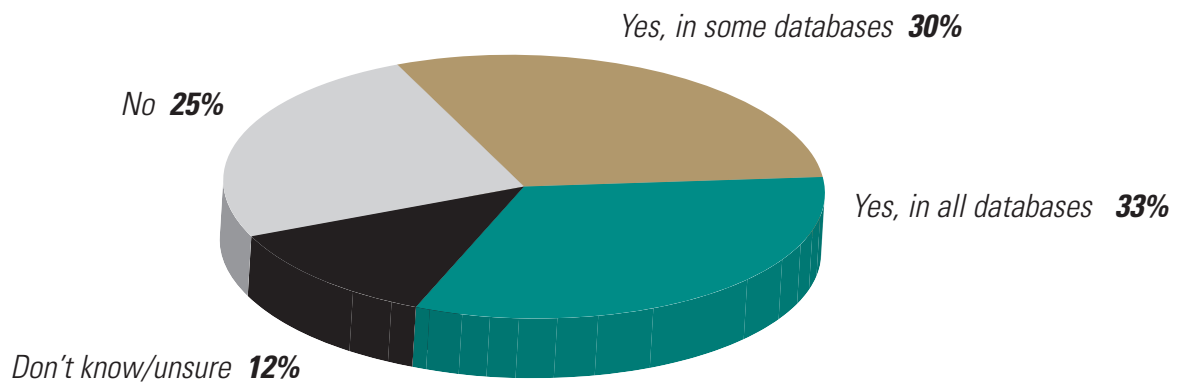


Figure 20: Personal Identity Information Encrypted? (e.g., Social Security, credit card, national identifier numbers)

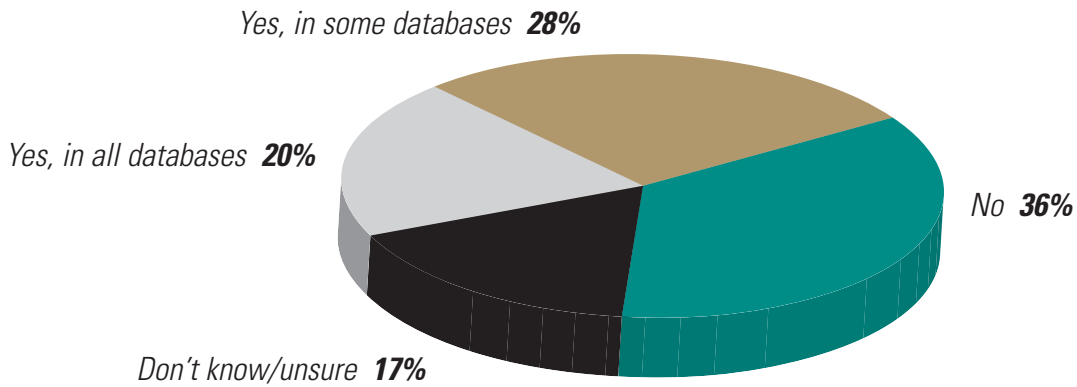


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Figure 21: Personal Identity Information Masked or De-identified? (e.g., Social Security, credit card, national identifier numbers)



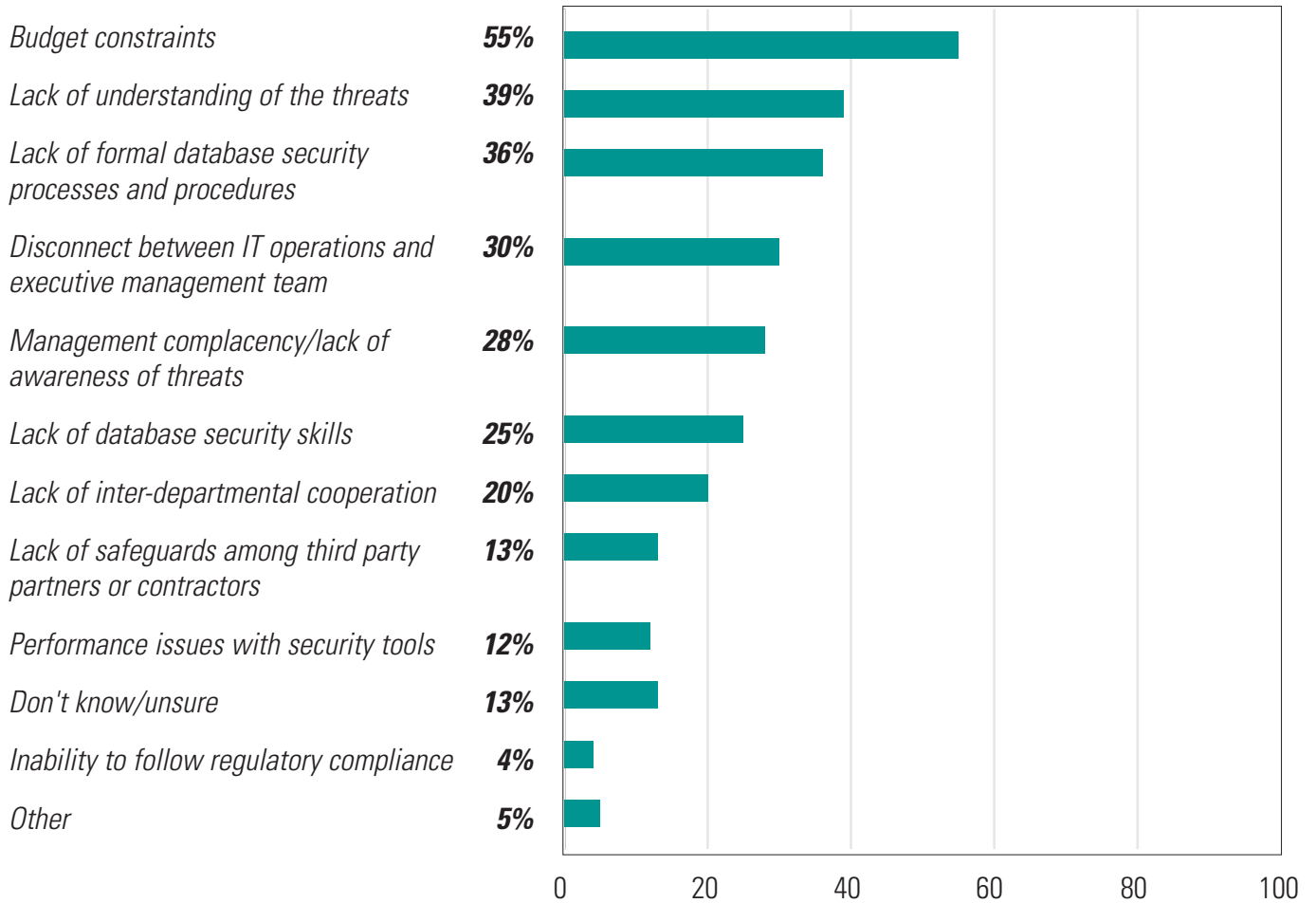
Total 101% due to rounding.

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Figure 22: Greatest Impediments Holding Back Information Security



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MONITORING AND PATCHING

A majority of respondents would not be able to detect, at least immediately, instances of abuse of data by privileged users. In addition, most respondents are unlikely to adopt security patches as they become available.

Respondents are split between monitoring security with manual approaches or employing automated tools. About one-third, however, either do not monitor at all for security issues such as unauthorized access to data or configuration changes, or are unaware if such monitoring even takes place within their organizations. (See Figure 23.)

In most cases, database managers and administrators watch for failed login attempts to their databases. Close to half also monitor for database definition changes (new tables, etc.), or for new account creation. Less than two out of five, however, say they keep track of all privileged user activities. (See Figure 24.) As one respondent laments, “Anyone with read access can pull any amount of data out of a database and put it in Excel or Access, with no problem whatsoever. And unless they pull a large enough chunk of data to trip a performance alert, there would be no trace that it was done.” Another comments, “Some of the major area of the risk is due to the inappropriate use of the system by the data center people, where they are monitoring the system using higher authority.”

How long would it take an administrator to detect and correct an unauthorized change to a database? Twenty-four percent say

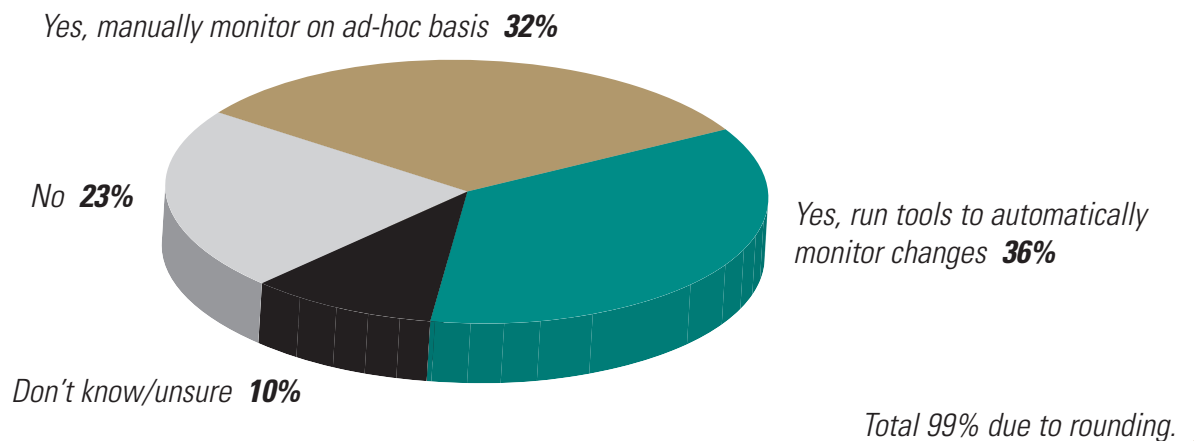
the process would take longer than a day; another 28 percent say it could take several hours. Once again, however, a substantial portion of respondents, 35 percent, have no idea what their capabilities are in this regard. There are numerous documented instances where database leaks and vulnerabilities have gone undetected for years, suggesting that there isn’t enough attention being paid. (See Figure 25.)

About two out of five respondents say they do run database activity monitoring solutions to help keep track of what happens across their data environments. However, as shown in previous responses, many of these tools may be going underutilized. (See Figure 26.) “Our monitoring product produces gigantic reports that nobody really has the time to actively review,” says one respondent. “We need to trim them way back and have them only contain items that are actually of a concern.”

When it comes to security patches, respondents are evenly split as to how quickly they put the changes through their systems. (See Figure 27.) And in most cases when they are applied, it typically doesn’t happen all at once, but in a gradual fashion. (See Figure 28.)

At least one respondent admitted the lack of updating is creating vulnerabilities for his organization: “We continue to use dated versions of SQL server for existing products that have discontinued support. Updating these environments to later versions of SQL would decrease the risks.”

Figure 23: Currently Monitoring Production Databases?



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Figure 24: Activities Monitored on Production Databases

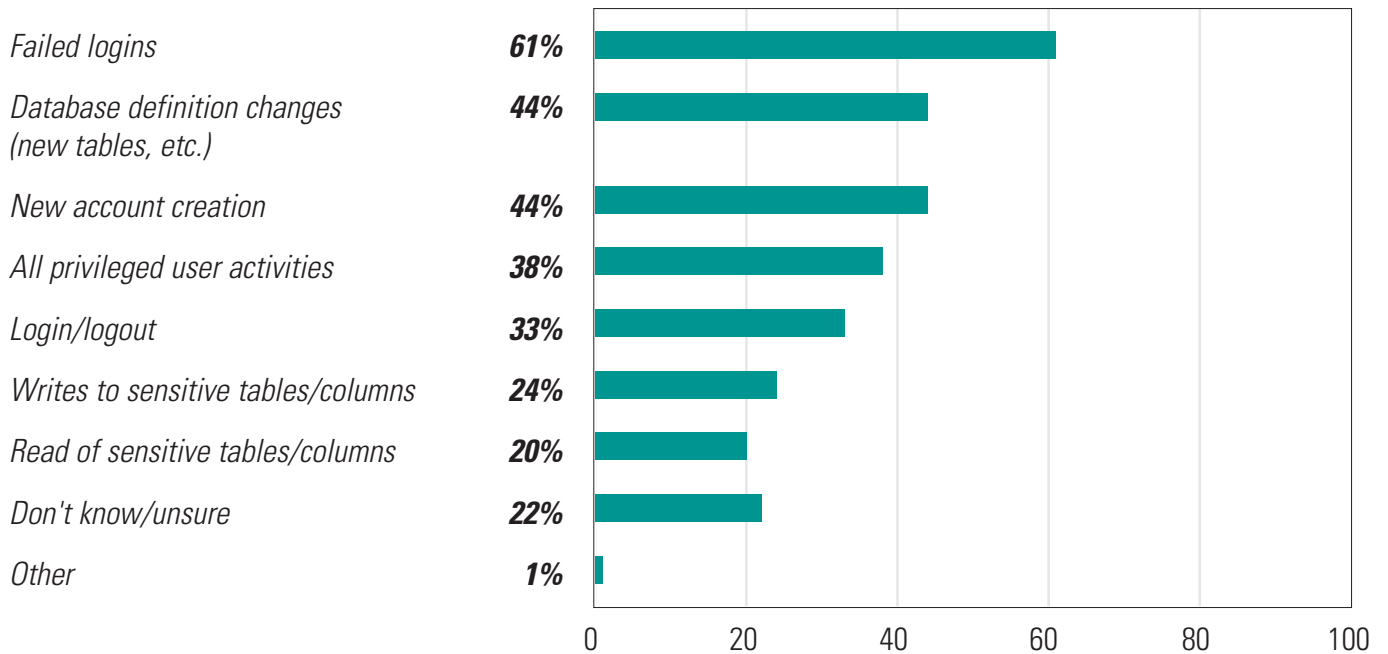
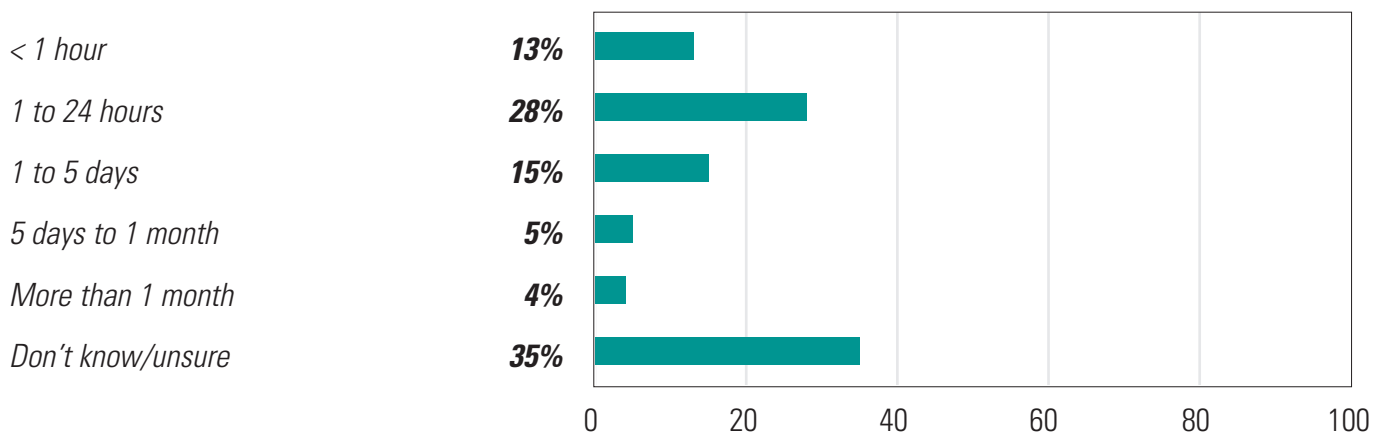


Figure 25: Amount of Time to Detect and Correct Unauthorized Database Change



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Figure 26: Database Security Technologies Currently Deployed

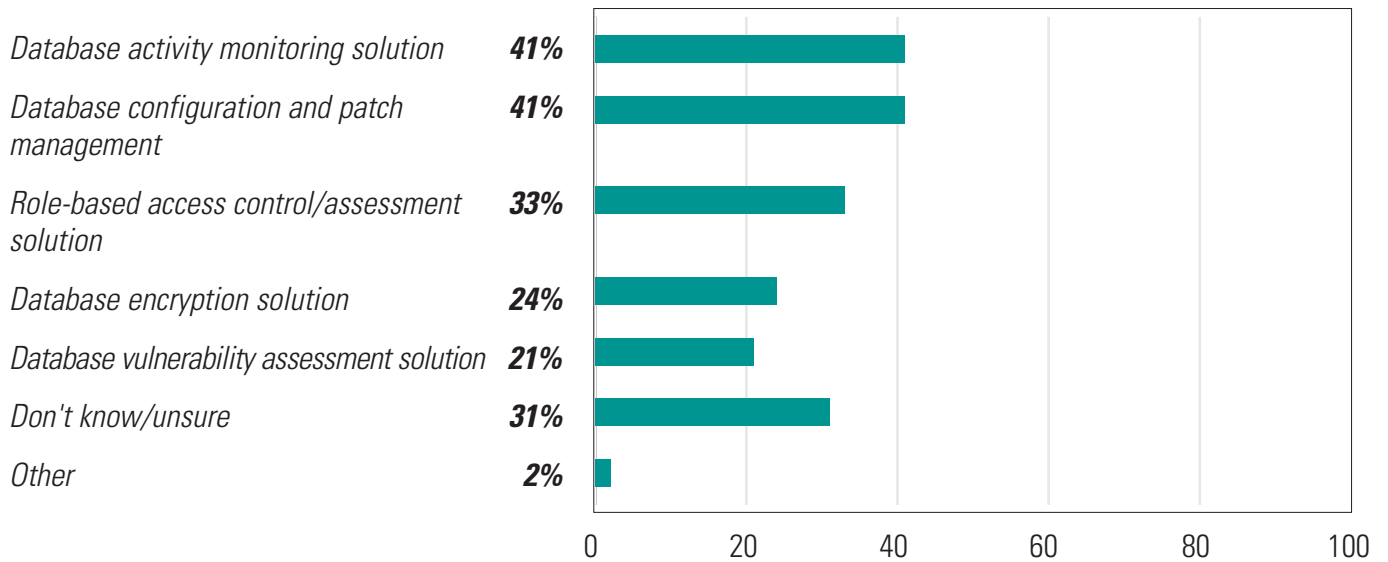
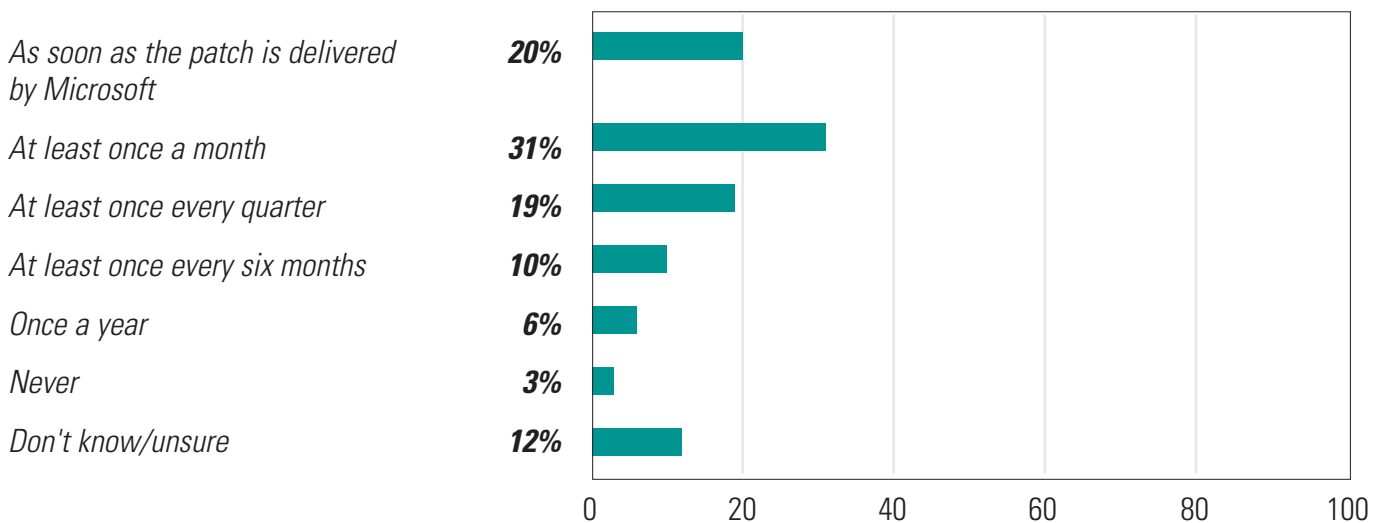


Figure 27: How Often are Security Update Patches to Microsoft SQL Server Database(s) Applied?

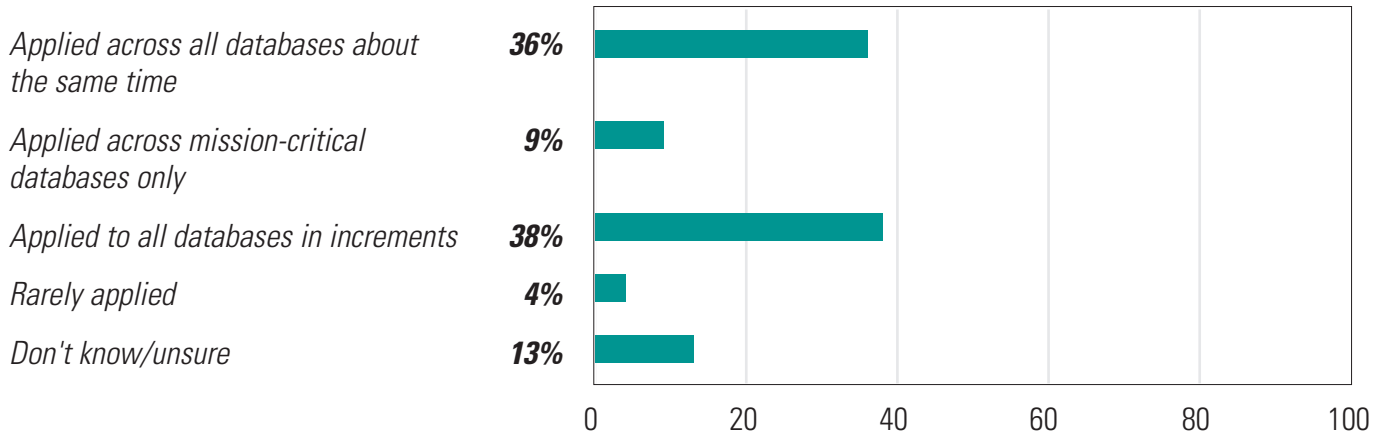


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Figure 28: Security Updates Installed Across Entire Database Portfolio?



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MANDATES AND AUDITS—OR LACK THEREOF

These days, data security is far more than just a technical issue. A majority of respondents say their organizations are affected by government and state mandates that require more judicious data management practices. However respondents report that they don't have or aren't aware if security audits are in place to meet more rigorous standards.

A growing array of compliance mandates makes data security as much a business issue as its a technology issue. While this survey confirms that there is a disconnect between IT and the business when it comes to actively support information security within their organizations, managers and executives must still answer to local, state or federal regulators about their data security practices.

Overall, two out of three survey respondents say they are directly affected by compliance mandates of a number of regulations, led by local and state data protection laws which typically require that companies publicly report significant data breaches that affect residents of their jurisdictions. Additional mandates that increase accountability for data management among many respondents include the Sarbanes-Oxley Act (SOX), various industry data standards, HIPAA (Health Insurance Portability and Accountability Act), and the PCI DSS (Payment Card Industry Data Security Standard). (See Figure 29.)

Keeping data secure is part of the requirements for these mandates. Organizations also need to maintain and keep data available for specified periods of time, raising new issues in terms of how to secure data that is being stored on a longer-term basis. Interestingly, a number of organizations, 15 percent, address the compliance and legal challenges now associated with data by simply hanging on to data “forever.” Overall, a majority, 55

percent, report they hold on to their data for more than seven years, usually the minimum length of time proscribed in most regulations. (See Figure 30.)

Another aspect of both external, and increasingly, internal corporate regulations is the ability to go in and audit data trails, to see who has touched data during a given time period, and what happened with this data. While the pressure is on from outside organizations to better account for data management and loss, few respondents say they perform audits to regularly assess the state of their data security. Only 11 percent in total report that they regularly—once a month or more—go in and assess and audit their data security. A large number of the data managers and administrators in the survey, in fact (38 percent), either never conduct such audits or simply don't know if their organizations do so. (See Figure 31.)

This uncertainty extends to the eventual results of audits, when and if they are conducted. Two out of five database managers and administrators in this survey, in fact, simply don't know how their data environments fared as a result of audits. (See Figure 32.) Likewise, respondents are fairly split as to whether their data operations pass the audits, or simply don't know if they do. (See Figure 33.)

Even among respondents with direct responsibility for data security, there appeared to be a lack of awareness of the nature of these audits—30 percent didn't know how their database environments fared after an audit, and 34 percent weren't sure if their databases even passed audits at all.

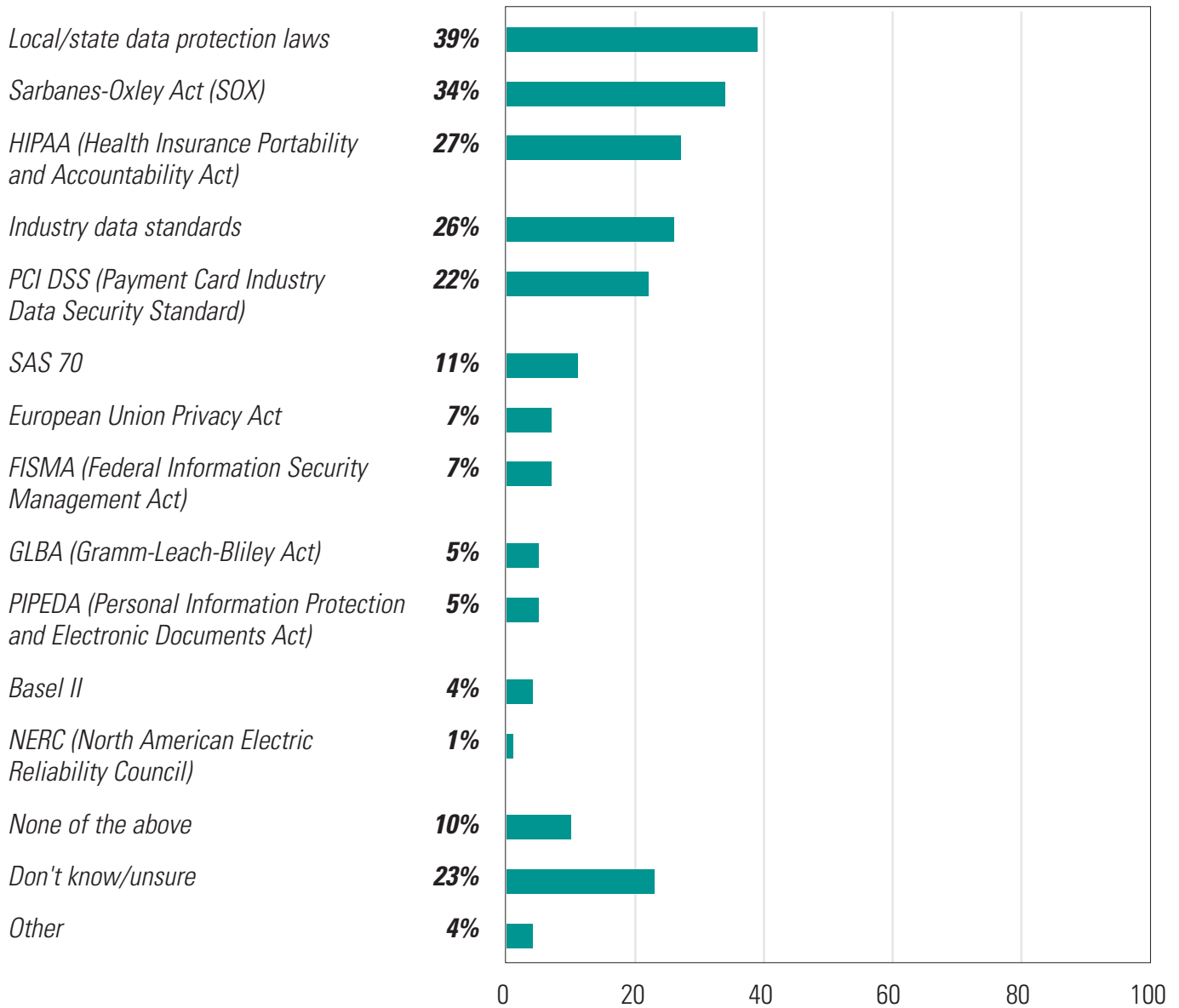
Access control issues were the most prevalent issue being surfaced as a result of these database audits, which suggests many corporate databases are wide open to tinkering from the inside. (See Figure 34.)

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Figure 29: Information Security Regulations or Mandates



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Figure 30: Length of Time Data is Stored in Archived Systems

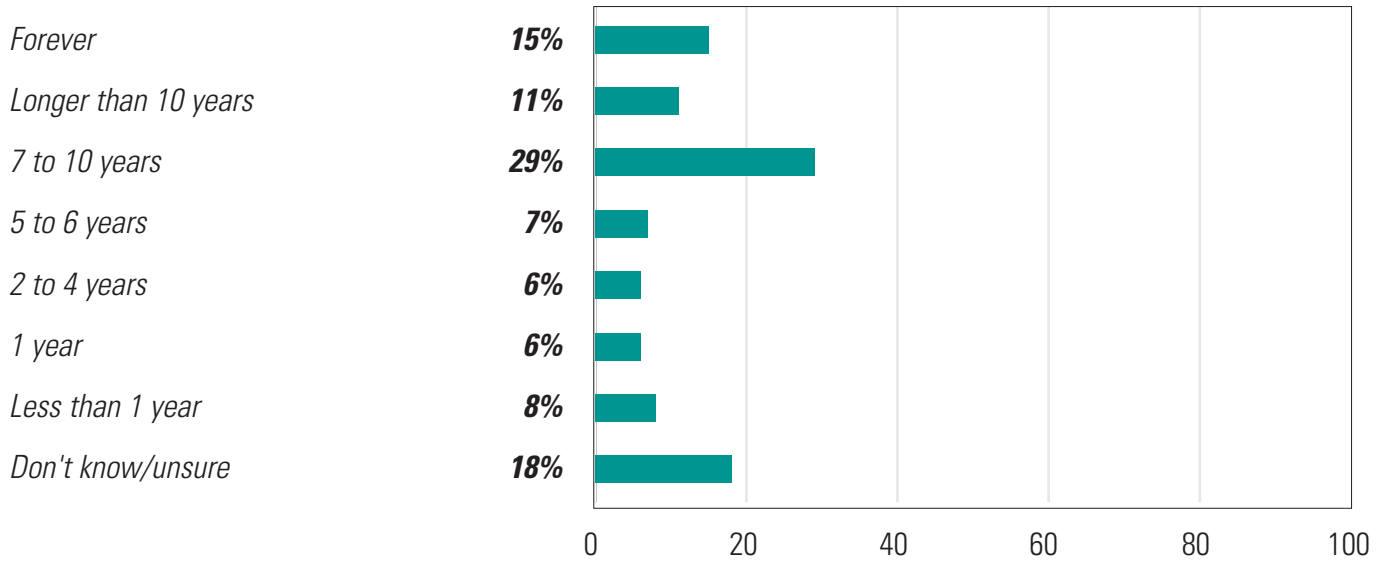
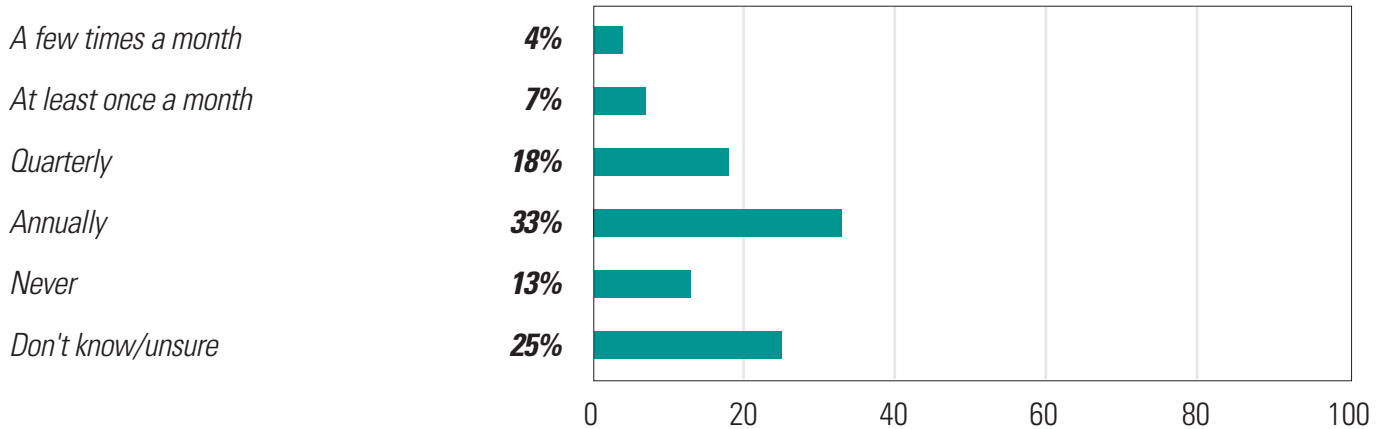


Figure 31: Frequency of Database Security Assessments/Audits



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Figure 32: Data Security Audit Results

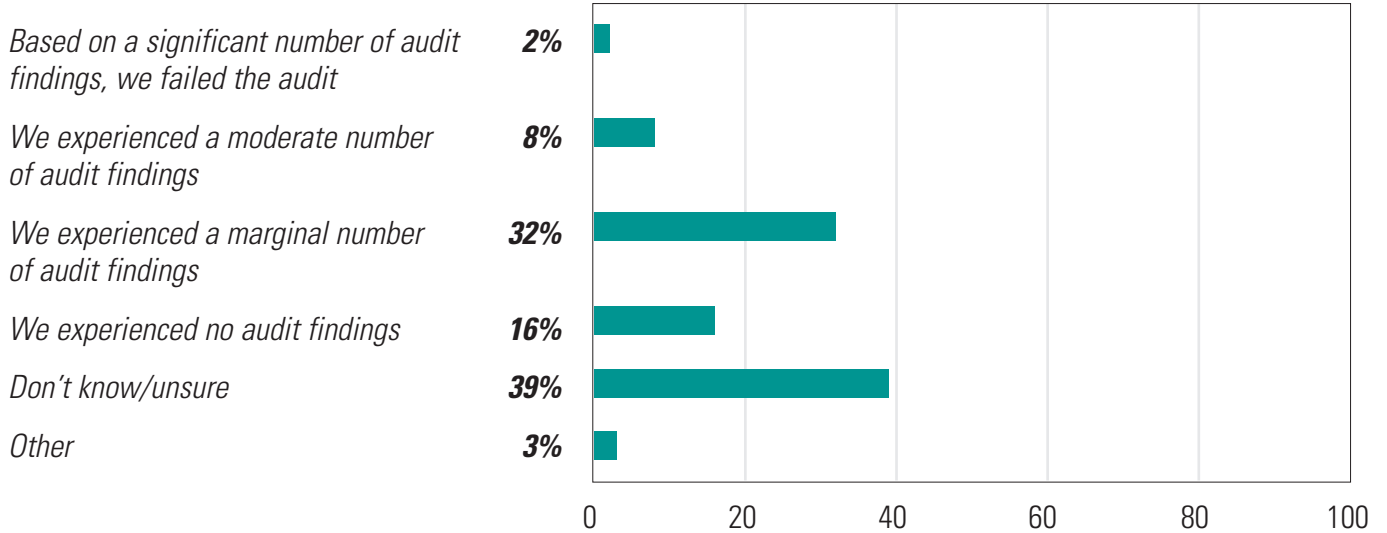
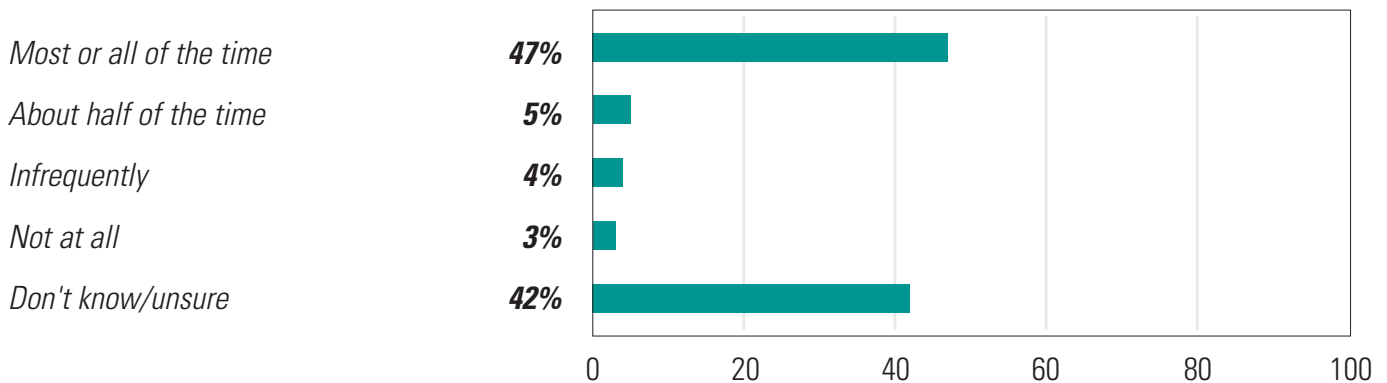


Figure 33: Frequency of Successful Audits

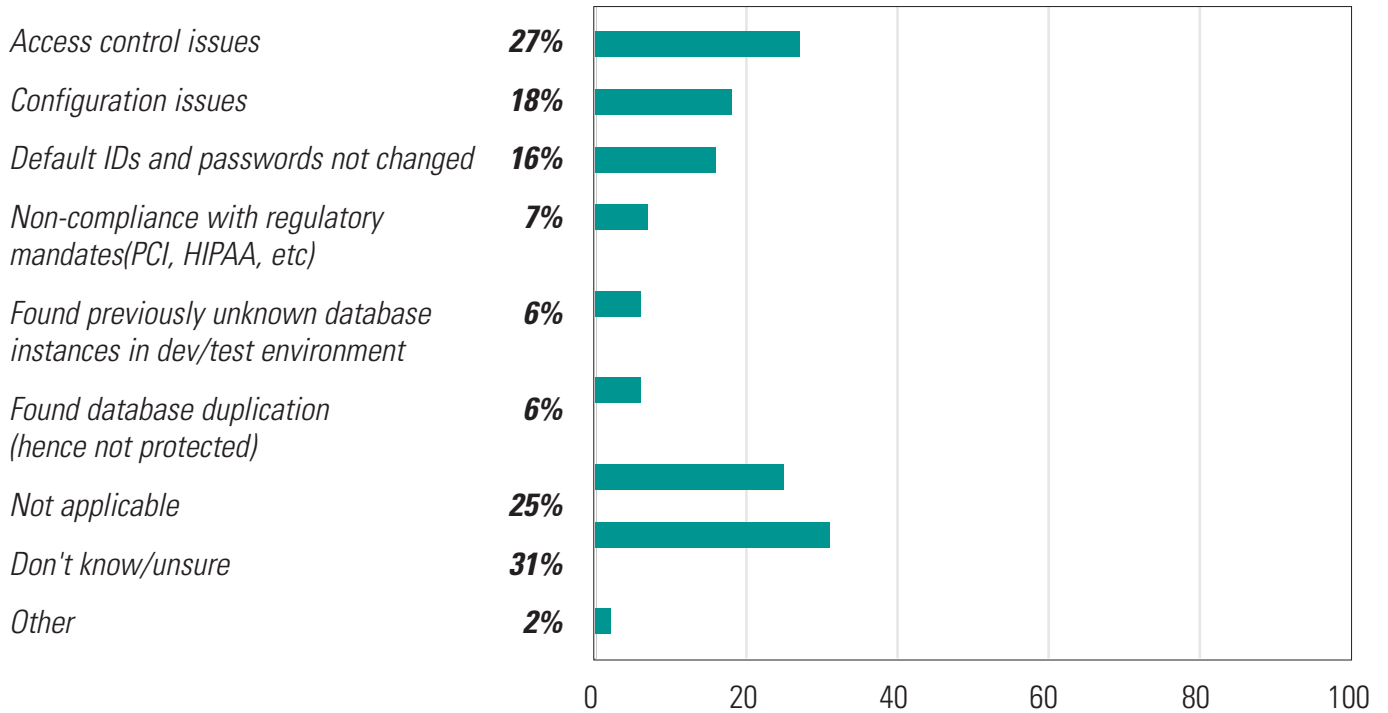


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Figure 34: Non-Compliance Issues From Audits

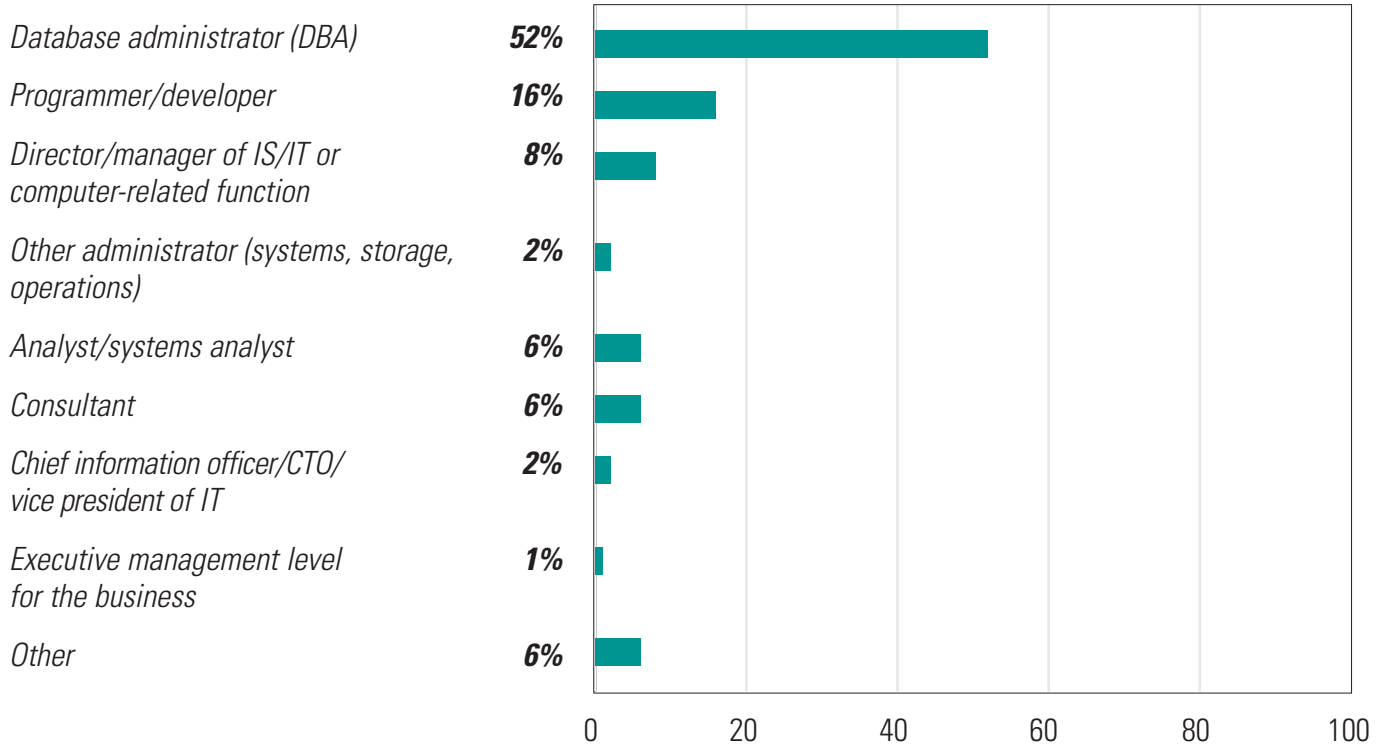


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DEMOGRAPHICS

Figure 35: Respondents' Primary Job Titles

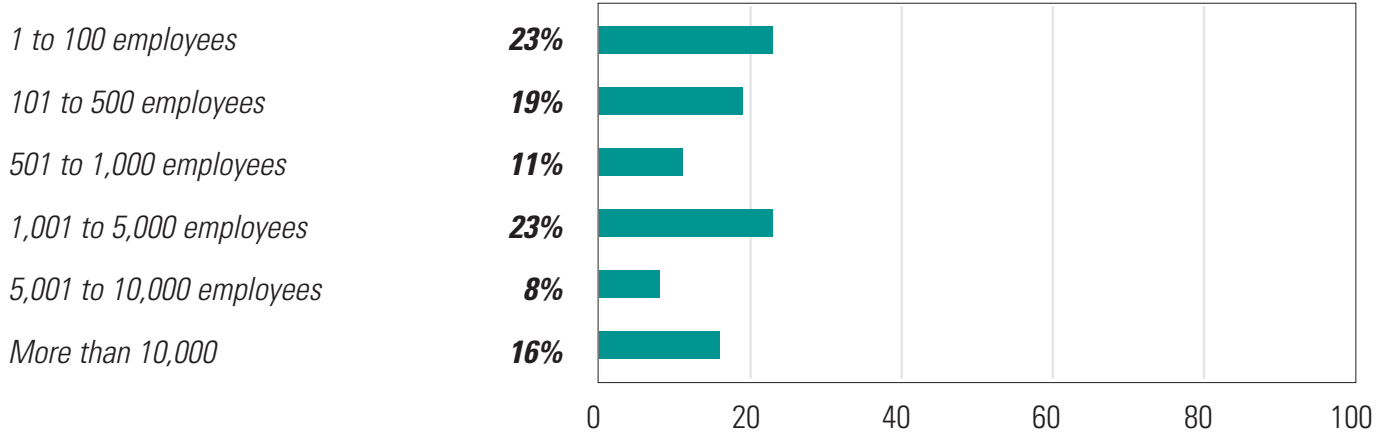
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Figure 36: Respondents' Company Sizes—Number of Employees

(Includes all locations, branches, and subsidiaries)

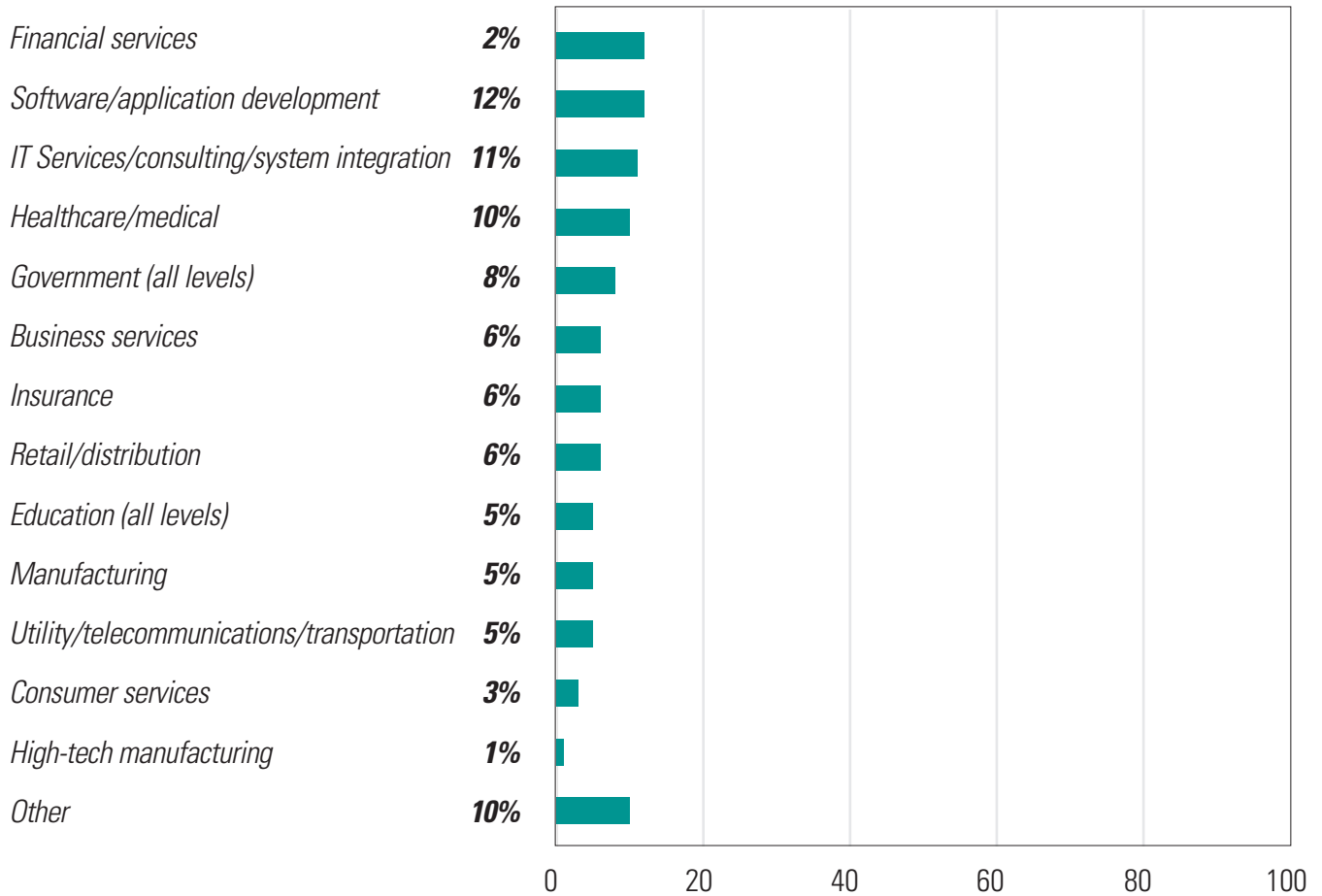


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Figure 37: Respondents' Primary Industries



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