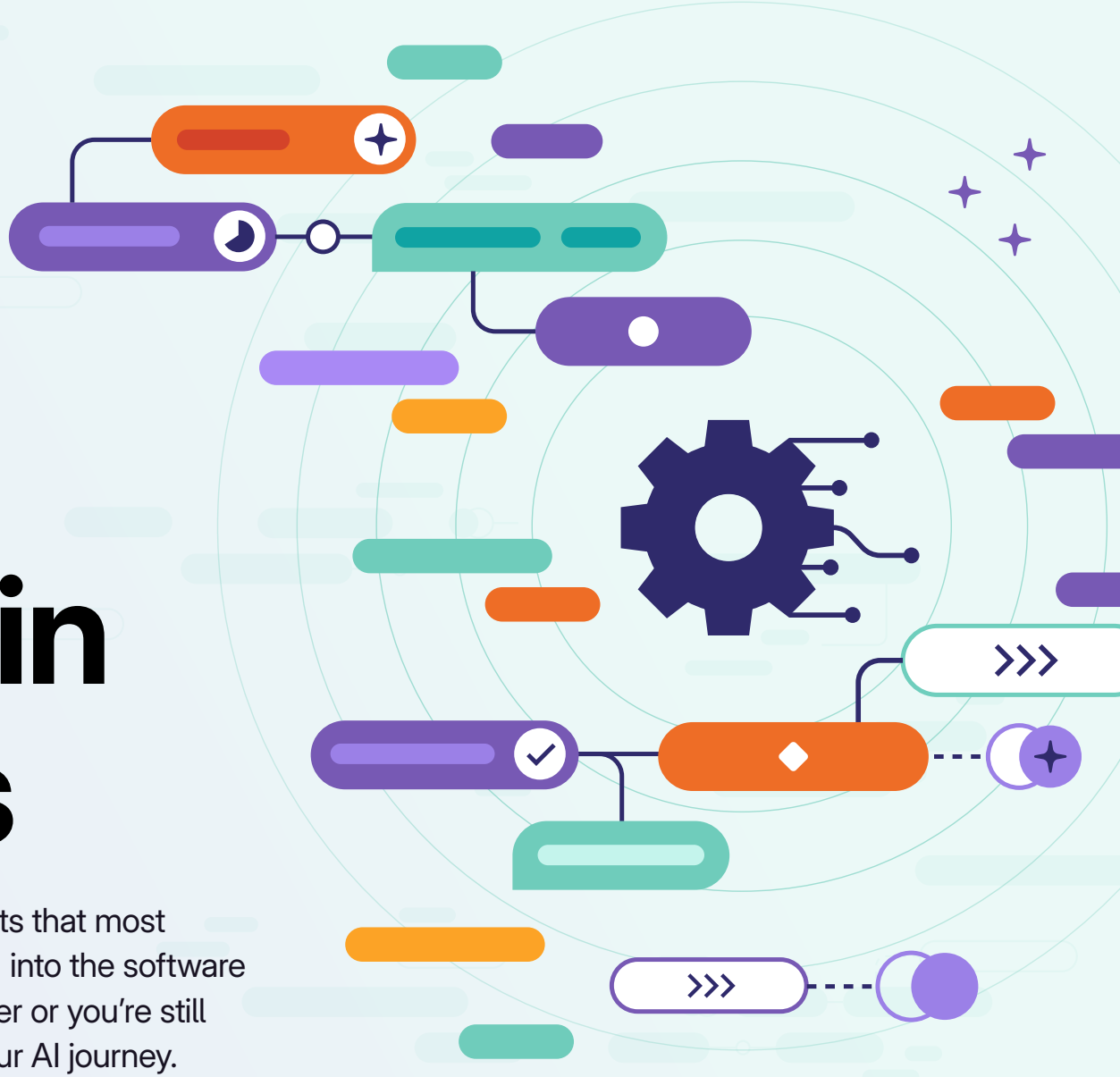
GitLab

2024 Global DevSecOps Report

Navigating AI maturity in DevSecOps



AI adoption is ramping up — but our research suggests that most organizations are still evaluating how to incorporate AI into the software development lifecycle. Whether you're an early adopter or you're still exploring, here's a look at what might be ahead on your AI journey.

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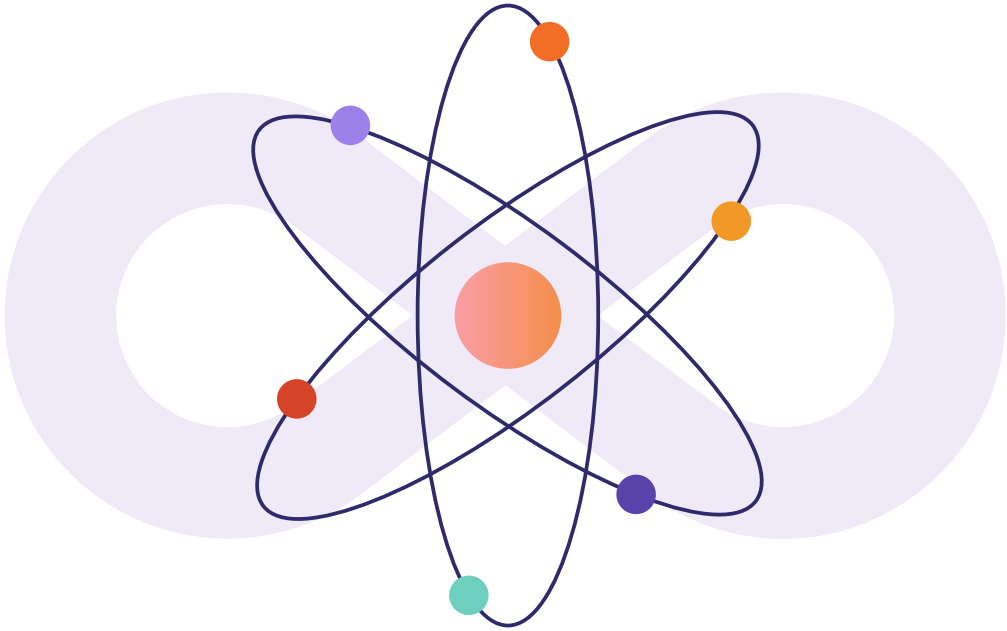
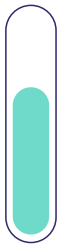


Executive summary

This report analyzes the results of a survey conducted by Omdia and GitLab in which we asked over 5,000 software development, security, and operations professionals worldwide about their organization's position on and adoption of DevSecOps principles and practices.

This year's survey revealed that while artificial intelligence (AI) is becoming status quo for software development, organizations are at various stages of maturity when it comes to adopting AI in the software development lifecycle. Most organizations have moved beyond the hype and have begun to explore how they might be able to use AI for specific use cases, and the earliest adopters have begun to optimize their approach and demonstrate the impact of AI on their software development processes.

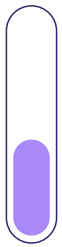
Organizations are eager to adopt AI



60%

of respondents said that it is essential for them to implement AI in their software development processes in order to avoid being left behind

AI adoption is ramping up



39%

of respondents said they are using AI for software development today, up 16 percentage points from 2023

Most organizations have moved past the AI hype

59%

of respondents said their organization is prepared to adopt AI

Organizations are encountering obstacles that prevent deeper adoption

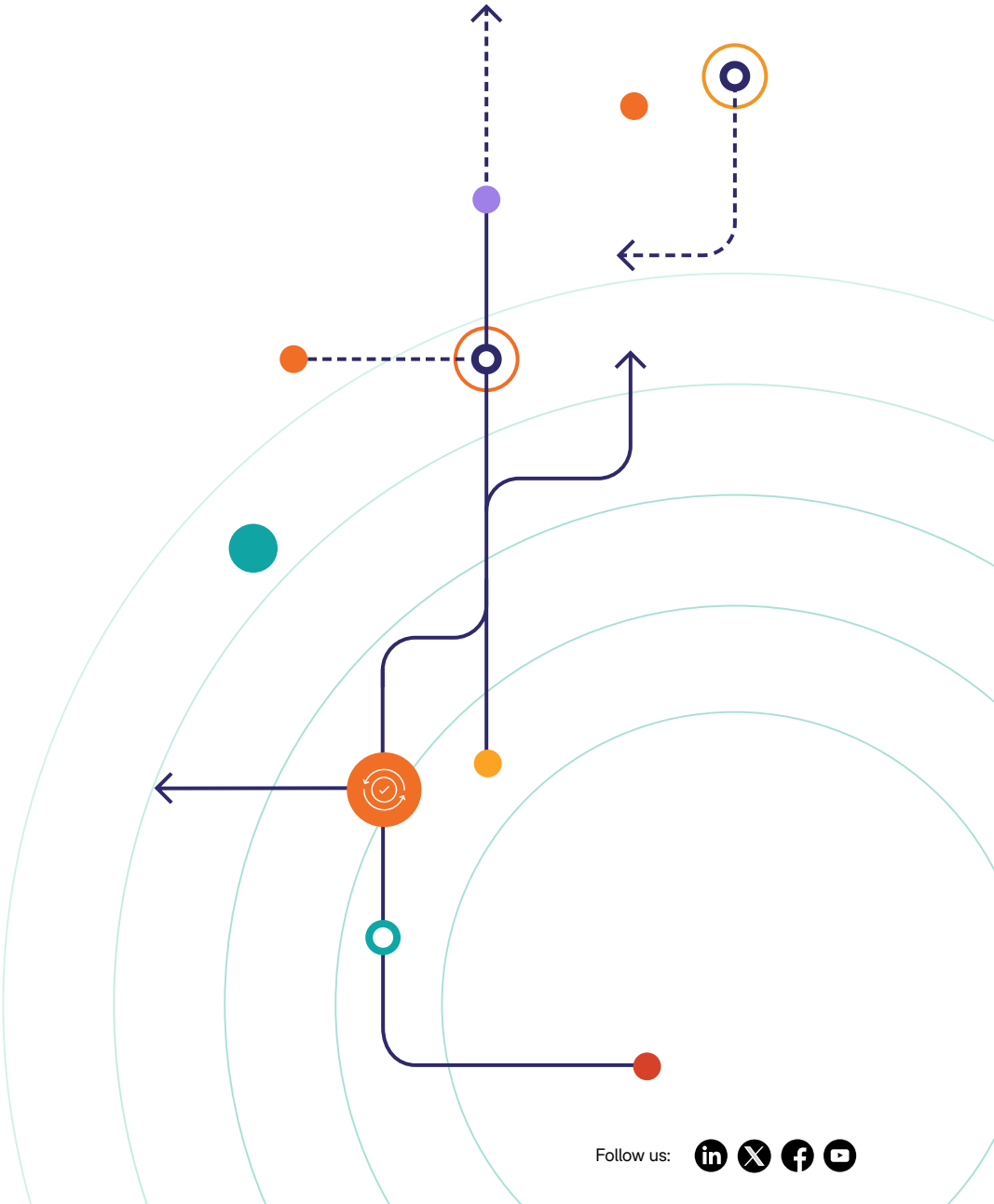
55%

of respondents said that introducing AI into the software development lifecycle is risky

Introduction

The rise of artificial intelligence (AI) is expected to have a massive transformative impact on business and work in general. One of the areas where AI is having a significant impact is in software development, with its ability to review, write, and explain code. An overwhelming majority (78%) of our survey respondents said they are using AI for software development or plan to in the next 2 years, up 14% from 2023. The findings from our research support the observation that AI is more than just hype: organizations are able to envision how specifically AI can help them improve their software development processes, and they're ready to begin adopting AI.

As organizations embed AI more deeply into software development workflows, what challenges and opportunities can they expect to run into? What steps can they take to avoid common pitfalls and ensure that they get the most out of their AI investments? Based on our research and conversations with GitLab customers, we have mapped out the journey of a typical organization as it brings AI into its DevSecOps practices. Every organization is different. However, by following along in the journey, you'll be able to understand what to keep in mind as your organization progresses through each stage.



The 4 stages of AI maturity in DevSecOps

1 Anticipation: 5% of organizations

Organizations in the Anticipation stage are interested in the idea of AI, but might not be aware of actual applications and risks related to AI adoption. They are beginning to feel a sense of urgency around AI adoption in order to avoid falling behind, but might have vague or unrealistic expectations about the benefits AI will bring.

2 Evaluation and Exploration: 56% of organizations

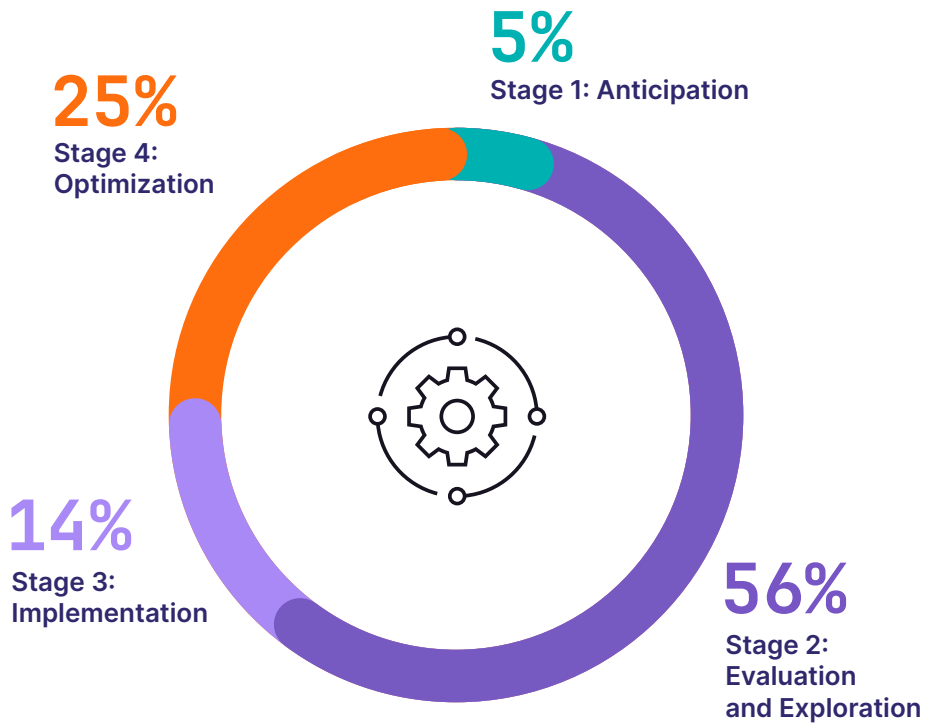
At the Evaluation and Exploration stage, organizations have moved from merely anticipating the value of AI to articulating it. Organizations at this stage are able to envision using AI for specific software development use cases and set achievable targets for AI adoption. At this stage organizations also begin to take steps to understand their unique privacy, security, and legal requirements and how these might be impacted by AI adoption.

3 Implementation: 14% of organizations

Now it's time to start using AI: the Implementation stage. At this stage, organizations have started to roll out AI tools to their teams, but AI usage may still be in a "trial-and-error" capacity. Different teams may also begin using their own AI tools, potentially leading to "Shadow AI" — the use of AI tools that are not managed officially by the organization.

4 Optimization: 25% of organizations

Once organizations have implemented AI and worked through the initial trial-and-error period, they can begin Optimization. At this stage, it's critical to identify and document the barriers that teams ran into during the previous stage, as well as how AI tools are meshing with established team workflows. Organizations at this stage can also begin to take steps to understand and overcome barriers by putting guardrails into place — for example, establishing regulations around AI tools to avoid Shadow AI.



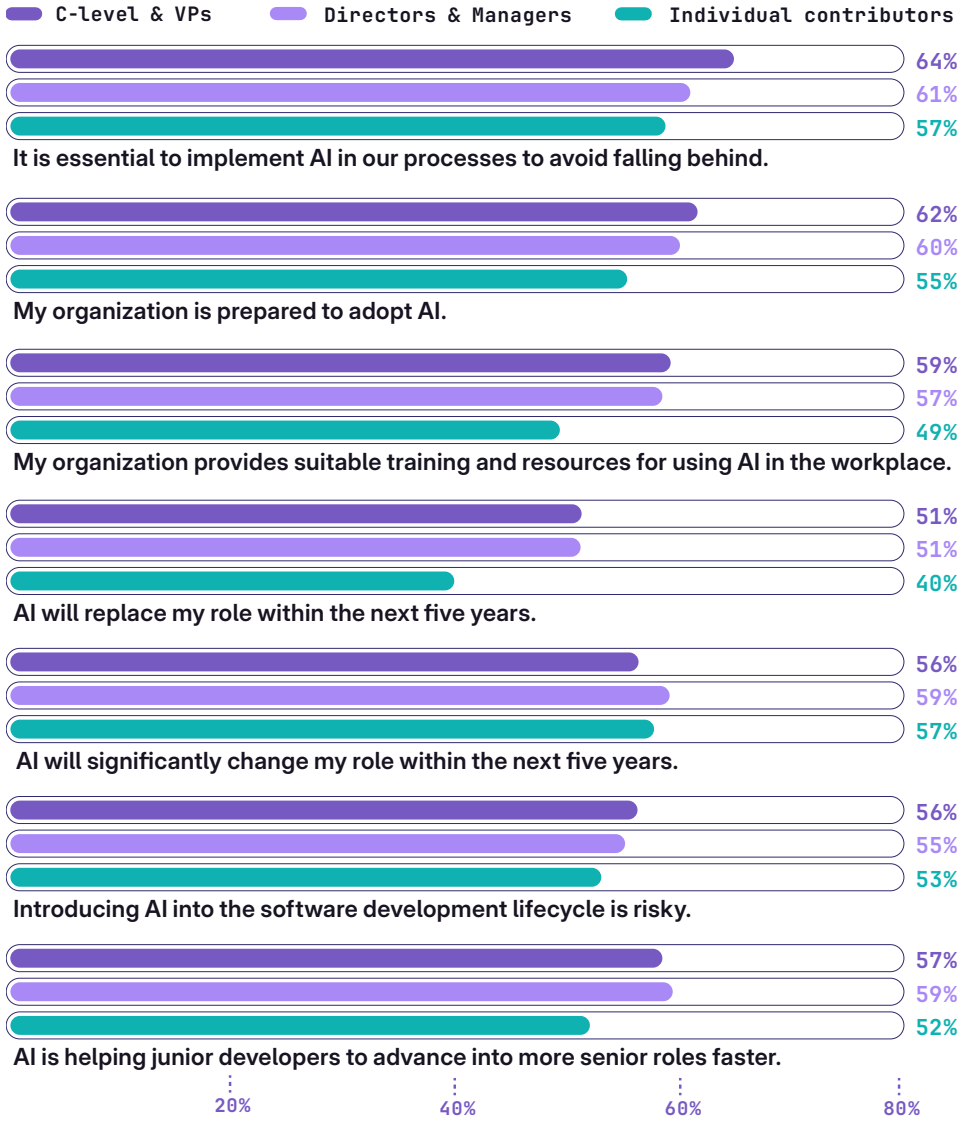
Read on for more insights from our survey about the challenges and opportunities organizations encounter at each stage of AI adoption, as well as tips for overcoming these obstacles and achieving success with AI in DevSecOps.

The AI hype is over — now's the time for thoughtful adoption

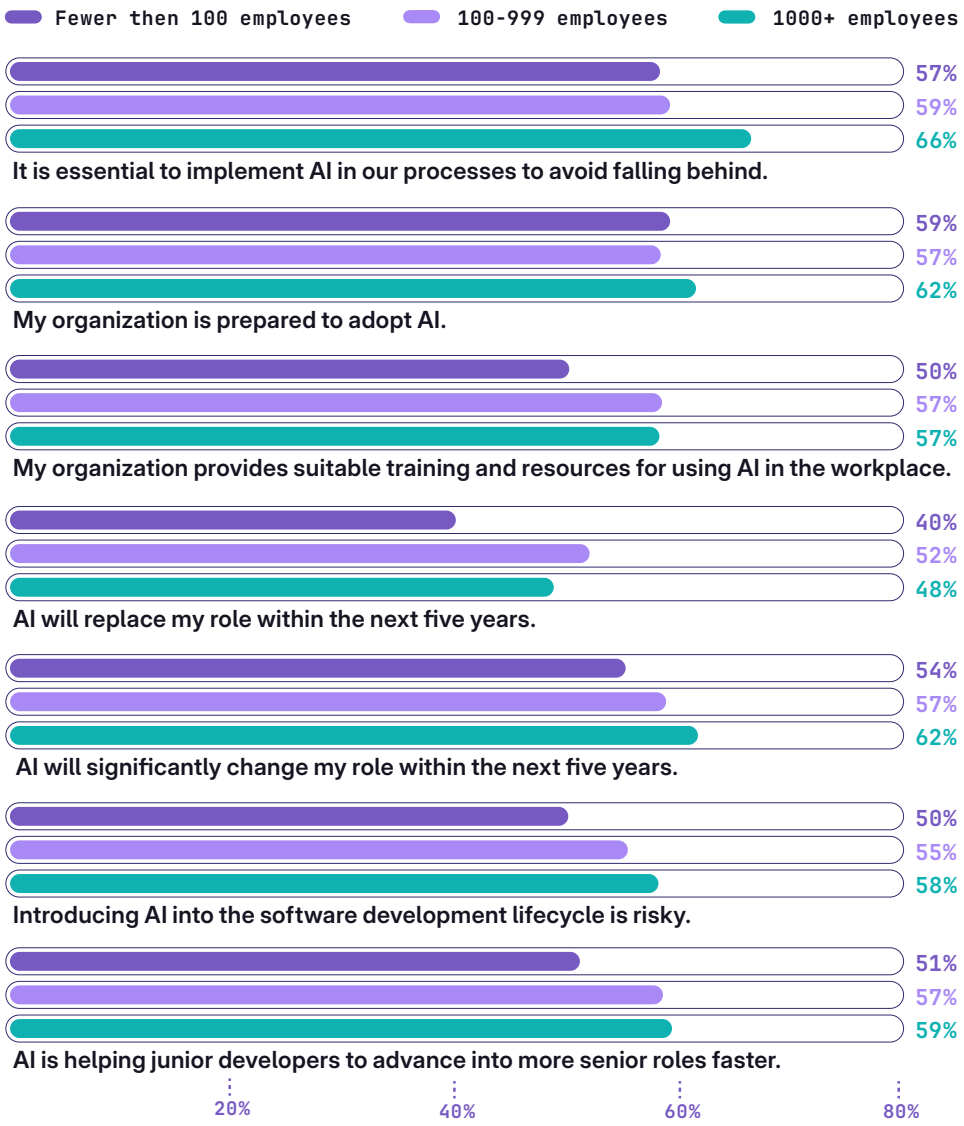
It's clear that most organizations are feeling the pressure to adopt AI — quickly. A majority (60%) of our survey respondents said that it is essential for them to implement AI in their software development processes in order to avoid being left behind. C-level executives (64%) were more likely than directors and managers (61%) and individual contributors (57%) to feel that pressure, suggesting that more organizations will build AI initiatives into their investment priorities going forward. Larger organizations are feeling the AI push the hardest: 66% of respondents at organizations with 1,000 or more employees said AI adoption is essential, compared to 57% of respondents at organizations with fewer than 100 employees.

The push to adopt AI is real, but our survey suggests that most organizations have progressed beyond the Anticipation stage. In fact, 59% of respondents said they feel their organization is prepared to adopt AI. Organizational leaders were more likely to feel ready: 62% of CXOs and VPs said their organizations were ready, compared to 55% of individual contributors. However, individual contributors (49%) were less likely than both directors and managers (57%) and C-level executives and VPs (59%) to feel that their organization provides suitable training and resources for using AI at work. As organizations move from Anticipation into Evaluation and Exploration, these findings underscore the need for thoughtful adoption of AI that takes into account the experiences and perspectives of the practitioners who will be using the tools.

Attitudes towards AI by job level



Attitudes towards AI by organization size



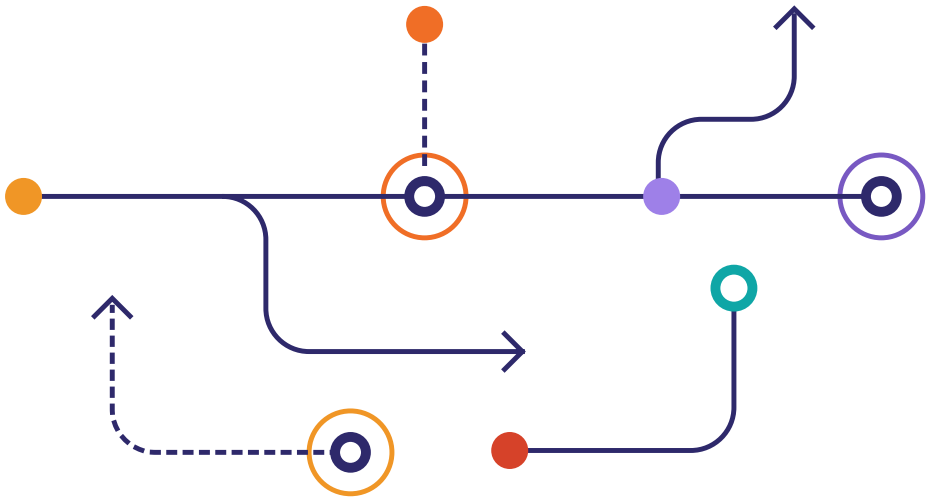
Adopting a thoughtful approach to AI

If your organization is feeling the pressure to implement AI in your DevSecOps processes but you haven't yet been able to identify concrete goals, use cases, and risks, don't worry — it's never too late to get started. Here are a few steps you can take today to set your organization up for success as you get ready to move beyond Anticipation and into the Evaluation and Exploration stage:

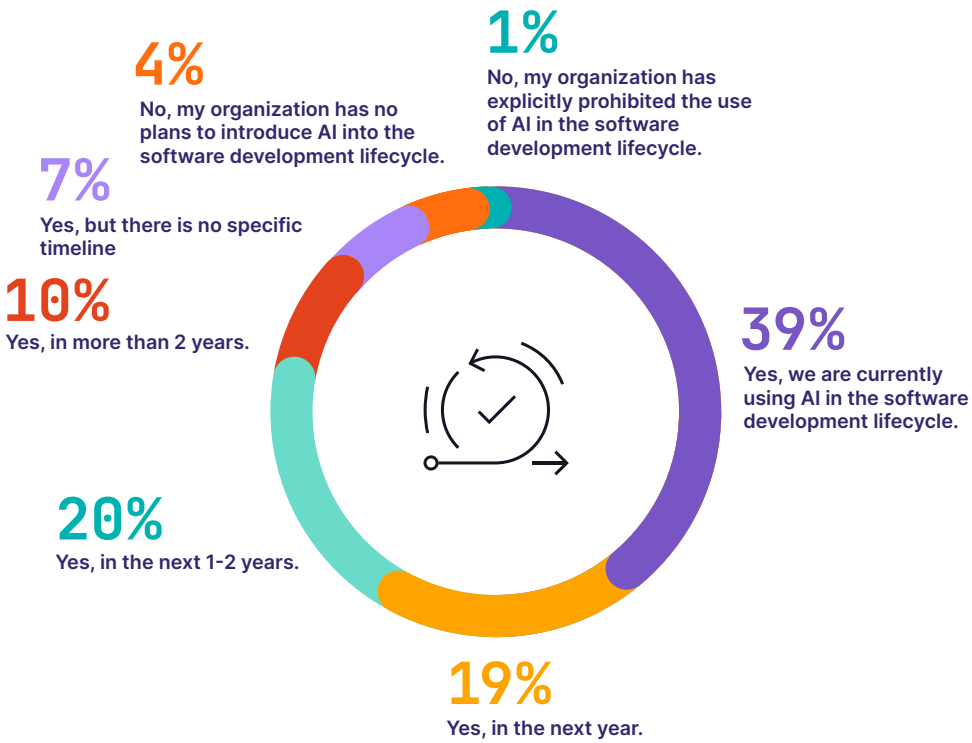
- **Identify priority use cases:** Determine the use cases you want AI to support in the organization. What workflows are currently in place for these use cases? How can you start to assess the current state of these use cases without AI? This exercise will help your organization map out where AI could make the most significant impact.
- **Identify key stakeholders:** Evaluating how your organization should incorporate AI into software development is a team effort. As you get ready to explore specific AI use cases in the software development lifecycle, start thinking about the different departments and functions in your organization who can help you understand where AI has the potential to unlock new efficiencies, as well as any potential roadblocks.
- **Give developers a voice:** While many developers fear how AI may impact their careers (63% of developers in our survey said they feel AI will significantly change their role over the next five years) they also play an essential role in the success of AI adoption initiatives. Start talking to engineering teams now to understand their pain points and motivate them to play an active role in your organization's AI strategy.
- **Prepare to iterate:** AI adoption is not a one-and-done process. As you enter the Evaluation and Exploration stage, be prepared to iterate on your approach as you learn more about what works best for your organization.

AI adoption is a matter of when, not if

Our research suggests that the majority of organizations have moved from the Anticipation stage into Evaluation and Exploration, where they are beginning to identify specific use cases in the software development lifecycle where they would like to apply AI and make plans for implementation. Of the 61% of our survey respondents who are not yet using AI for software development, the vast majority (92%) told us that their organizations plan to do so at some point in the future, and 63% indicated they will be implementing AI in the next two years. Many of these organizations are able to envision the benefits they stand to achieve with AI — for example, more than a third (34%) of respondents who are not yet using AI told us their organization plans to embed AI into existing workflows in the coming year to improve visibility into the software development process.

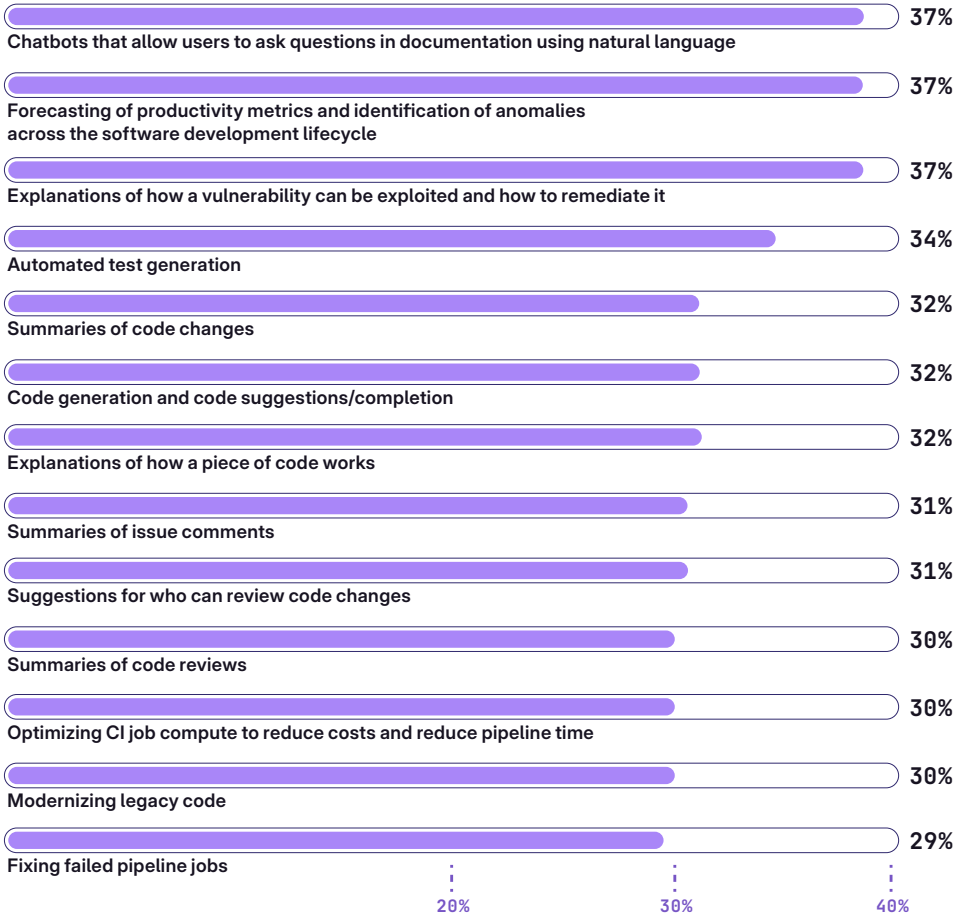


Is your organization using or planning to use AI in the software development lifecycle?



Respondents who are not yet using AI for software development also expressed interest in a broad range of AI-powered use cases across the software development lifecycle. They were most interested in AI-powered chatbots, forecasting of productivity metrics, and vulnerability explanations, with automated test generation and summaries of code changes rounding out the top five.

Most interesting AI use cases in software development, according to respondents not yet using AI



Making the most of your AI evaluation

As your organization starts to explore how you might want to implement venture AI into the software development process, it is crucial to ensure that you're not just jumping on the AI bandwagon without a plan. Here are some tips to keep in mind as you evaluate potential use cases for your organization:

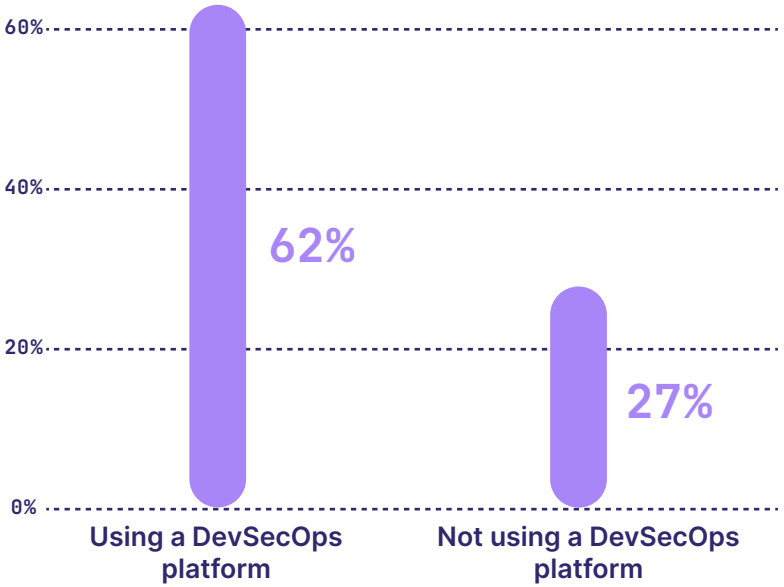
- **Create an AI steering committee with a strong leader:** The committee should bring legal, security, and engineering leaders together to build a structure for AI adoption. It's important to remember that AI success isn't possible without first addressing the privacy, security, and legal requirements your organization may face, and how AI adoption plays into continued compliance. Establishing strong leadership and clear roles will help ensure that your organization is ready to address any potential roadblocks before diving into implementation.
- **Approach AI responsibly:** As you explore and evaluate the risks and benefits of AI for your organization, it's critical to keep stakeholders across the organization informed. One way to achieve this is to hold regular strategic discussions about AI involving both technical and legal teams, as well as AI service providers. Also consider setting up an AI Transparency Center that can help decision makers navigate these conversations and issues with clarity and confidence.
- **Set realistic expectations for ROI:** Our survey revealed that organizations are looking for a variety of outcomes from AI adoption, but it's essential to keep in mind that you won't see results overnight. Be realistic about the time and resources needed to achieve your goals with AI. Don't rush the process — it's better to start slow and build momentum than to roll out a poorly planned AI initiative that doesn't deliver results.

Organizations are implementing AI across the software development lifecycle

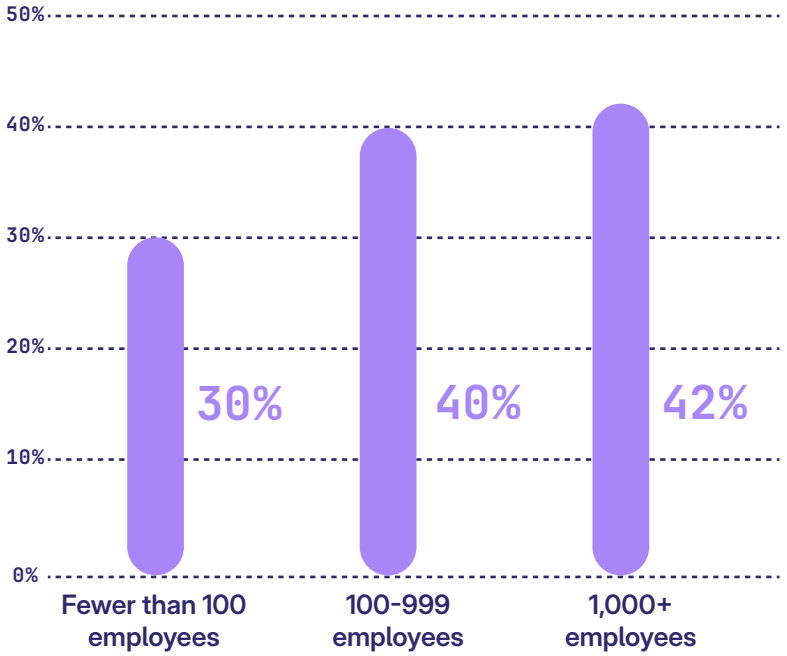
Overall, 39% of survey respondents said they are using AI for software development today, up from 23% in 2023.

This year, we noted a few factors that could be helping organizations transition from Evaluation and Exploration into Implementation. Respondents whose organizations use a DevSecOps platform (defined in our survey as a single application with one user interface, a unified data store, and security embedded within the DevOps lifecycle) were much more likely than those not using a platform to be using AI in software development today. Larger companies also tended to have higher rates of AI adoption: 42% of respondents at organizations with 1,000 or more employees reported using AI in software development today, compared to just 30% of respondents at organizations with fewer than 100 employees.

AI adoption by DevSecOps platform usage



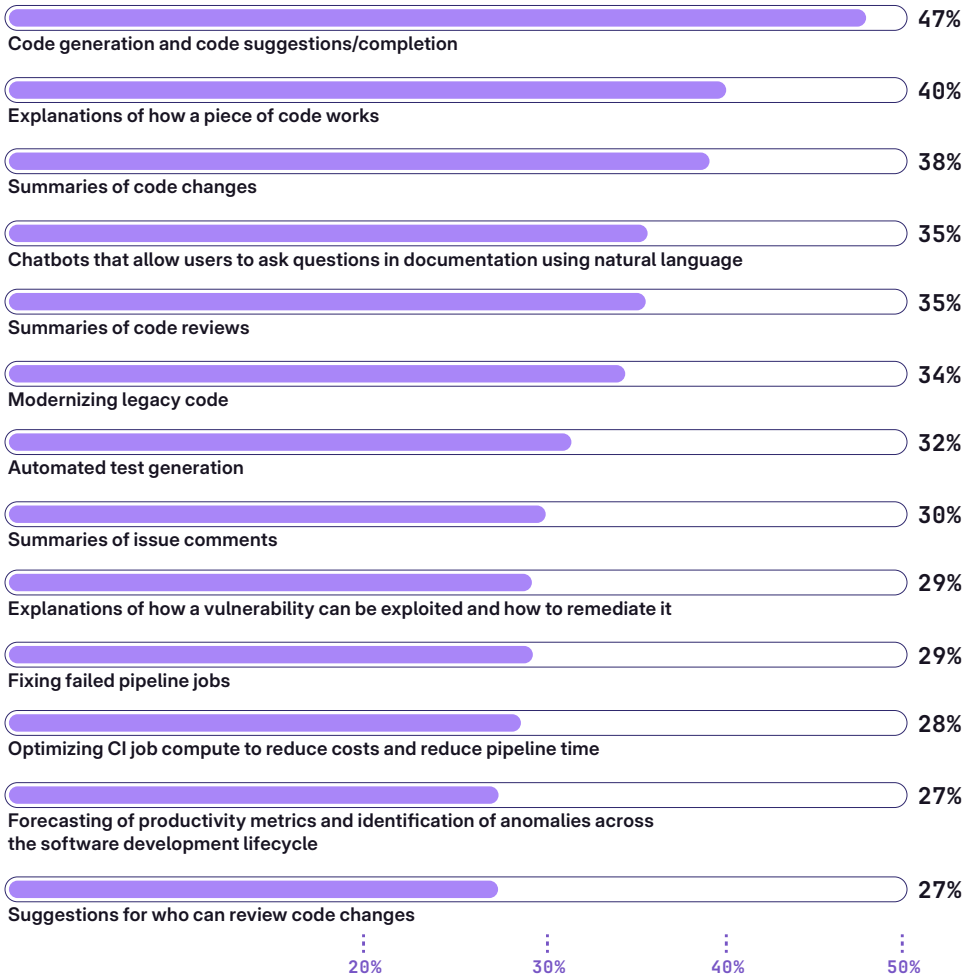
AI adoption by organization size

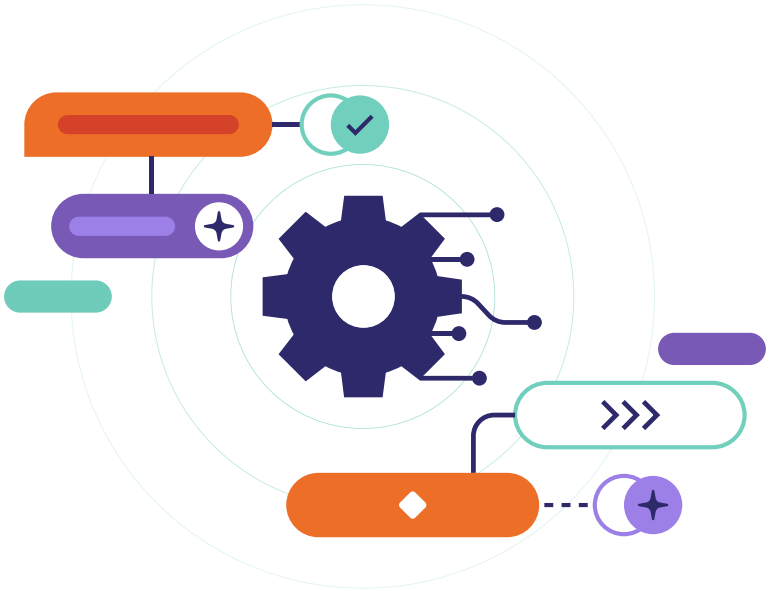


When we asked organizations that have progressed at least to the Implementation stage how they are using AI for software development today, they identified a different set of use cases than organizations in the Evaluation and Exploration stage. Code generation and code suggestions was by far the top response (47%), followed by explanations of how a piece of code works (40%) and summaries of code changes (38%).

Because code generation was one of the first AI use cases to emerge in software development, these respondents could represent early adopters who have seen the benefits of generative AI on code creation and have begun to apply AI to other parts of the software development lifecycle. As we have observed for two years in a row, developers spend less than a quarter of their time writing new code — so as organizations move past the Implementation stage and begin to refine their approach to AI, it will be critical for them to account for the entire software development lifecycle, not just coding.

How are you currently using AI in the software development lifecycle?





Setting your AI implementation up for success

As organizations dive into the Implementation stage of AI adoption for software development, it's essential to keep in mind that the success of AI initiatives relies on a solid foundation. Here are some tips for setting your organization up for success at this stage:

- **Prioritize high-impact use cases:** Think back to what you learned during the Evaluation and Exploration stage. What are the biggest pain points you identified? Where does AI stand to make the biggest improvement to your organization's software development processes — and what are the potential negative consequences of using AI on these use cases? Asking these questions will help you prioritize AI implementation in areas where it can have a significant, measurable impact on your organization's goals. This will help build momentum and support for future AI initiatives.
- **Go back to the basics:** Ensure you have continuous integration (CI)-based code quality and security scanning firmly established in your development workflow. This will not only enhance the efficiency of your development process but also significantly increase your defenses against potential vulnerabilities or other flaws introduced by AI. Having a solid foundation in place will help you catch vulnerabilities and coding errors early, providing you with greater protections and peace of mind as you navigate the complexities of AI development.
- **Begin with a pilot:** Initiate your AI implementation by working with a small focus group of users. This approach allows you to gather insights and provide guidance to others within the organization. By addressing any potential challenges early on, you can pave the way for success before scaling the use case more widely.
- **Prepare now for multi-model approaches:** AI is not one-size-fits-all. Large language models (LLMs) are often tuned for specific tasks, meaning teams that are using the same AI models across multiple use cases may not be getting optimal results. As you shop around for AI tools, look for vendors that allow you to use a variety of models tailored to specific use cases — this will save you from having to rip and replace later.

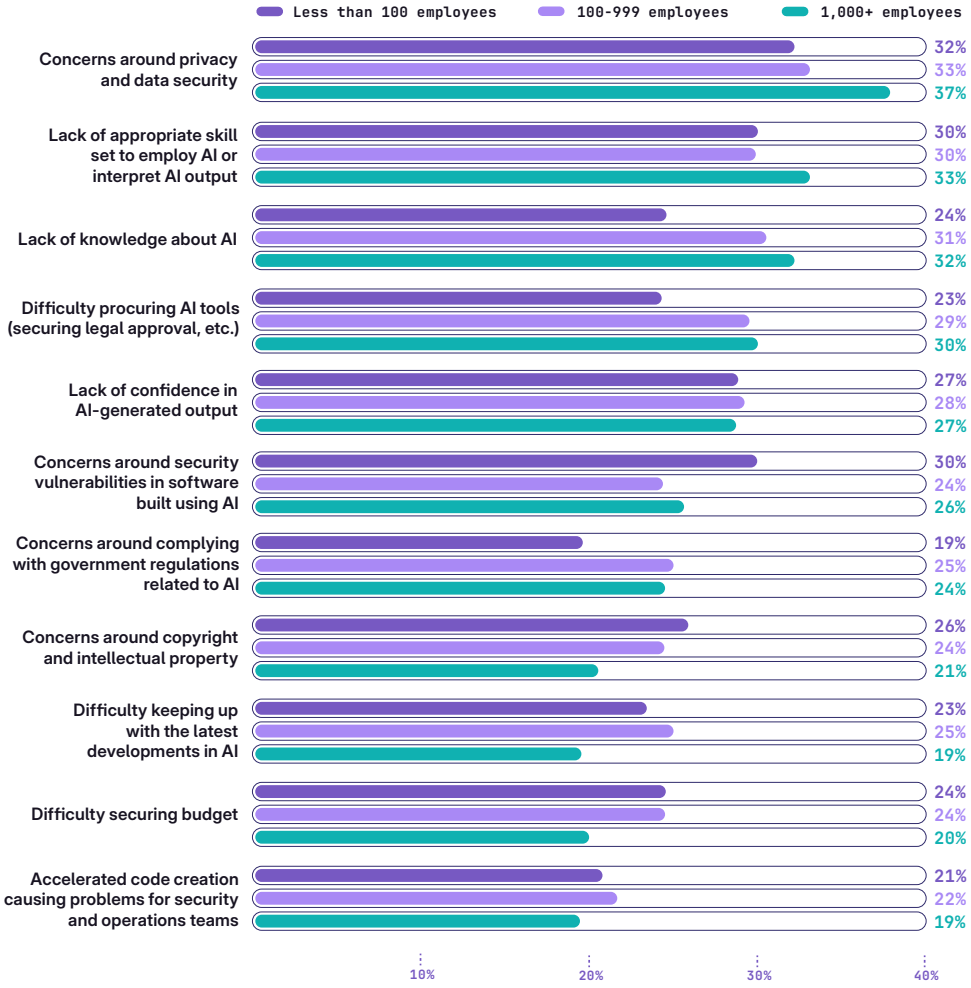
Security and skills are barriers to deeper AI adoption

Our survey made it clear that organizations are beginning to adopt AI for software development, but respondents also expressed a certain level of caution: in fact, over half (55%) said that introducing AI into the software development lifecycle is risky. Once organizations have implemented AI and have begun to define this risk more concretely by pinpointing specific barriers to the deeper integration of AI into the software development lifecycle, they have entered the Optimization stage.

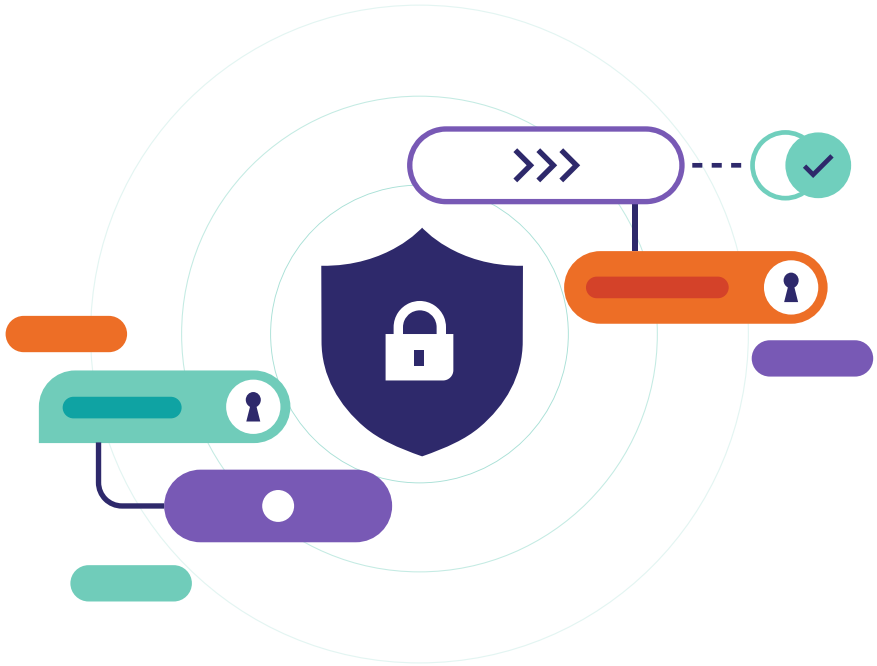
To clarify where exactly organizations are running into challenges when it comes to implementing AI, we asked respondents who are using AI in the software development lifecycle to identify specific obstacles they have encountered. Concerns around privacy and data security (34%) were the top response, followed by a lack of the appropriate skill set to employ AI or interpret AI output (31%) and a lack of knowledge about AI (30%).

Organization size had an effect on the types of obstacles respondents encountered when implementing AI into the software development lifecycle. Larger organizations tended to be more concerned about privacy and data security, a lack of AI-related knowledge and skill sets, and difficulty procuring AI tools. Meanwhile, smaller organizations tended to be more concerned about security vulnerabilities in AI-generated code, uncertainty over copyright and intellectual property, keeping up with the latest developments in AI, and securing budget for AI tools.

Top obstacles experienced by respondents using AI, by organization size



The finding that a lack of AI-related skill sets and knowledge was one of the top obstacles to deeper AI adoption, especially in larger organizations, aligns with the earlier observation that individual contributors were less likely than leaders to feel that their organization provides suitable training and resources for using AI. This suggests that organizational leaders lack visibility into the reality of AI adoption on the ground — or that organizations are making a top-down attempt to make AI resources available to employees, but those resources may not be adequate, or some employees may not be aware of them.



Navigating around AI obstacles

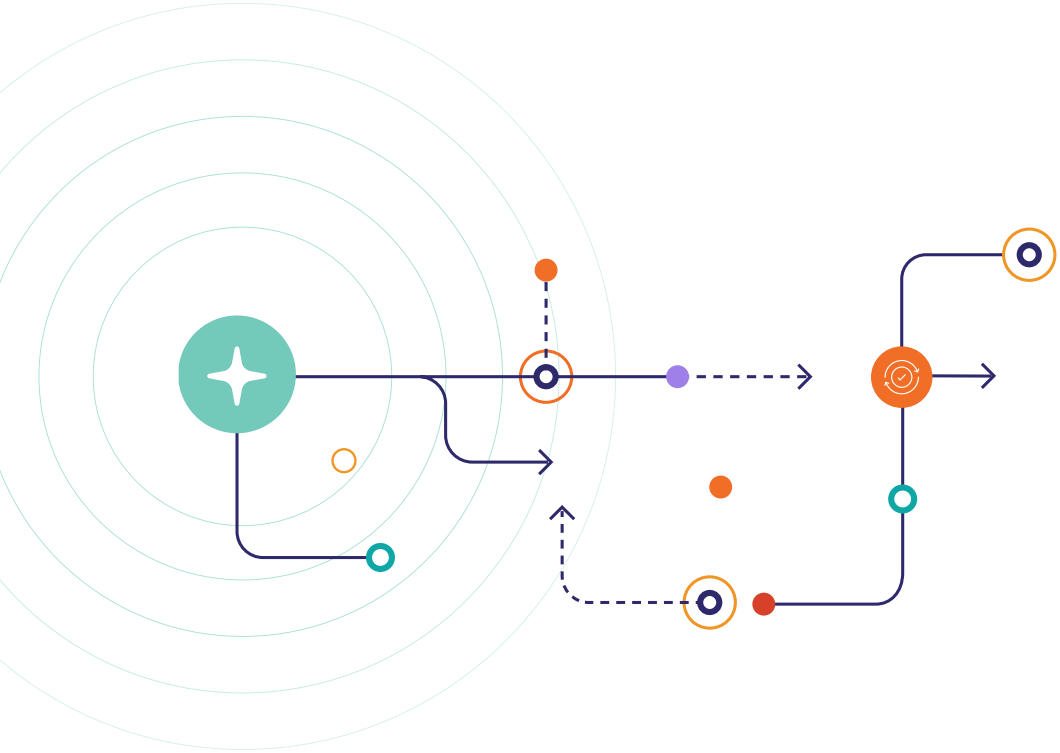
As your organization works to integrate AI deeper into the software development lifecycle, bumps in the road are inevitable. It's essential to address these obstacles head-on. Here are some tips for navigating around common barriers:

- **Establish guardrails for using AI:** Be sure to have a process and guidelines in place for any AI tools used by individuals on your team. This will help maintain control and visibility over the use of AI within your organization, and will also help to prevent "Shadow AI" — when workers subscribe to their own assistants while working on your code base, potentially leading to the leakage of sensitive information.
- **Compare against benchmarks:** AI isn't effective if it's not delivering consistent results that are at least as good as what your teams were doing before. Regularly compare AI-generated output against the results your team was producing pre-AI to ensure your AI tools are producing comparable, or ideally better, results. Also keep in mind that sentiments around success with AI will be different for developers than for executives. As you compare your teams pre- and post-AI, be sure to solicit feedback from team members who are using the tools every day.
- **Focus on training and support:** A quarter of individual contributors in our survey felt that their organizations did not provide adequate training and resources for using AI in the workplace. As your organization optimizes your AI approach, it's important to provide comprehensive training sessions to ensure teams understand how to use the tools effectively. Ongoing support can help alleviate fears and improve adoption.

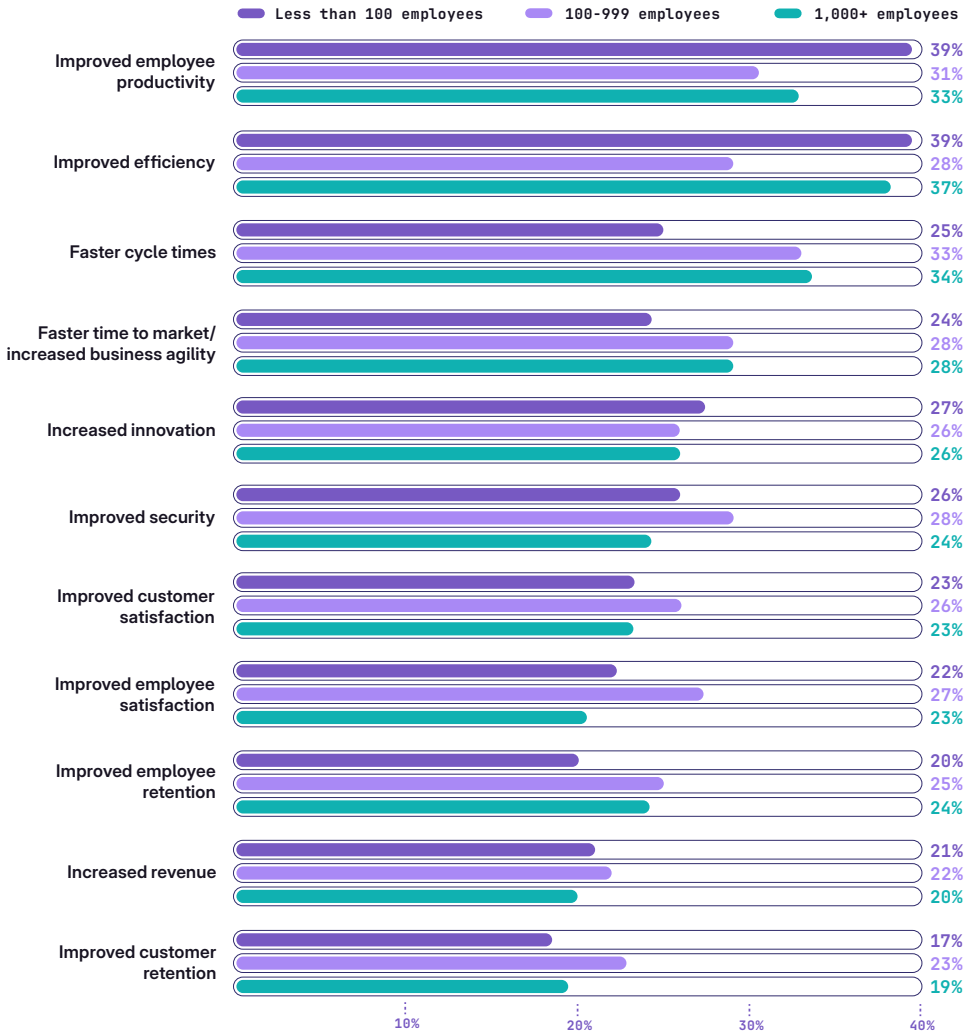
Understanding AI impact: The next frontier

As organizations implement AI into the software development lifecycle and take steps to refine and optimize their approach, it will be important to demonstrate the impact of AI on their software development processes. Our research suggests that organizations are starting to see the benefits of introducing AI into the software development lifecycle, but relatively few organizations are able to measure those outcomes in a reliable and quantifiable way.

Improved employee productivity (33%) was the top AI benefit identified by our survey respondents, followed by improved efficiency (32%) and faster cycle times (32%). Smaller organizations were more likely to see improved employee productivity and efficiency, while larger organizations were more likely to see faster cycle times and faster time to market.



What are the biggest benefits your organization has achieved by using AI in the software development lifecycle?



Despite the fact that a third of overall respondents (and nearly 40% of those in smaller organizations) identified improved productivity as a key benefit of introducing AI into the software development lifecycle, most organizations either aren't measuring productivity, or don't feel confident in their current measurements. More than half (57%) of the C-level executives we surveyed told us that they don't measure developer productivity, or their existing methods for measuring developer productivity are flawed.

C-level executives whose organizations are using a DevSecOps platform (58%) were much more likely than those not using a platform (33%) to be happy with their current approach to measuring productivity, suggesting that a DevSecOps platform can help organizations better understand the impact of AI on the business. Capabilities such as AI impact reporting enable leaders to understand how teams are using AI and where it's introducing efficiencies, as well as where teams may be struggling. That data can help executives monitor AI adoption and assess the benefits and business value of AI features.

Measuring what matters

Instead of focusing purely on raw statistics, such as lines of code produced, think about how your AI initiatives are driving business outcomes. Some metrics to consider include:

- **DORA metrics:** These metrics (deployment frequency, lead time for changes, mean time to restore, change failure rate, and reliability) provide visibility into a team's agility, operational efficiency, and velocity, serving as proxies for how well an engineering organization balances speed, quality, and security.
- **Value stream metrics:** Value stream analytics continuously monitors metrics such as lead time, cycle time, deployment frequency, and production defects, focusing on business results rather than individual developer actions. This comprehensive approach ensures a more productive and efficient development process

Demographics and methodology

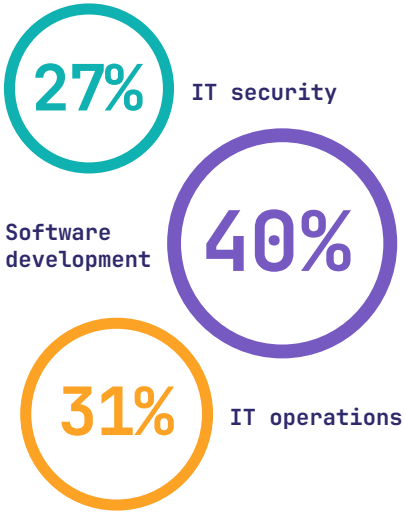
We collected a total of 5,315 survey responses in April 2024 from individual contributors and leaders in development, IT operations, and security across a mix of industries and business sizes worldwide.

We used two sampling methods for the data collection:

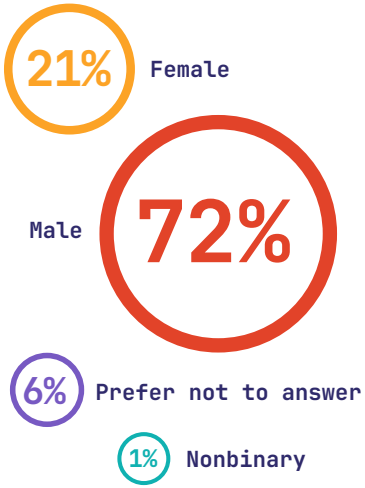
- We distributed the survey via GitLab's social media channels and email lists.
- A third-party research partner, Omdia, conducted panel sampling, which reduces bias in the sample. Omdia used its proprietary access to lists, panels, and databases to gather quality responses and cleaned the data throughout fielding to ensure data quality.

Here's a closer look at the survey respondents:

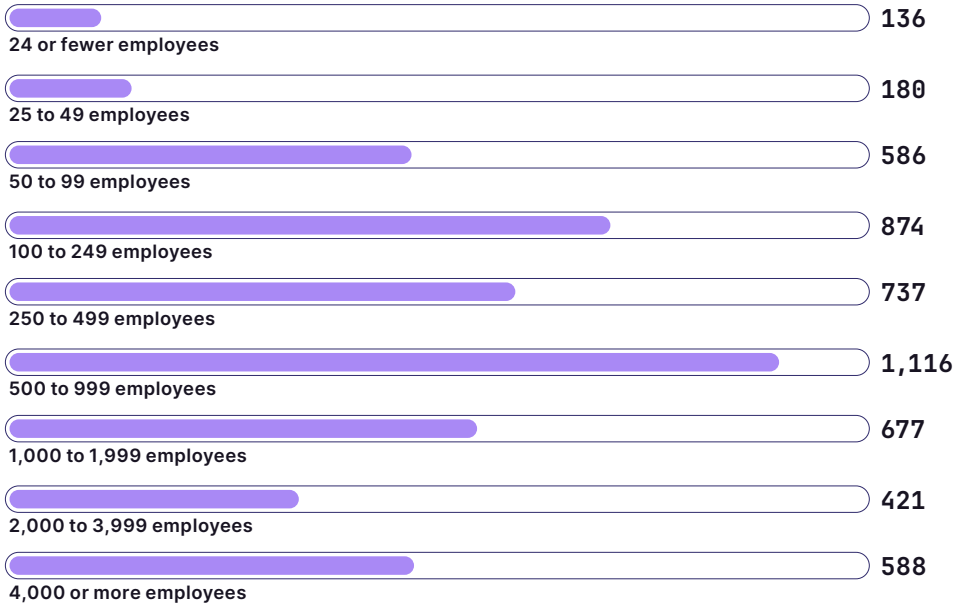
Functional area



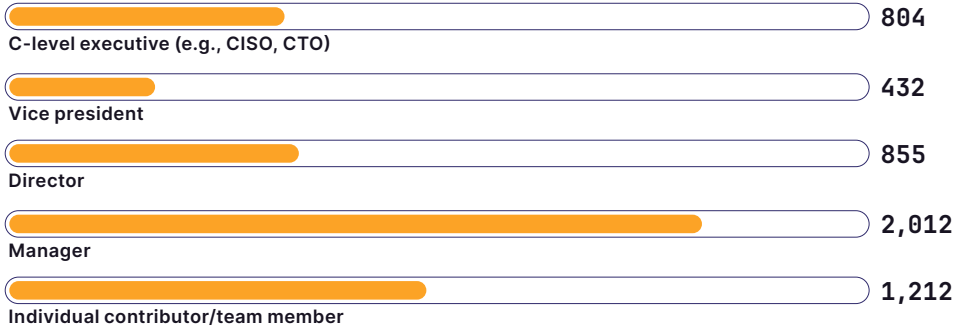
Gender



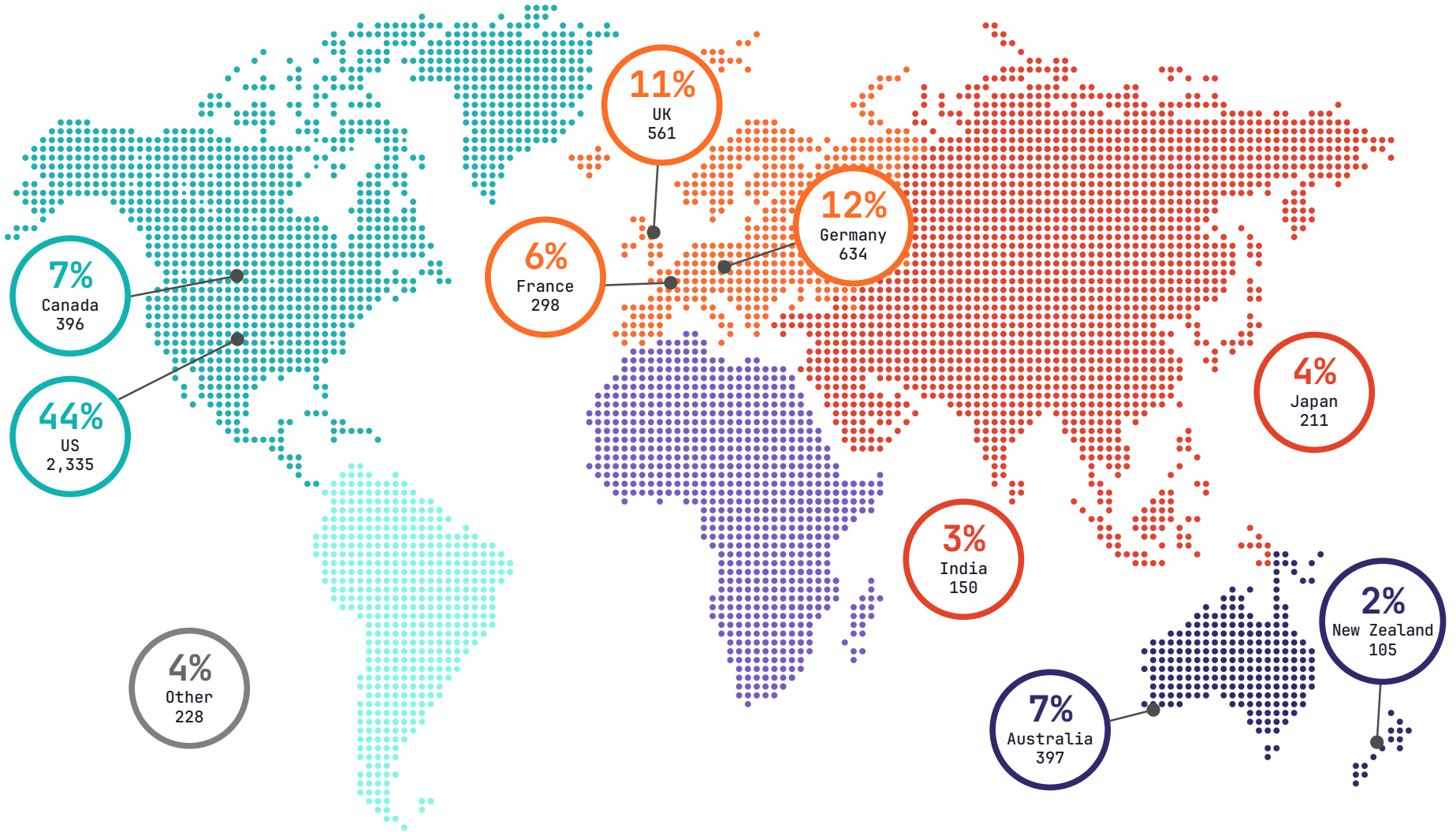
Organization size



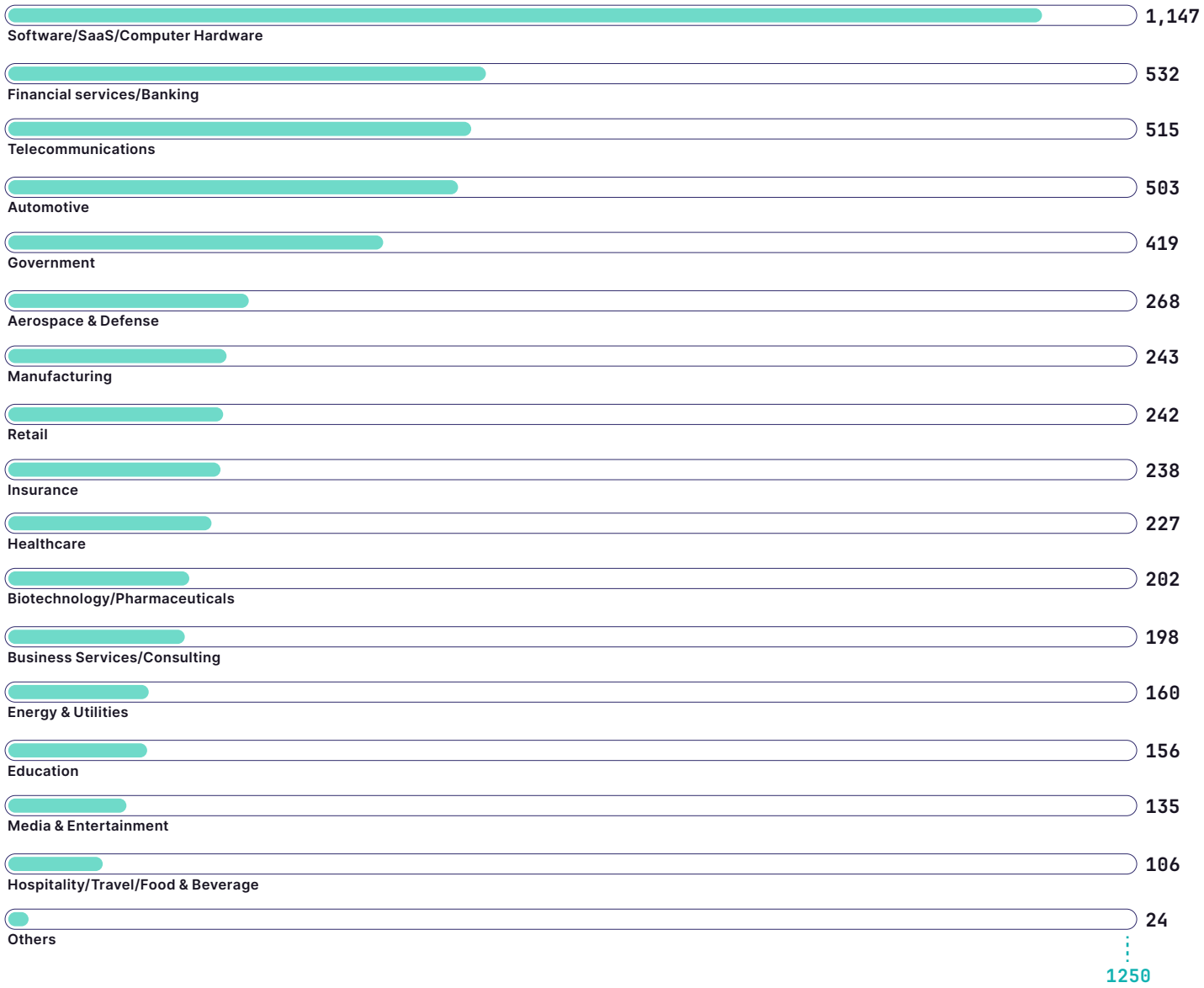
Job role



Geography


11%
UK
561
12%
Germany
634
6%
France
298
7%
Canada
396
44%
US
2,335
4%
Japan
211
3%
India
150
2%
New Zealand
105
7%
Australia
397
4%
Other
228

Industry


Software/SaaS/Computer Hardware
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Financial services/Banking
532
Telecommunications
515
Automotive
503
Government
419
Aerospace & Defense
268
Manufacturing
243
Retail
242
Insurance
238
Healthcare
227
Biotechnology/Pharmaceuticals
202
Business Services/Consulting
198
Energy & Utilities
160
Education
156
Media & Entertainment
135
Hospitality/Travel/Food & Beverage
106
Others
24
1250