



Stack Overflow Developer Survey

2024

Introduction

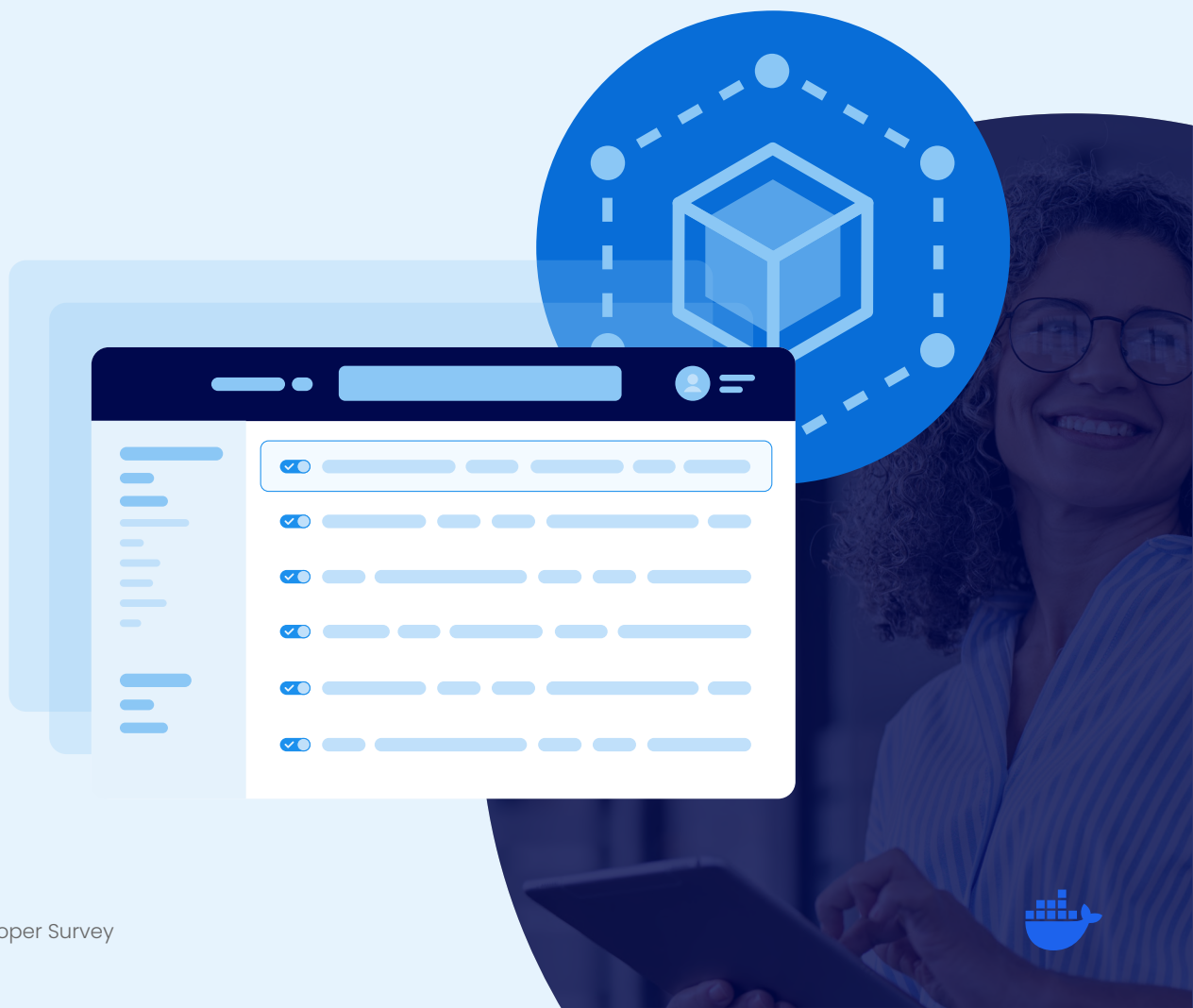
Recognition of Docker as a driver of productivity for developers and competitive edge for businesses continues to grow. The latest show of love comes from the [2024 Stack Overflow Developer Survey](#), which ranked Docker the most used, desired, and admired developer tool based on responses from over 65,000 developers.

Stack Overflow's annual survey is widely considered a bellwether of the evolving developer experience, the rising or falling popularity of technologies, and where tech might be headed next.

The survey's findings underscore Docker's broad impact on the developer community and the value it delivers — a great developer experience, outstanding productivity, the industry's largest repository of trusted content, and a vibrant user community for support.

These factors point to Docker's reliability and relevance — to the why behind its broad adoption and community engagement. In the following pages, we'll dive deeper into the survey findings and related research to highlight insights and market trends that show why Docker is a key partner for any organization looking to hone their competitive edge through the latest tech advances.

In short, we'll show why Docker is your solution for developer team productivity.



Key survey takeaways

The 2024 Stack Overflow Developer Survey shows Docker trending upward in several key areas. The survey:



Recognized Docker as the **most used and most desired developer tool** for the second consecutive year (50% of respondents, up from 47% in 2023).



Elevated Docker to **most admired developer tool** (78%, up from 75% in 2023).



Ranked Docker the most used tool (in the “other tools” category) **by professional developers** (59% use it in their work, up from 57% in 2023).

Developer profile

The survey was based on responses from **over 65,000 developers from 185 countries** with the following characteristics.

37%

Age: Most developers in this year’s survey were 25 – 34 years old (37%).

66%

Education: 66% of developers have a BA/BS or MA/MS degree despite only 49% of developers learning to code at school.

38%

Years coding: 38% of respondents have been coding for 15 years or more, while 1 in 3 developers have been coding professionally for four years or less.

47%

Company size: 47% of respondents work for organizations that have fewer than 100 employees, and 15% work for organizations of 5,000 employees and more, including 11% for organizations of 10,000 or more.



Developer type: Full-stack, back-end, and front-end developers were the top three roles reported by developers for the last three years.

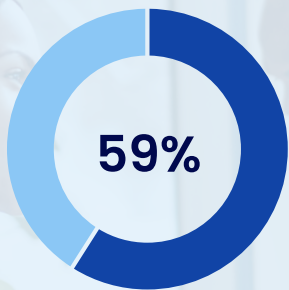
These demographics underscore the seniority and experience of survey respondents. This reinforces Docker’s relevance to serious development teams and its reputation among seasoned professionals and large enterprises.

Put another way, Docker is no new kid on the block. That means you can trust it to scale with the needs of your organization – no matter how complex it is or how fast it’s growing – without running the risks associated with adopting new technologies.

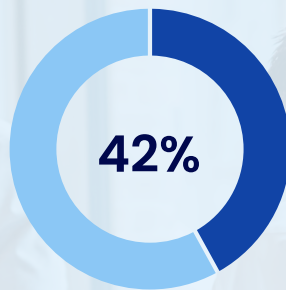


Docker's popularity among developers

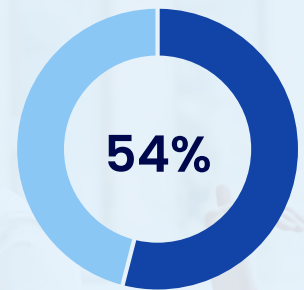
Stack Overflow's 2024 Developer Survey reinforces the popularity of Docker among developers. In the survey's "other tools" category (distinct from programming languages, databases, cloud platforms, and so on), Docker is used the most by the following user types:



Professional developers



Other coders



All respondents

It's also the third most used tool among those learning to code (31%).

The broad popularity of Docker is echoed by a variety of other sources. According to Docker's own recent metrics (July 2024), Docker recorded:

- **20 million+** monthly developers
- **7 million+** applications
- **20 billion+** monthly image pulls

Docker's [2024 State of Application Development Report](#), which asked more than 1,300 respondents a wide-ranging set of questions about their work, further underscores Docker's widespread usage. Respondents ranged from home hobbyists to enterprise professionals, with over half in engineering roles. A large majority of them (nearly 80%) said they use containers in application development across the life cycle, with 71% of those favoring Docker Compose, 57% favoring Docker Engine, 42% Kubernetes, and 35% Kubernetes with Docker Desktop.

Docker's widespread use translates to lower risk for your organization. It means lower barriers to adoption and integration, a robust community to support getting things done, and a proven track record that ensures smooth onboarding and implementation for your developer teams.



Challenges and pain points

Both IT decision-makers and developers face an array of challenges. These range from data security to sluggish legacy systems, integrating new technology, and training and adoption of development tools across teams, among others.

Security

Security tops the list of pain points for many stakeholders. According to a recent report generated by The Register, [A Developer's Wish List for the Modern Age](#), a large majority (85%) of IT staff and decision-makers rated security features as an important or critical factor in the technology adoption process. And 25% of respondents identified robust data security and compliance as primary considerations. (The report surveyed over 200 software industry professionals.)

For developers, security — specifically the shift-left approach to security — appears to be a source of frustration and an area where more effective tools could make a difference. This is borne out in the 2024 State of Application Development Report, where over a third of respondents rated security-related tasks as “difficult” or “very difficult.” When respondents were asked where better tools were needed in the development process, security/vulnerability remediation tools were the fourth-most selected (25%).

Legacy system drawbacks

Bloated legacy systems make it hard for organizations to respond quickly to market changes. These legacy IT infrastructures face high costs for things like data center space, hardware, maintenance, and energy. In addition, developers using these systems can take weeks to build and iterate on customer-facing applications, slowing time to market and making it difficult for organizations to stay competitive. Add to that a lack of standardized approaches to deployment, which hinders organizations' ability to scale applications and automate delivery pipelines.





Integrating new technology

Integrating new technology with legacy systems is another key concern, highlighted by nearly a quarter (22%) of respondents in the Developer's Wish List report. This includes new technologies and systems designed to enhance automation to improve productivity. For example, integrating AI-enabled applications and workloads into the development process can be complex and time consuming, often straining existing IT infrastructure.

Training and adoption across teams

Training and adoption of development tools across teams is a significant challenge for 31% of respondents in the Developer's Wish List report. This suggests that many organizations have yet to fully implement DevOps practices or are not realizing the expected benefits from their current tools.

At the same time, data security concerns prompt many organizations to keep development activities on premises rather than risk operating in multi-cloud or hybrid environments — even as developers increasingly shift from monolithic to microservices-based development and leverage cloud-native software practices.

However, on-prem development often comes at a cost, potentially denting ROI and curtailing organizations' ability to scale operations to meet demand when rolling out new applications and SaaS services. It also precludes the benefits of CI/CD (Continuous Integration/Continuous Deployment) — a DevOps practice designed to accelerate application development by automating and streamlining code deployments.

Docker offers comprehensive solutions that address these and other pain points. [Docker Business](#), our premium subscription, helps IT leaders boost agility and reduce time to market, enhance data security, and integrate legacy systems to support hybrid and multi-cloud workload collaboration.



Docker's impact on developer productivity

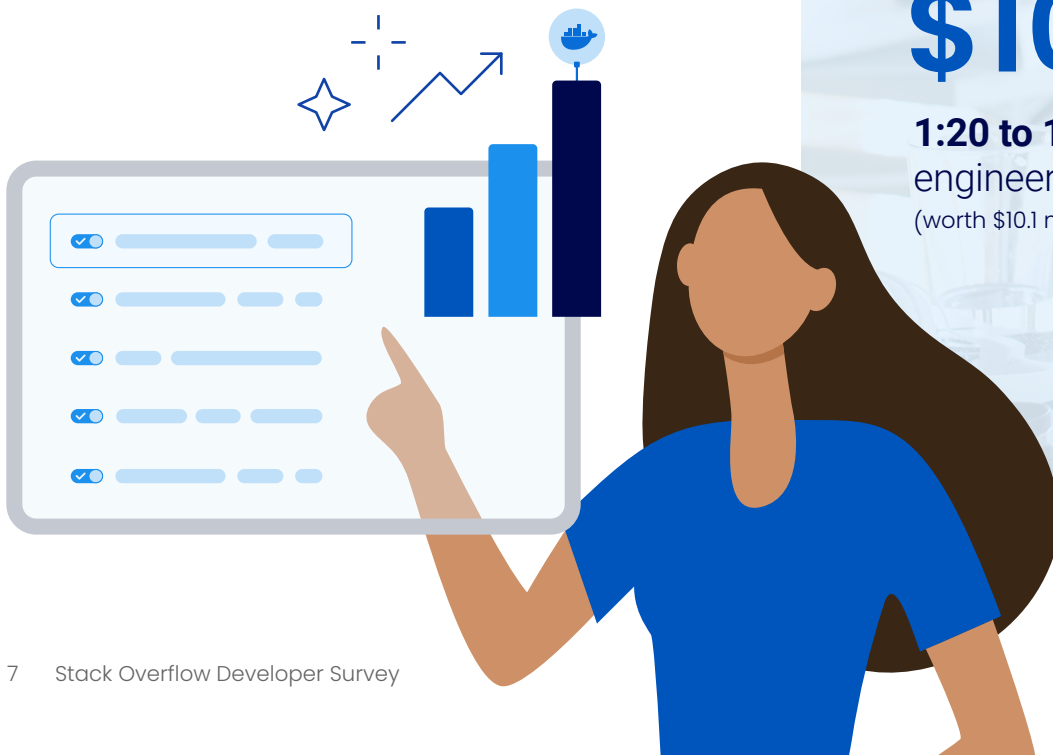
A core tenet of world-class application development is speed, pure and simple. According to the Developer's Wish List report, over 37% of respondents cited the capability to enhance developer productivity and shorten development life cycles as the primary consideration when selecting technology solutions. And most organizations view the ability to build new products and services and deliver them quickly to end users as core to their business, especially those who monetize these offerings through licenses and support.

Doing more, faster, with Docker Business

Docker Business, a broad suite of applications and services that includes [Docker Desktop](#), [Docker Hub](#), [Docker Scout](#), [Testcontainers Cloud](#), and [Docker Build Cloud](#), is tailored to improve the developer experience. Offering centralized management and collaboration tools designed for large teams, Docker Business employs containerization to optimize workflows across different stages of the developer life cycle, streamlining DevOps, CI/CD, and IT processes. This allows organizations to speed up development cycles and shrink operational overhead, while empowering teams to work more efficiently across distributed environments.

A 2023 study by Forrester, [The Total Economic Impact™ of Docker Business](#), showed the compelling productivity benefits Docker Business could bring to a "composite organization" with \$25 billion in annual revenue and 5,000 employees.

Forrester's analysis showed a net present value (NPV) of \$66.9 million and ROI of 126% over three years, with the investment in Docker Business paying for itself in 15 months.



\$18.8M

6% increase in application developer productivity
(worth \$18.8 million over three years)

\$17.4M

3 months faster time to market for revenue-generating applications
(resulting in \$17.4 million net operating profit over three years)

\$10.1M

1:20 to 1:60 improved DevOps engineer-to-developer ratio
(worth \$10.1 million in productivity over three years)



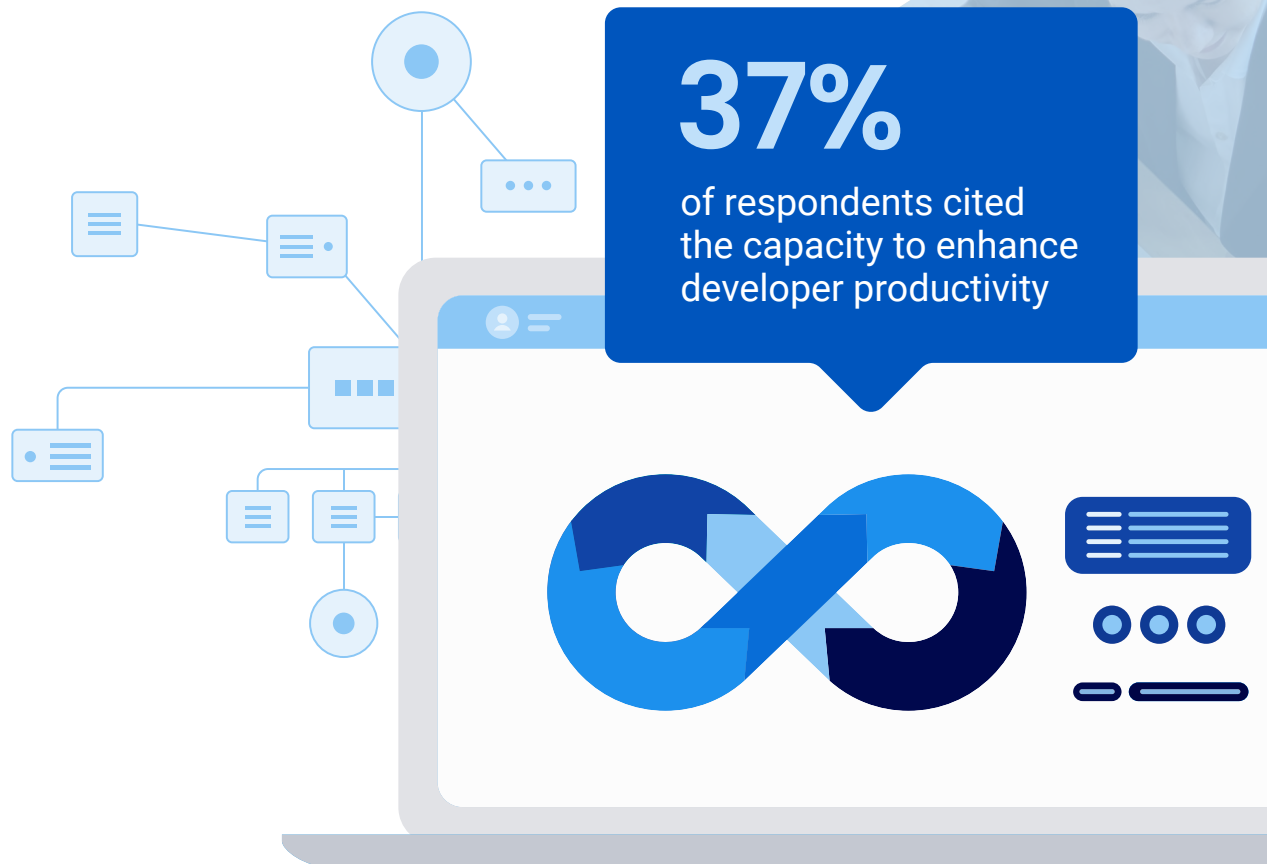
Moving fast

We're moving fast to bring more developer firepower to market. For example, in the past year alone, Docker has delivered over a dozen Docker Desktop releases, boosting developer productivity through capabilities such as Docker Debug, Docker Build checks, Docker Init, and more. We've also shipped Betas of many new capabilities, including GitHub Actions builds, Compose File Viewer, enterprise-grade Volume Backup to cloud providers, and others.

Leaning into AI

Further enhancing productivity, we're leaning into artificial intelligence to help developers innovate faster and smarter — for example, by integrating with tools like GitHub Copilot to support rapid onboarding and continuous learning for developers, and by adding an AI-powered assistant to Docker documentation.

Bottom line: by combining greater automation of routine tasks with the ability to compile, test, and run applications in any on- or off-premises environment, Docker Business can turbo charge your developer team productivity. It also helps you automate your CI/CD pipeline as you transition to containerized microservices and modernize legacy applications, bringing greater alignment with your broader business goals and potentially boosting your ROI.



How Docker helps overcome other challenges

In addition to boosting productivity, organizations and developers want tools that enhance security and help them with the latest technological advancements. Here, too, Docker Business delivers.

A focus on security

Docker Business prioritizes security with robust measures such as isolation and encryption to safeguard applications and data. In addition, the platform helps organizations enhance their security compliance by providing processes that can be included in audits and that assure auditors of the security measures in place.

Supply chain security with Docker Scout

Docker Business also facilitates vulnerability management. Specifically, [Docker Scout](#) allows developers to catch and fix vulnerabilities at the time of writing code, not 30 minutes later in CI or, much worse, a week later when an app is in production. By automatically detecting vulnerabilities and recommending fixes while developers are coding in their “inner loop,” this allows devs to focus on delivering business value.

Leveraging AI

Artificial intelligence and machine learning are going mainstream in app development. In our 2024 State of Application Development Report, most respondents (64%) reported already using AI for work for tasks such as code writing, documentation, and research. The uptake of tools such as ChatGPT, GitHub Copilot, and Google Gemini underscores AI’s value in the development process and reflects a shift toward more intelligent, efficient, and adaptable development methodologies.

Docker is already a key part of the [AI/ML development](#) ecosystem, and its use in AI/ML is growing. For example, a year ago there were [more than 100 million pulls](#) of AI/ML images in Docker Hub. That number has since grown to more than 500 million. There’s also a growing interest in ML engineering and data science within the Docker community, with almost half of the survey respondents (46%) saying they were working on ML in some capacity.



If you're looking to take advantage of the latest tech, our AI capabilities will help keep your organization on the cutting edge. Stacked on top of Docker's other features and offerings, they're easy to integrate into existing systems and they help provide a pathway to realizing the value of Docker within your operations.

Need training and educational resources?

The Docker Business subscription includes both, enabling you to upskill your organization's teams and maximize the value of new technology.

For more on how Docker helps developers and organizations overcome challenges, check out our [Docker Resources page](#). It offers a wide range of analyst studies, white papers, videos, infographics, newsletters, and more. It also features a number of case studies illustrating real-world examples of how Docker helps organizations meet their technical needs and business goals — whether it's [accelerating ZEISS Microscopy's AI journey](#), leveraging Docker Extensions to [grow Release.com's SaaS business](#), or [helping Canadian Digital Service provide notifications to the public](#).

64% reported already using AI for work

for tasks such as coding, writing, documentation, and research

46% reported working on ML in some capacity



Docker and cloud integration

In the constantly evolving landscape of software development, two investment areas continue to trend upward: accelerating builds and moving development to the cloud.

Cloud development rising

According to the 2024 State of Application Development Report, when asked about their main development environment, almost 64% of respondents cited their laptop or desktop. But the real story is that more than 36% cited non-local environments, such as ephemeral environments, personal remote dev environments or clusters, and remote development tools such as GitHub Codespaces, Gitpod, and Coder. This hints at the growing popularity of developing software in the cloud – a trend driven by increased efficiency, shorter build times, reduced time to market, and faster innovation.

Docker's cloud innovations

According to [Forrester's TEI study](#), a key benefit of adopting a container-first approach with Docker Business was the ability to host new applications and containerized workloads in public cloud environments, thus reducing the need to increase data center capacity. This in turn led to lower costs and simplified management. The analysis found the decreased need for data center capacity for new applications led to cost savings of more than \$69.9 million over three years.

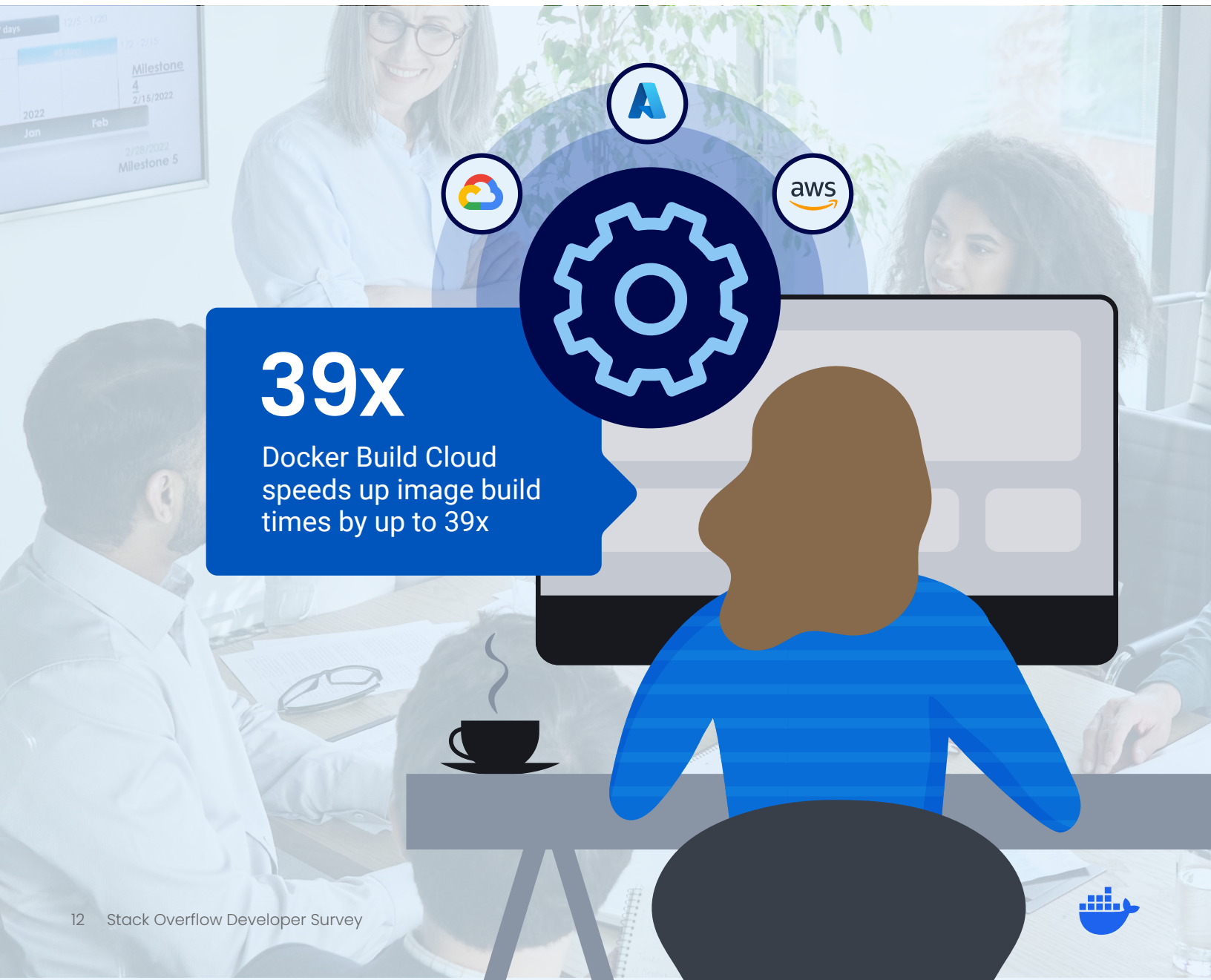
Meanwhile, Docker continues to innovate in bringing the power of the cloud to local development. Developers using [Docker Desktop](#) (included in Docker Business) easily benefit from Docker's cloud services in their inner loops, which can help address challenges such as slow image builds. According to a [survey by Incredibuild](#), 98% of developers spend up to an hour every day waiting for builds to finish. [Docker Build Cloud](#) speeds up image build times by up to 39x, improving developer productivity, reducing frustrations, and helping shorten the release cycle. Other Docker cloud services include [Testcontainers Cloud](#) and [Docker Hub](#).



Docker and Kubernetes

In addition, Docker Compose and Docker Desktop are critical tools for improving productivity in Kubernetes environments, making them essential for organizations focused on efficient cloud operations. According to a 2024 user survey by Docker, 62% of respondents cited Docker Desktop as a tool that has enhanced their productivity in Kubernetes environments. (The survey was conducted at KubeCon, the flagship conference of the Cloud Native Computing Foundation, and gathered responses from 270 developers and software industry professionals.)

The takeaway: Docker Business's cloud integration capabilities help developer teams deliver more frequent releases of higher quality and more secure applications, which can translate to significant cost savings and operational efficiencies. Put another way, Docker is not just a development tool, but a strategic asset that enhances cloud operations, offering scalability, flexibility, and reduced infrastructure costs that align with your business demands.



39x

Docker Build Cloud
speeds up image build
times by up to 39x



The future of Docker

Stack Overflow's 2024 Developer Survey shows Docker clearly trending upward as the most popular technology among professional developers, as well as the most admired and most desired developer tool. These trends align with the long-term strategic goals of organizations looking to stay ahead in technology adoption, particularly with regards to AI.

Looking ahead, we see AI/ML fundamentally changing how developers work and how applications are built. This view is supported by a range of findings in the Stack Overflow survey. For instance, 76% of all respondents said they are using or are planning to use AI tools in their development process this year, up from 70% last year. Many more developers are currently using AI tools this year, too (62% vs. 44%). There's also broad recognition of the benefits of AI tools, with 81% agreeing that increasing productivity is the biggest benefit. And in the next year, most developers agree that AI tools will be more integrated for tasks such as documenting code (81%), testing code (80%), and writing code (76%).

At the same time, the 2024 State of Application Development Report underscored a marked growth in roles focused on machine learning (ML), engineering, and data science within the Docker ecosystem. These roles made up 8% of respondents in the latest survey, up from about 1% in our 2022 survey. ML engineers and data scientists represent a rapidly expanding user base, which signals the growing relevance of AI to the software development field, and the blurring of the lines between tools used by developers and tools used by AI/ML scientists.

To explore these quickly evolving spaces together with our community, we are experimenting in public with new techniques and tools in our [Docker Labs GenAI series](#). For example, a recent post explores [how to create Dockerfiles with GenAI](#).

Docker is continuously evolving to meet the future needs of development teams. Translation: When you partner with us, you're making a forward-looking investment that aligns with emerging trends and future-proofing strategies — so your investment will remain valuable over time.



Conclusion

Stack Overflow's 2024 Developer Survey highlights the central role Docker plays in the developer ecosystem and the value it delivers. By continually innovating and addressing the needs of our community and customers, we help developers and businesses achieve their goals. By taking a container-first approach to development with Docker Business, your organization can achieve faster development cycles, secure development practices, and seamless cloud integration — all while aligning with your business goals of reducing time-to-market and optimizing infrastructure costs.

Ready to uplevel your business?

Check out our [Docker Business](#) or [contact sales](#) today.

