Beyond Efficiency:

Overcoming digital complexity through observability

APRIL 2023

OXFORD ECONOMICS

aws

Introduction

Digital transformation and accelerated migration to the cloud over the last three years helped keep businesses up and running—even thriving—but these trends also added unprecedented complexity to computing environments.

In this new world, visibility into system performance becomes a meaningful competitive advantage, providing insights needed to wring out efficiencies and improve business performance and customer experiences. Innovation and expanding revenue streams get easier, as does navigating inevitable shifts in economies and business priorities.

Not surprisingly, then, observability—which enables the creation of detailed data that can be translated into visible evidence—has become an important focus for business leaders, who see it as a critical tool for turning small improvements into big gains. Chief among these: Diminishing down time, which on average costs organizations more than $1 million annually for eight hours each month.

Observability has moved to the forefront as organizations struggle to understand the complex web of applications they now support and all of the resultant dependencies. Ben Sigelman, co-founder and GM at LightStep, a ServiceNow company, said a deliberative planning process is no longer sufficient to sort out all those dependencies. "I think the systems have gotten complicated to the extent that there is literally nobody in these organizations who could take a blank sheet of paper and draw the system," Sigelman said. "It is not possible for anyone to keep track of it because it is changing too quickly."

Large majorities of executives surveyed have high hopes for observability, expecting those practices to bring improvements in several key areas vital to their business, according to new research by Oxford Economics and Amazon Web Services (AWS) that included outreach to 300 US executives across multiple industries. Most (85%) believe that observability will bring greater efficiency—with even higher numbers among those in Operations (92%) and IT (90%). The same number are turning to observability to provide insights into security risks, not surprising since security threats and the damage they cause—both monetarily and

"Systems have gotten complicated to the extent that there is literally nobody in these organizations who could take a blank sheet of paper and draw the system...it is not possible to keep track of it because it is changing too quickly."

-Ben Sigelman, Co-founder and GM at LightStep

reputationally—have steadily ticked upward in the last three years. On that last point, 78% of executives surveyed said that observability will boost brand reputation. And even more (82%) have pegged observability as a way of helping them reach their Service Level Objectives (SLOs).

Yet creating and nurturing a robust observability program remains a work in progress for many companies. Organizations must integrate observability practices while keeping systems up and running—and with minimal disruption to the way employees do their jobs.

The survey revealed several key takeaways:

- Organizations are looking to optimize system performance but are missing opportunities to do so.
- Current monitoring solutions do not support the increasingly complex environments resulting from rapid digital transformation, migration to cloud, and the adoption of microservices, which greatly increases the difficulty of tracking down errors.
- Organizations have widely adopted DevOps models, but their rollout has been blocked by a skills deficit and existing gaps in technology and inefficiencies.
- Executives agree on metrics important to tracking system performance but believe their organizations fall short.
- Cybersecurity is seen as a top priority, but future investments do not match executive enthusiasm for it.

Down time: Hard on budget and reputation

Down time is a persistent, thorny, and costly challenge for most organizations. It follows, then, that executives' efforts to prioritize efficiency and improve productivity extends across systems centered on reducing down time.

Even a little down time can wreak havoc on a business's operations—and bottom line. Our research shows that just one hour of down time costs about $136,000 per hour, on average. While up time runs high, organizations still have room to improve. Just 14% of respondents meet four nines (99.99%) standards, but most respondents (51%) sit at two nines (99%)—or less than 8 hours of down time per month. At the hourly average above, organizations would rack up about $1.088 million in down time costs every month. It follows, then, that the executives we surveyed are focused on increasing up time and availability (19%) over the next two years—the top response in our survey.
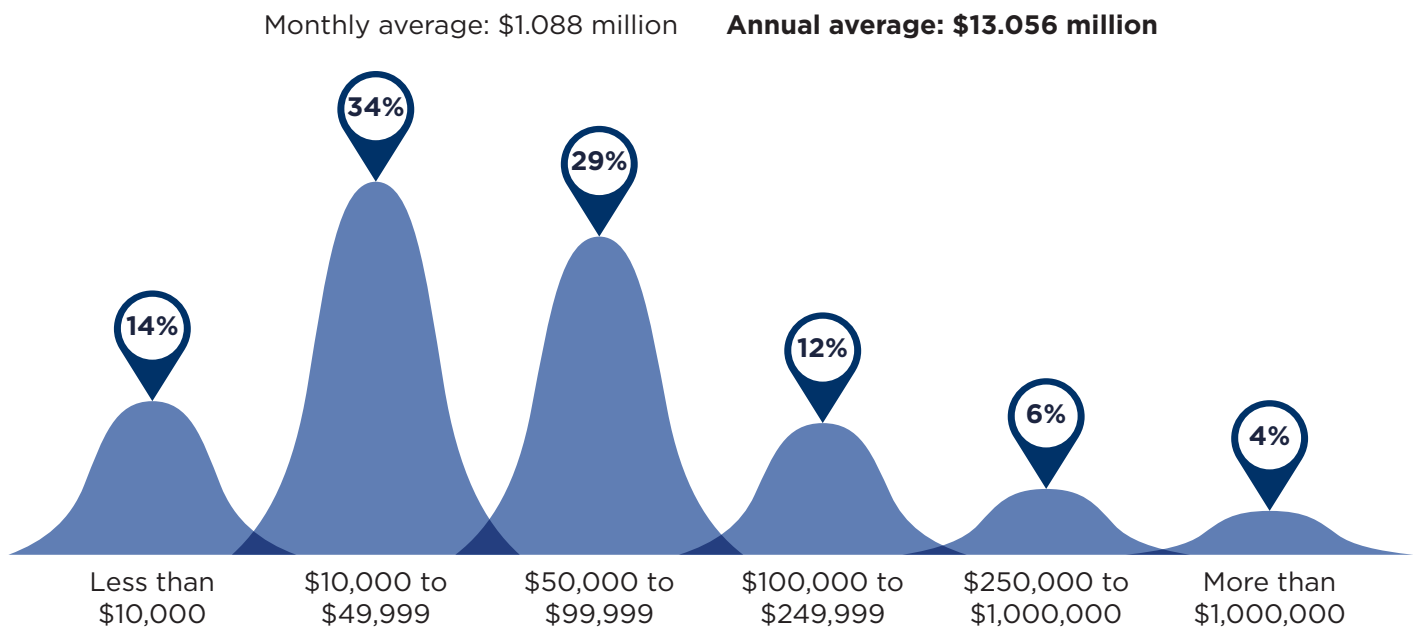
Executives understand the negative impacts of down time extend beyond financial losses and can affect customer loyalty, retention, and completed

"Two-thirds say that the increased risk of losing clients or contacts (69%) and the workforce time spent fixing issues (66%) are significant consequences of down time."

transactions. Two-thirds say that the increased risk of losing clients or contacts (69%) and the workforce time spent fixing issues (66%) are significant consequences of down time.

The perceived consequences of down time also vary by function. Marketing is more concerned about the increased risk of losing clients (74%), while distribution executives worry over the time the workforce spends on fixing issues (72%).

Fig. 1: Downtime is costly. *Q. To the best of your knowledge, approximately how much does each hour of downtime cost your company (in US$)?*

Monthly average: $1.088 million   **Annual average: $13.056 million**

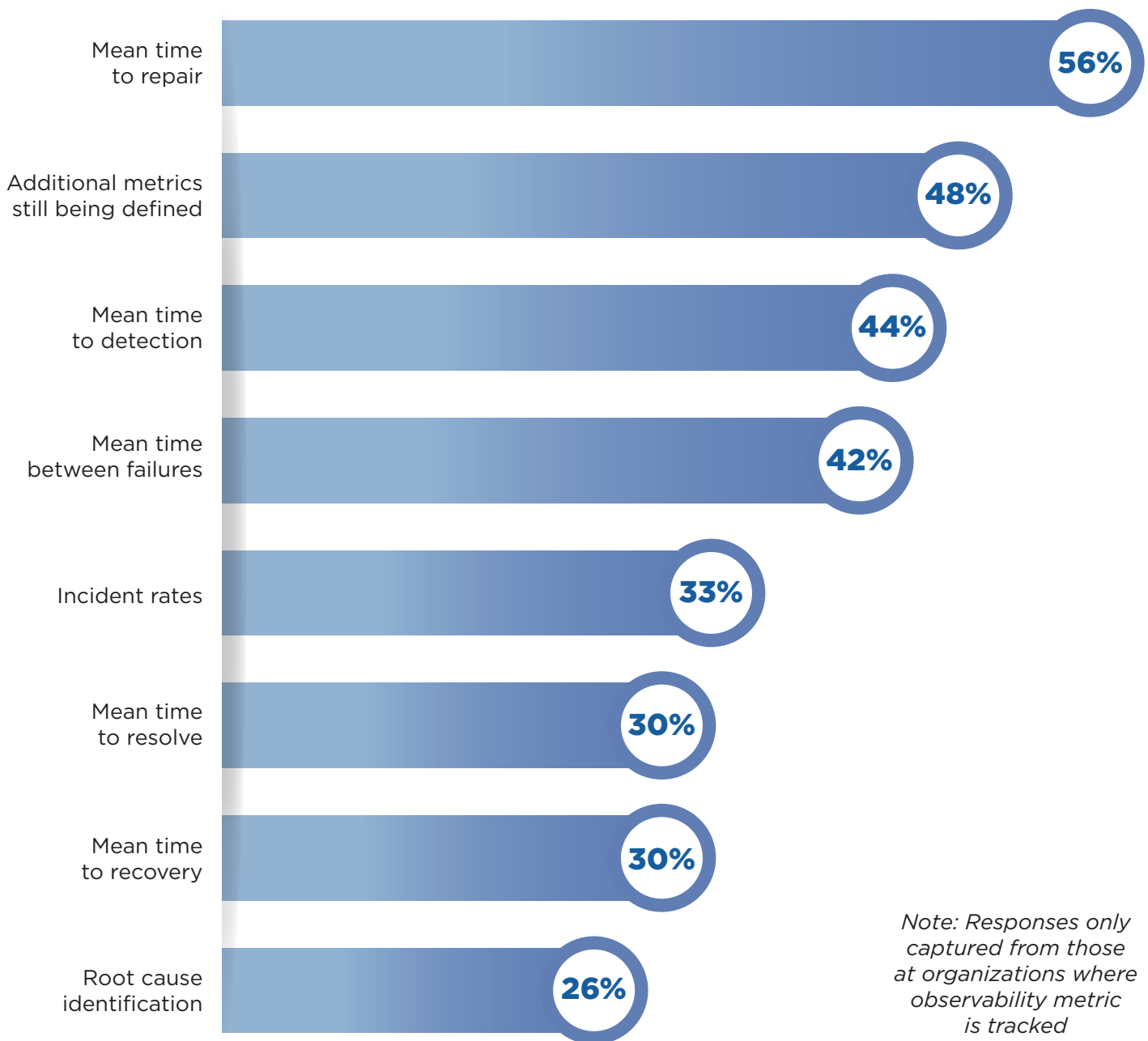| Less than $10,000	$10,000 to $49,999	$50,000 to $99,999	$100,000 to $249,999	$250,000 to $1,000,000	More than $1,000,000
14%	34%	29%	12%	6%	4%

Measuring up. Organizations can fine-tune processes and resolve or manage many existing problems more effectively if they have information on how systems perform, and if they did better in meeting stated metrics.

While organizations understand the importance of metrics and track them to some extent, their performance against those metrics falls short. More than half cite error rate (58%) and system capacity (56%) as the most important metrics to assessing system performance. Those in IT,

though, point to system capacity (66% vs. 56%) as most important. But when looking at specific measurements, roughly two-thirds track MTTD (67%) and MTTR (63%).

Despite their best efforts, though, across the board, organizations struggle to perform well against those metrics. Only 44% overperform when it comes to MTTD, and just 30% overperform on MTTR—suggesting that there is much room for improvement in the way organizations measure success and the effort they put into it.

Fig. 2: Metrics in place, but performance lags. *Q. How well does your team perform against each of the observability metrics you track? "Somewhat" and "Significantly" overperform responses combined.*

Metric	%
Mean time to repair	56%
Additional metrics still being defined	48%
Mean time to detection	44%
Mean time between failures	42%
Incident rates	33%
Mean time to resolve	30%
Mean time to recovery	30%
Root cause identification	26%

Note: Responses only captured from those at organizations where observability metric is tracked

Developing DevOps

As organizations have continued their digital transformation, they have turned to DevOps for the agility and scalability needed to bring products and services to market in a rapidly changing business environment. Given its importance to quicker product development, fostering innovation, and boosting productivity, it's not surprising that about three out of four respondents (76%) already have a DevOps model in place.

But despite the widespread adoption of DevOps strategies, implementation is tripped up by barriers familiar to any tech initiative. Of respondents that have at least begun their DevOps rollout, nearly three in five (58%) cite the lack of sufficient skills as a challenge, though that varies slightly by function—61% of those in distribution see a skills deficit as a barrier to DevOps, while accounting struggles the least with this issue (52%).

As with many other facets of business, especially those dominated by technology, workers have become entrenched in the way they do their jobs. Just under half (46%) of executives say that breaking established ways of working is a challenge to rolling out DevOps. They are also confounded by a pair of foes familiar to technology initiatives—interoperability with existing technology (44%) and budget deficits (35%).

Undaunted by those challenges, or perhaps spurred on by them, companies are investing in both operations and technology to bolster DevOps. Just under half of executives (44%) are focused on building up additional DevOps skills, while nearly one-fifth (18%) have prioritized managing DevOps tooling and workflow more effectively.

Alert management systems (76%) and central logging systems (73%) have become de rigueur in current DevOps workflows—although, again, the systems that are favored varies by function. Those in operations are less likely to rely on alert management systems (70%), while those in marketing (85%) and HR (81%) hew to central logging systems. Regardless of the systems they rely for DevOps workflows, they gravitate toward the same third parties to monitor them—roughly two-thirds of those surveyed are using Splunk, Datadog, or AWS. IT is more likely to cite Splunk (78%), while HR and operations are more likely to use Datadog (78% each).

"Observability creates a really significant orders of magnitude improvement in their ability to diagnose complex issues that span many teams and many services."

-Ben Sigelman, Co-founder and GM at LightStep

With a skills shortage looming and budgets tightening in a fast-paced, dynamic environment where every second counts to remaining productive and competitive, organizations are naturally turning to automation to handle tasks important to DevOps. Nearly half of all respondents use machine learning to automate issue identification and analysis (48%)—something that, not surprisingly, more in IT are doing (65%).

The scarcity of time and resources has pushed organizations to improve and streamline the way DevOps staff works. To better manage the amount of time DevOps staff spends on day-to-day tasks, executives have created new collaborative workflows (67%), though distribution slightly trails all others (61%).

More than half (56%) have sunk budget dollars into new technologies to speed up how tasks are handled. Again, function dictates this investment—71% in IT and only 45% in accounting have invested in new technologies to streamline the way DevOps addresses tasks. That holds true when it comes to investing in reworking item prioritization, where IT (71%) and HR (65%) were also more likely to have aimed resources at this, while operations, distribution, and accounting were the least likely (48% each vs. 56% overall).

Already, organizations that have embraced observability are realizing gains in understanding complex issues and resolving them quickly. Those in production say "things that are now taking 90 seconds to understand what's going on used to take four or five hours," Sigelman says. "Observability creates a really significant orders of magnitude improvement in their ability to diagnose these complex issues that span many teams and many services."
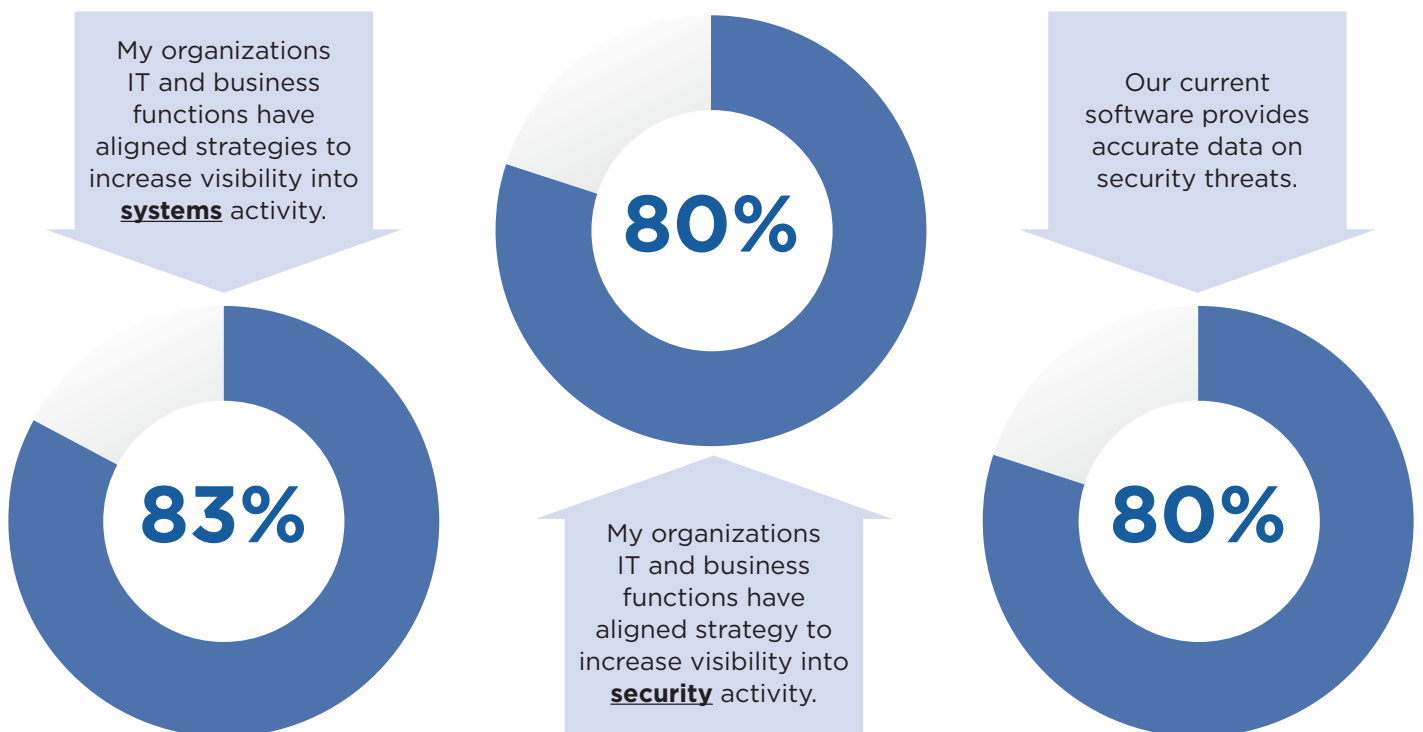
Cybersecurity crucial but implementation lags

With about two in five (38%) saying DevOps spends too much time resolving security issues, it's not surprising that nearly nine in ten (85%) organizations are turning to observability to gain greater insights into security issues. As breaches intensify and threat actors step up the cadence of potentially damaging attacks, organizations are prioritizing cybersecurity, not only as a way to protect sensitive data and valuable assets but as foundational to future innovation. Half of executives surveyed have trained their sights on improving cybersecurity (51%) as a top strategic goal over the next two years. Unsurprising, IT is more likely to be keen on boosting their organization's cyber posture (63%), followed by HR (56%).

Our research shows that organizations understand the impact that aligning IT and business has on their security posture. Following an important trend to strengthening security, most (80%) say IT and business are aligned for visibility into

security—more so for those in accounting (88%). But perhaps surprisingly, given the difficulty IT security has had in wrangling good, actionable information, most executives (80%) also believe their current software provides accurate data on security threats. Embracing observability practices has the potential to help ratchet up the volume of available and accurate data—and in turn, create a better opportunity for success in IT's efforts to curb those threats.

While security is seen as a high priority by executives, most of their organizations' efforts are aimed at reducing internal security risk rather than the security needs of their customers. Only 19% are focusing IT initiatives in the next three years on limiting client exposure to security risks. Executives would be wise to increase their client security efforts by implementing observability more in this area; it's a fool's errand to leave security responsibilities in the hands of customers.

Fig. 3: The union of Business and IT.

My organizations IT and business functions have aligned strategies to increase visibility into **systems** activity.

Our current software provides accurate data on security threats.

80%

83%

My organizations IT and business functions have aligned strategy to increase visibility into **security** activity.

80%

Sidebar 1: Observability and sustainability goals

Heeding the pressures from suppliers and customers alike, organizations are looking for ways to meet and even accelerate their sustainability goals—and they have found an ally in observability. While executives may have first used observability to gain visibility into system performance and the insights needed to improve efficiencies, business performance, and customer experience, they have begun to recognize the essential role that observability plays in meeting sustainability goals. In fact, our research uncovered only two respondents who believe observability has or will have no influence in meeting sustainability goals.

They differ widely on the magnitude of that influence, however. More than two-thirds of executives believe that observability is at least moderately influential in promoting organizational sustainability goals; almost half (47%) say that influence is moderate; and just one-fifth (20%) say it is significant. Another one-third (32%) say that observability's influence is minimal.

While its ability to deliver efficiencies across business is well documented, it has the potential to deliver gains in a number of areas essential to sustainability. A third of executives say it will reduce their organization's carbon footprint. By reducing the need for replacement (29%), observability can bring organizations that much closer to their sustainability goals. And more than one-quarter of executives believe it will boost more efficient software creation. But the sustainability benefits executives expect to see vary greatly by their view of observability's influence. Those who see observability as significantly influential say it will be most

"More than two-thirds of executives (67%) believe that observability is at least moderately influential in promoting organizational sustainability goals."

beneficial for enabling more efficient software creation (45% vs. 26% overall). But those who view it as minimally influential say it will be most useful for reducing the need for replacement parts (46% vs. 29% overall).

Yawning differences can also be found in how organizations track their teams' performance against observability metrics. Those who view observability as significantly influential rank incident rates as the highest metric for observability tracking (61% vs. 33% overall). Those who view observability as minimally influential rank mean-time-to-repair highest (78% vs. 56% overall).

Organizations that view observability as critical to sustainability success are much less likely to struggle with common business challenges. While others in the survey struggle to overcome siloed workflows and extracting meaningful data, executives from this cohort do not. More than three-quarters (77%) of those in the significantly influential camp report no or minimal challenge (vs. 60% overall).

Investing in tech

Streamlining DevOps and bolstering security each rely on the strength of underlying technology—and investment in this area has been both robust and rewarding. Executives are largely satisfied with their current strategies and technologies. They believe that aligning business and IT strategies has increased visibility into systems activity (83%) and security activity (81%). Likewise, they assess their current software as providing accurate information on security threats (80%) and how the system is functioning (77%).

Organizations already have made investments in technology that will underpin observability. Most operations respondents feel their business and IT strategies are aligned to increase visibility into systems (96% vs. 83% survey overall) over the next two years. And as expected in a business world gripped by the pandemic and embracing digital transformation, executives have invested heavily in cloud (75%) in the past—particularly those in marketing (84%) and IT (80%). In keeping with a growing reliance on log and monitoring systems as well as alert management, 80% have invested in log systems (up slightly at 86% for both marketing and accounting). Fewer overall have sunk budget dollars into monitoring systems (63%), with marketing (84%) and IT (80%) more likely to have invested here. The same number overall invested in alert management, with marketing (84%), IT and HR (70% each) exceeding that.

The expected outcome of each of those investment varies, though. For example, executives see investments in log systems and monitoring systems as a means of increasing protection from cyber threats while those who invest in cloud expect increased visibility into computer environments. Loosening the purse strings for alert management aims to speed up alert times and reduce alert fatigue—two challenges that IT teams have struggled to overcome, and which can have devastating effects on productivity, efficiency, and security if not addressed.

Many of the investments made and actions taken by organizations have already paid off. Over two-thirds of executives that invested in log systems (68%), cloud (74%), monitoring systems (77%), or alert management (67%) say they have seen at least moderate success from their efforts. By now, the benefits of Cloud are clear; it makes for a more nimble organization, and the rapid shift to Cloud helped many businesses keep the lights on and even thrive during a period of unprecedented disruption. But those in operations are more likely to say their Cloud investment has increased visibility into computing environments (63% vs. 53% overall).

Organizations already have made investments in technology that will underpin observability. Most operations respondents feel their business and IT strategies are aligned to increase visibility into systems (96% vs. 83% survey overall) over the next two years.

Those in HR and marketing are investing in ways that speed-up alert management times (77% and 67%, respectively, vs. 62% overall) while distribution (44%) and accounting (54%) have lagged behind.

Long viewed as a cost center, it makes sense that executives would look to IT as they prioritize cost management. Most are aiming at process automation (69%) and digitizing development products (58%) to keep spending in check—HR is more likely than all other functions to target the latter (74%) as a cost-cutting measure. And nearly one-fifth of all executives surveyed cite optimizing costs with smart capacity planning as their top IT initiative.

The path to observability

Observability has done more than pique the interest of executives across functions—they see it as a means of improving operations and business performance. While there are many ways for organizations to implement observability practices, executives agree on certain key factors.

Executives of all stripes make the distinction between monitoring and observability, and see these as discrete business areas (86%). In particular, operations and accounting are most likely to say this (90% each).
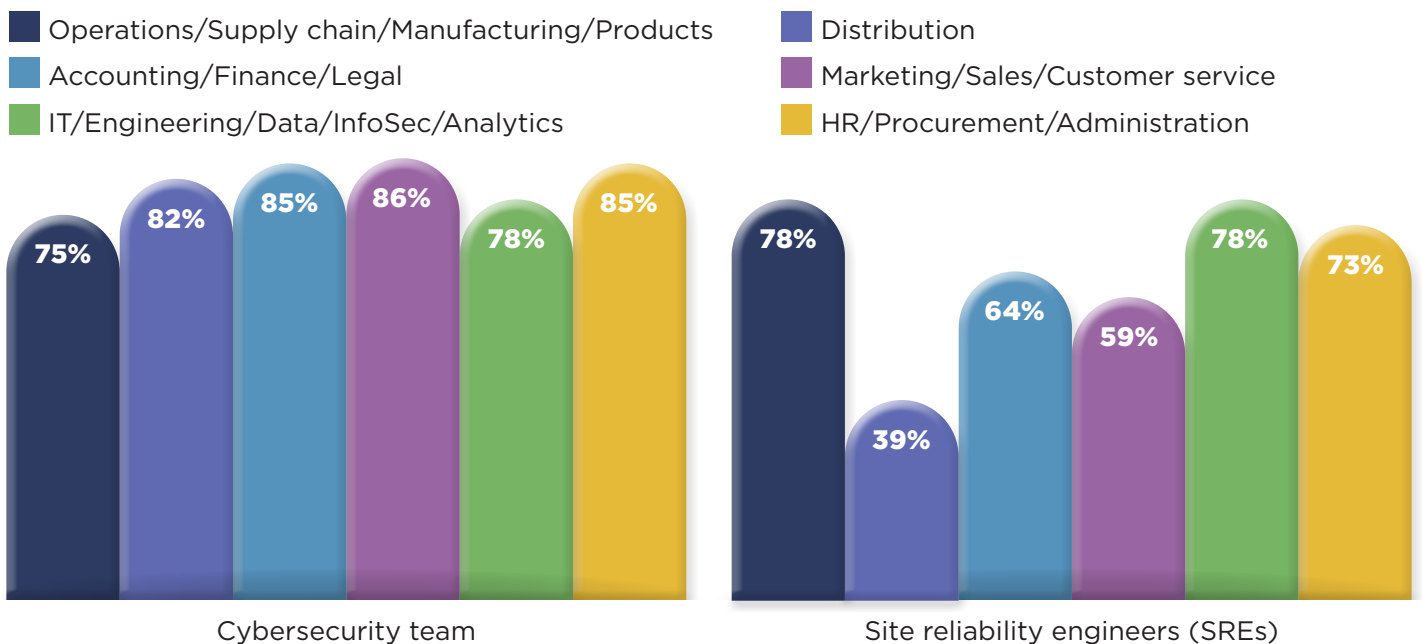
While observability initiatives are well under way, it is not yet widely adopted in all aspects of an organization. In fact, only 39% have integrated observability into all areas of their business. Those in marketing and accounting are ahead of others with their observability initiatives—nearly half in each area say their organizations have integrated observability into all areas of business (48% and 46%, respectively).

Executives widely agree on who is charge of observability at their organizations—cybersecurity teams. Recognizing observability as the means of understanding cybersecurity risks, just over four in five executives (82%) say the cybersecurity team leads the observability charge.

Site Reliability Engineers (SREs) are cited as observability leaders by two-thirds (66%) and for well over half, that responsibility falls to developers (56%). Just 10%, though, say third-party vendors are in charge. But some differences in leadership emerge on closer inspection of function; perhaps as expected, given the nature of their business and overall structure, IT (78%) and operations (77%) are more likely to see SREs as a driving force.

While observability provides a critical benefit to developers, for initiatives to be successful, many parts must fit into place. Having fully functioning cloud spaces (51%) and strong application software (50%) play a significant or critical role in observability, as do robust collaborative technologies (45%). Executives are willing to move forward with these actions because they perceive the benefits that will come from implementing observability practices. More than two in five (44%) believe integrating observability will speed the detection of system issues and improve incident prevention (42%). And two-thirds believe it will be at least moderately influential to meeting sustainability goals—including reducing carbon footprint (33%). (See sidebar.)

Fig. 4: Security needs dictate observability leadership. *Q. To what extent do the following groups of individuals drive observability activity at your organization?*

- ■ Operations/Supply chain/Manufacturing/Products
- ■ Accounting/Finance/Legal
- ■ IT/Engineering/Data/InfoSec/Analytics
- ■ Distribution
- ■ Marketing/Sales/Customer service
- ■ HR/Procurement/Administration

Cybersecurity team: 75%, 82%, 85%, 86%, 78%, 85%

Site reliability engineers (SREs): 78%, 39%, 64%, 59%, 78%, 73%

Conclusion

As computing environments become more complex, organizations will continue to grapple with gaining much-needed visibility into system performance. Those that implement observability practices across their businesses can gain the insights needed to boost efficiencies, improve both business performance and customer experiences, expand revenue streams, and encourage innovation. Not only can observability save them money—eight hours of downtime monthly on average costs more than $1 million—organizations will be well positioned to deftly navigate the inevitable shifts in economies and business priorities. To realize those benefits, organizations must:

Move from monitoring to true observability. Current monitoring solutions often do not support the increasingly complex environments resulting from rapid digital transformation, migration to cloud, and the adoption of microservices.

Dependence on them greatly increases the difficulty of tracking down errors, while true observability provides the detailed data that turns small improvements into big gains.

Invest in DevOps skills. DevOps is crucial for the agility and scalability organizations need to bring products and services to market—and stay competitive—in a rapidly changing business environment. But organizations will not get the full benefits of DevOps until they conquer a skills deficit as well existing gaps in technology.

Take security to the customer. Investing in internal security is always prudent and a strategic priority at most organizations. But security does not stop at an organization's borders—prioritizing the security needs of customers not only helps ward off threats but can create a level of trust and loyalty crucial in today's competitive environment.

About the research

Oxford Economics and AWS created a questionnaire to field to 300 technology executives across the United States. The survey was fielded using a Computer Assisted Telephonic Interviewing (CATI) methodology; responses were collected between September and November of 2022.

Respondents consist of 1/3rd C-level executives, Vice Presidents (including Senior Vice Presidents and Executive Vice Presidents), and Director level executives each. Executives represent 24 distinct industry clusters, including agriculture, automotive, advertising, consumer packaged goods, defense, financial services, IT, and manufacturing (among others).

Fig. 5: Survey demographics.

Company size (*by annual revenue*)

Less than $50 m	$50 m to $99 m	$100 m to $199 m	$200 m to $249 m	$250 m to $499 m	$500 m to $999 m	$1 bn to $10 bn	More than $10 bn
13%	20%	12%	9%	13%	12%	11%	10%

- Operations/Supply chain/Manufacturing/Products
- Distribution
- Accounting/Finance/Legal
- Marketing/Sales/Customer service
- IT/Engineering/Data/InfoSec/Analytics
- HR/Procurement/Administration