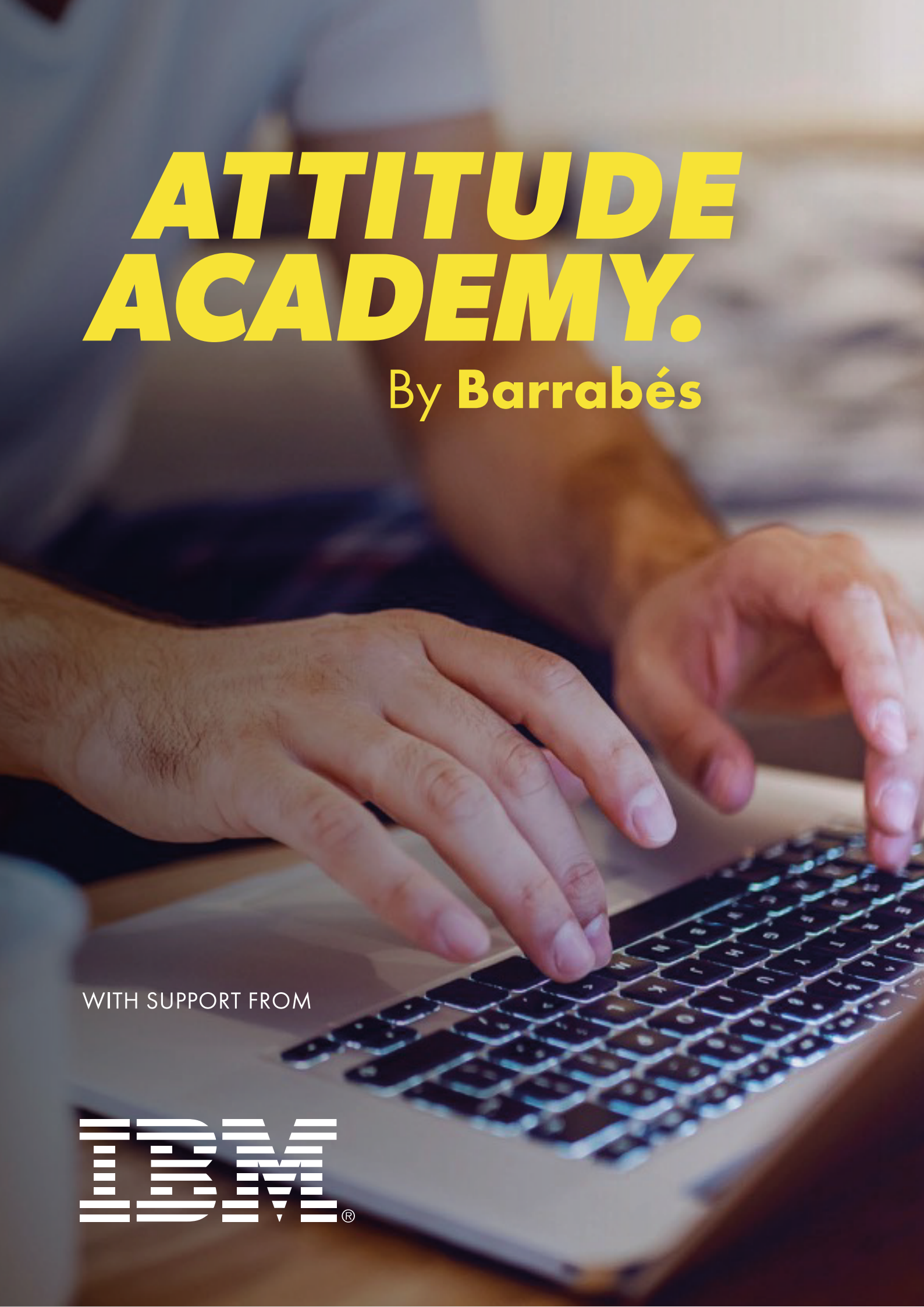
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IBM **Cloud**

The state of container-based app development

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3 Outlook on containers by role
4 Factors driving adoption
6 Adoption analysis
7 The future of container development
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Key takeaways

1	In order of importance, enterprise-grade security, tools that ease operational challenges, support for cloud and on-premises environments, and flexible application architectures are the key drivers of container-based cloud platform adoption.
2	In terms of using and adopting container-based platforms, solving challenges related to the new technology currently overshadows the demand for advanced services like AI and big data analysis tools.
3	Using containers is associated with improving app quality, reducing both app development costs and production app downtime, and facilitating user experience innovation.
4	Container usage for production enterprise workloads is expected to increase from 25 percent to 44 percent within the next three years. Deployment will shift heavily to Hybrid Cloud and support for on-premises, serverless containerized environments. Deploying only on public clouds will decrease.
5	Respondents see enterprise applications as best suited for container-based application development. Over 40 percent of respondents consider apps involving data analytics best positioned to benefit from being containerized, and approximately a third consider web serving, database and CRM apps best positioned to benefit.
6	Commercial solutions could be the catalyst for container-based development to expand beyond open source frameworks. Commercial solutions are perceived as highly correlated with DevOps, microservices development and automation tools that reduce the operational and uncertainty challenges that currently overburden the container market.
7	Cloud platform support for developing and easily migrating apps is fundamental for fostering investment in container-based development. Two-thirds of respondents value the ability to allow users to design container compute environments.
8	Consulting services are considered only necessary for complex endeavors — for example (and especially), when companies seek to leverage AI within containerized apps and need support for non-x86 architectures.
9	Compared to IT executives, developers favor container-based technologies and are likely to report strategic benefits from using them. Developers are especially interested in AI, Machine Learning, big data, non-x86 and industry use cases.
10	Across the range of roles, respondents see insufficient internal expertise as one of the significant challenges of adopting container-based app development. IT executives are concerned with time and cost uncertainty, whereas developers are bogged down by operational challenges like redesigning on-premises apps and managing data across containers.
11	Developers value a platform that is best suited to support diverse environments. For developers and IT executives, compatibility with their current IT environment and ease of use rank among the top reasons why a container platform is selected.
12	The primary buyers and leading influencers of container investments are the heads of IT operations and senior IT executives. However, app development leaders, DevOps teams and app developers are also highly influential.

The outlook on containers by role

Developer executives

In terms of business value, business executives focus most on practical benefits, **highly valuing (61%)** the potential of containers to reduce costs related to production downtime, **improve application quality (56%)** and **employee productivity (53%)**. While remaining wary of containers' **unproven efficiency (55%)**, business executives nevertheless see the **potential efficiencies in the DevOps pipeline (77%)** as the single most valuable potential benefit in using containers.

IT executives

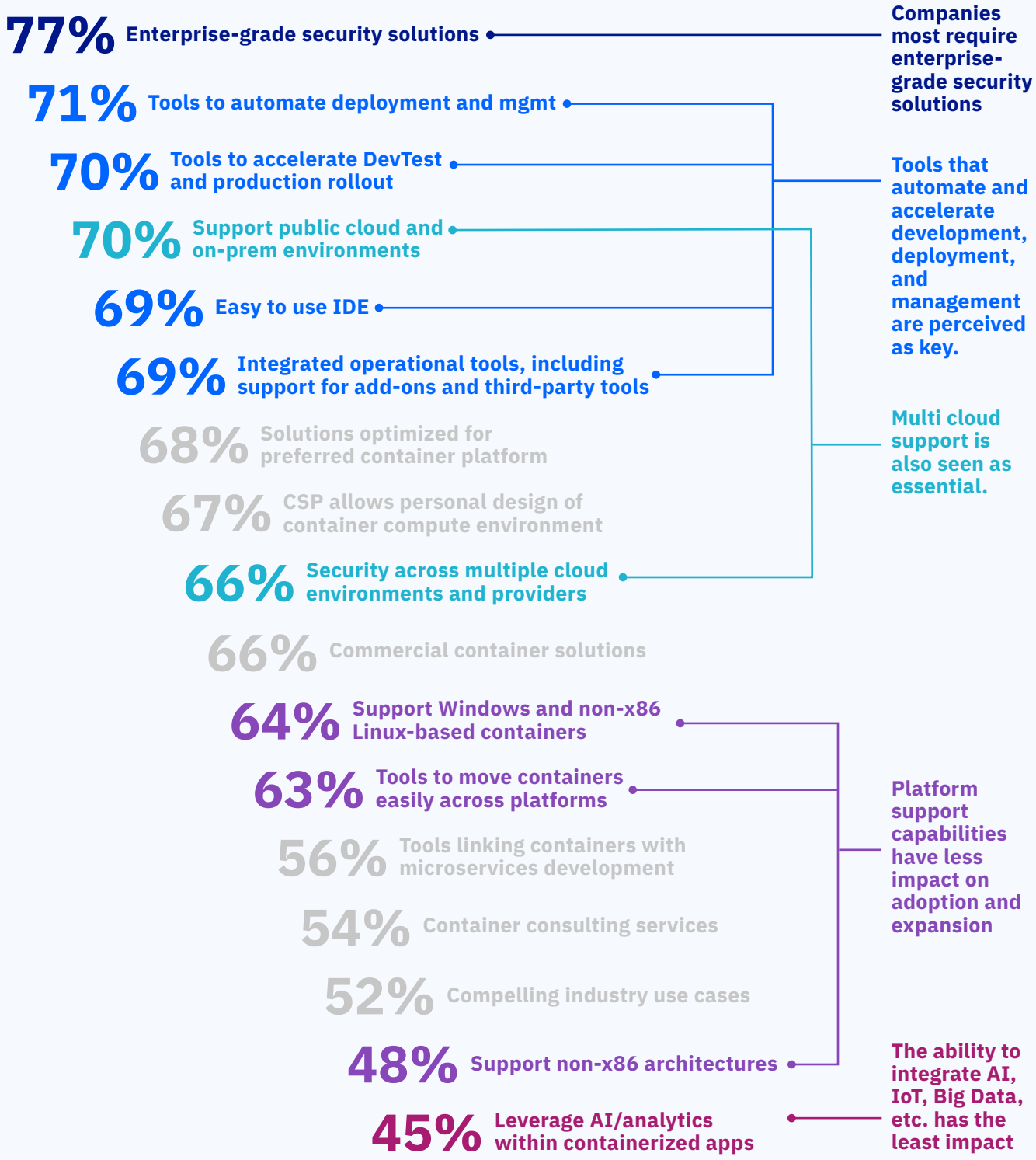
IT executives also focus on practical benefits. They see **improved software quality (61%)** as the highest business value of containers, and **enhancing security (72%)** as the greatest technical opportunity. In contrast, IT executives see the **skepticism of top business executives as the biggest challenge (65%)**.

Developers

Due to recent market-disrupting companies achieving success on container-based platforms, business leaders might be expected to focus on innovation. However, **developers (66%)** are the ones who focus on that, seeing the **potential to quickly respond to changes in the market (64%)**. For them, the most important thing about containers and their environments is the **potential for high security (84%)**. **Lack of adequate expertise within their organization is the biggest concern (62%)**.

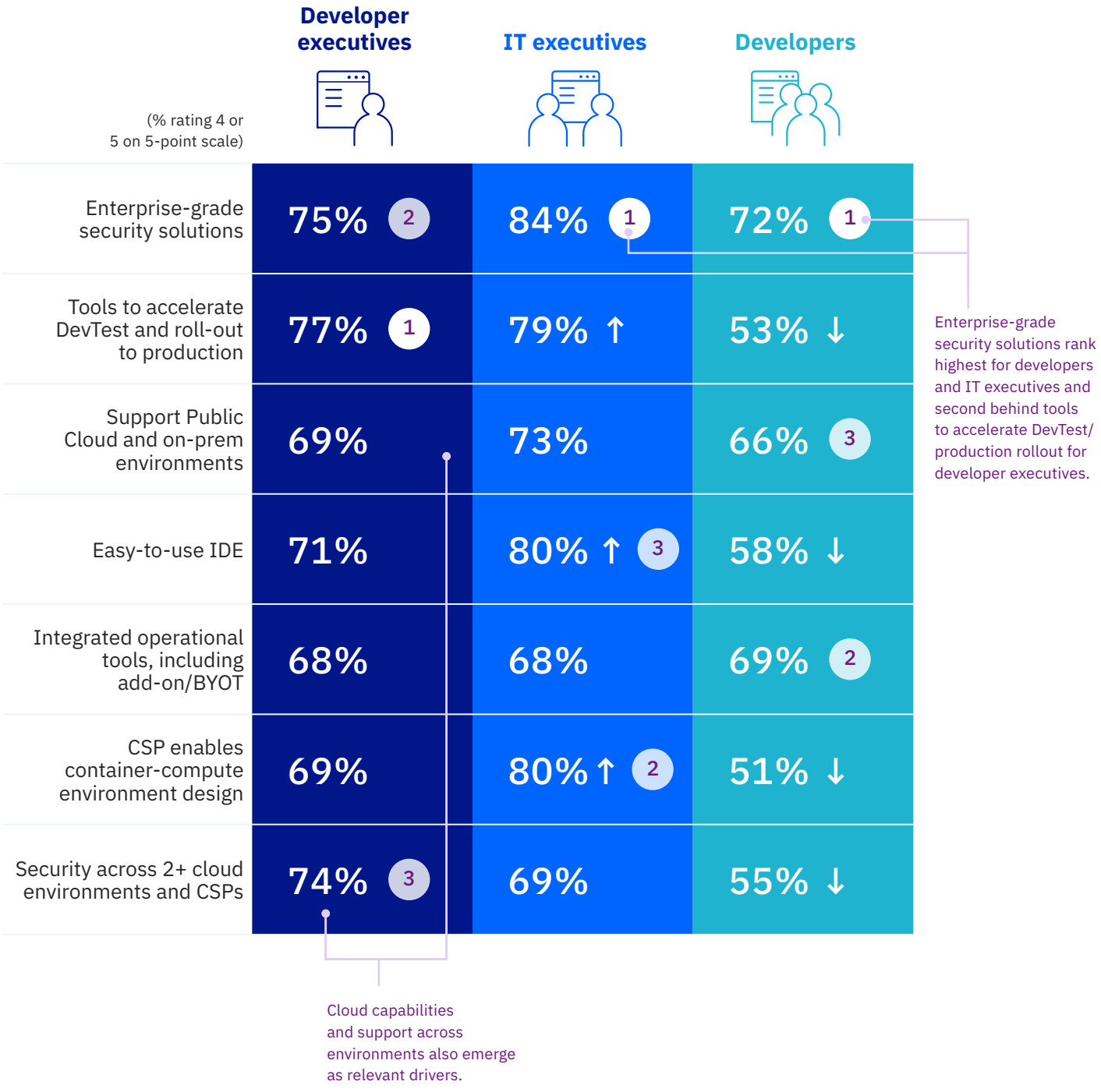
Factors driving adoption

What are the most important solutions and capabilities helping companies adopt container-based app development?



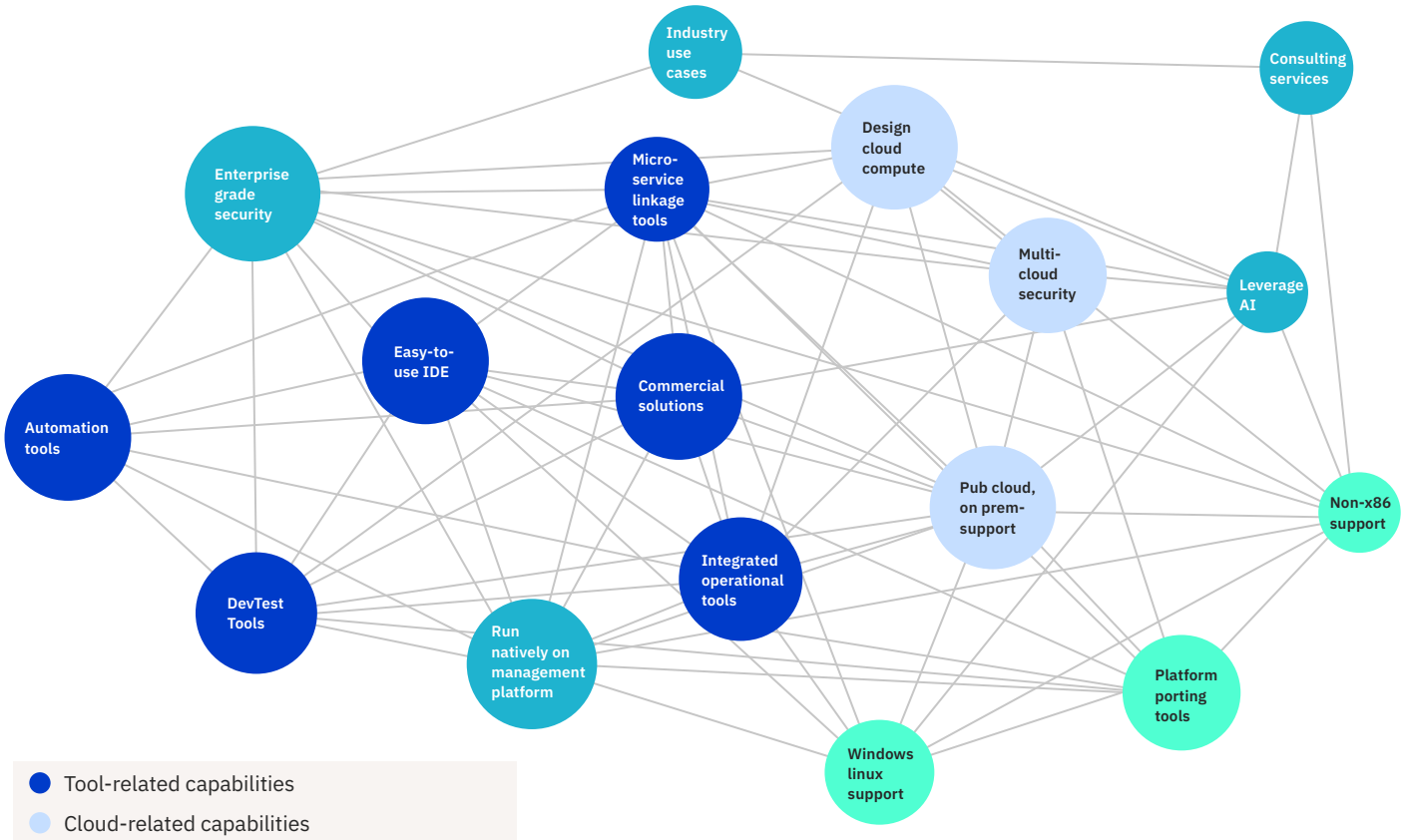
What is most important to whom?

Overall, developers see the most value in using containers while IT Execs see the least. App-differentiating technologies like Artificial Intelligence, Machine Learning, Big Data, non-x86, and industry use cases are held in significantly higher regard among developers.



Adoption analysis

The capabilities and solutions helping companies adopt or expand the use of containers are highly linked in positive relationships: as one rises or falls in importance, so does the other. No capabilities work in isolation, as seen in the graph below.



Enterprise-grade security is highly correlated with **commercial container solutions** and tools that tightly link containers with **microservices development**.

Commercial container solutions are highly correlated with **DevTest tools** and tools that link **microservices**. These solutions are the bridge between DevOps and a microservices-based application architecture.

Companies seeking to **leverage AI** within containerized apps will be seeking container **consulting services** and **support for non-x86 architectures (e.g., GPUs)**.

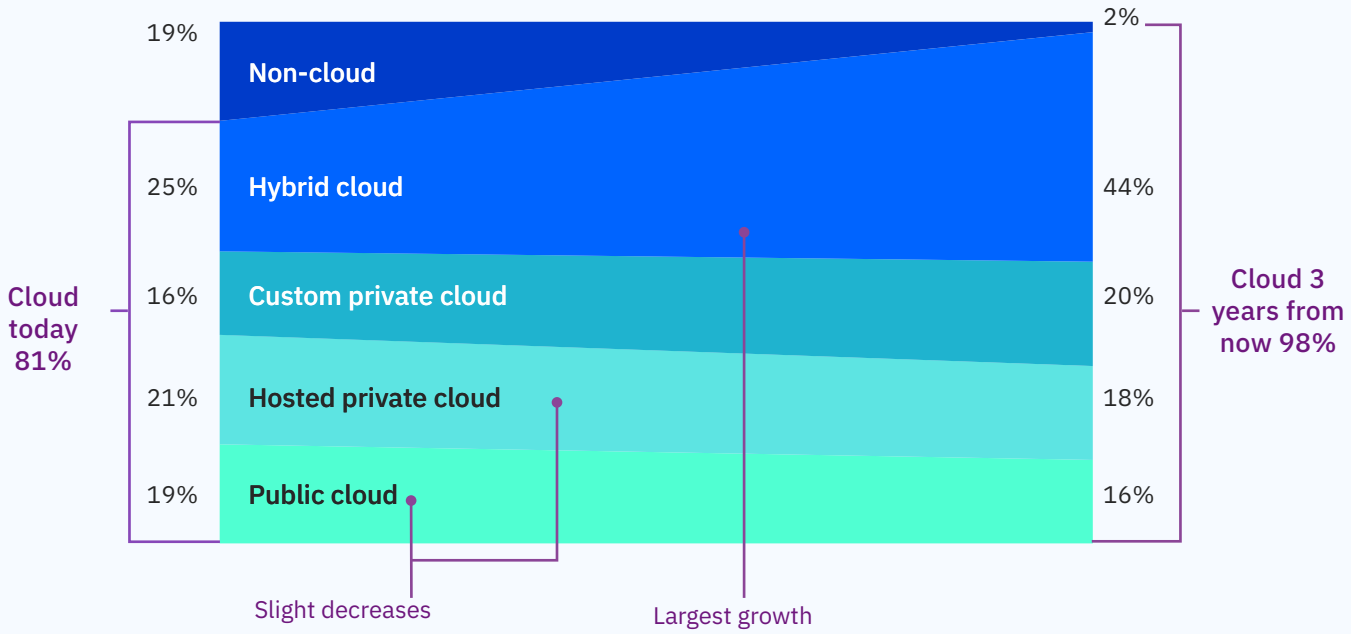
Though there is consistency across the perceived importance of solutions and capabilities driving container adoption, there is a discrepancy in their perceived availability. Of utmost importance and interest is **enterprise-grade security**. However only a quarter of respondents consider it widely available today.

Easy-to-use IDEs, integrated operational tools, solutions for preferred platform, and the ability to support containers securely across multiple cloud environments are also seen as important but not widely available. Respondents perceive DevTest and automation tools, public cloud on-premises support, the ability to design a compute environment, and commercial container solutions as widely offered. Lastly, though widely available, consulting services and industry use cases are not considered essential needs. Mainly, companies seeking to leverage Artificial Intelligence indicate the need for consulting services.

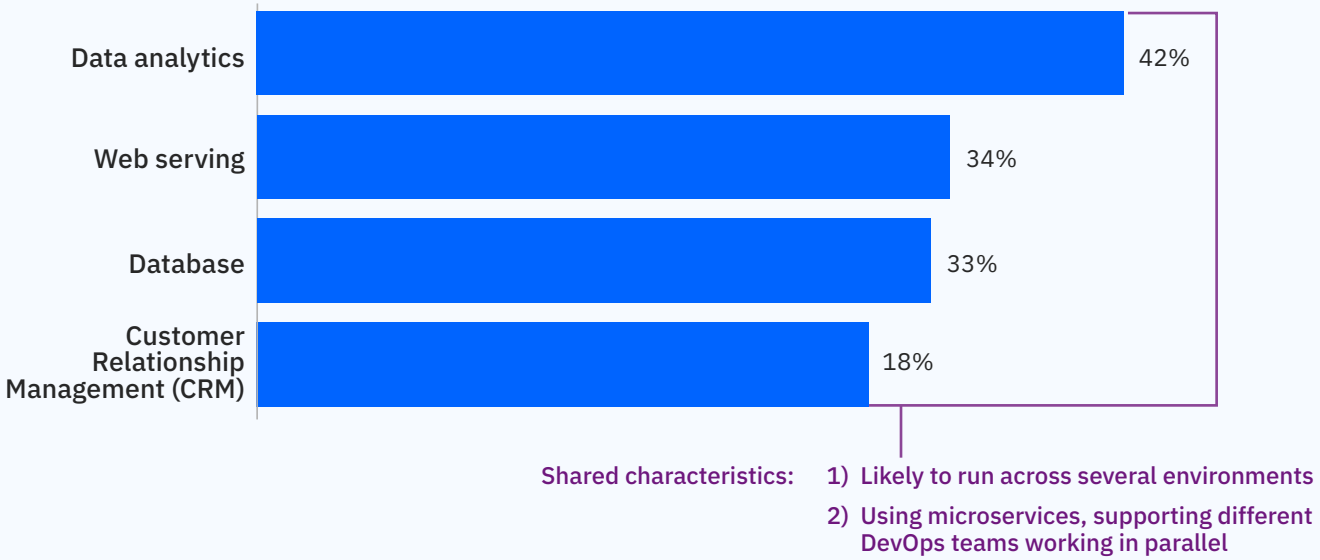
The future of container development

Already commonly deployed on cloud, essentially all containerized production apps will be on the cloud in three years. Hybrid cloud deployments will see the largest growth, while public cloud and hosted private cloud will see slight decreases.

Common environments for container development



Apps best suited for containers



The value of container development

Why choose containers?

Operational efficiencies are the most commonly associated benefits of adopting containers. However, improving response to market changes and achieving greater levels of innovation were cited as strategic benefits by at least 50 percent of respondents.

Benefits of adopting containers

59% Improved application quality and reduced defects

57% Reduced application downtime and associated costs

54% Improved employee productivity

53% Faster response to market changes

51% Greater levels of innovation

50% Lower operational costs

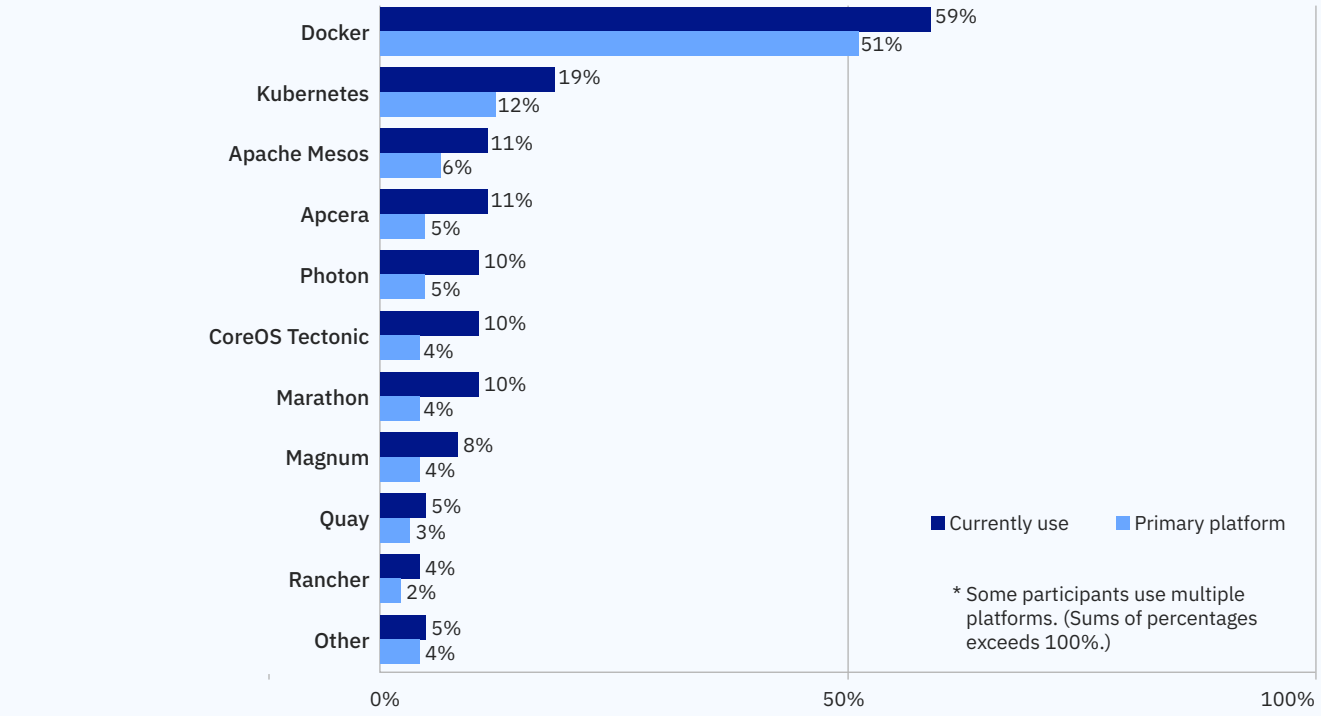
Business benefits more commonly expected by non-users than actually experienced by users:

- **Reduced app downtime and associated costs**
  - 65% non-users
  - 50% users
- **Lower costs**
  - 60% non-users
  - 40% users

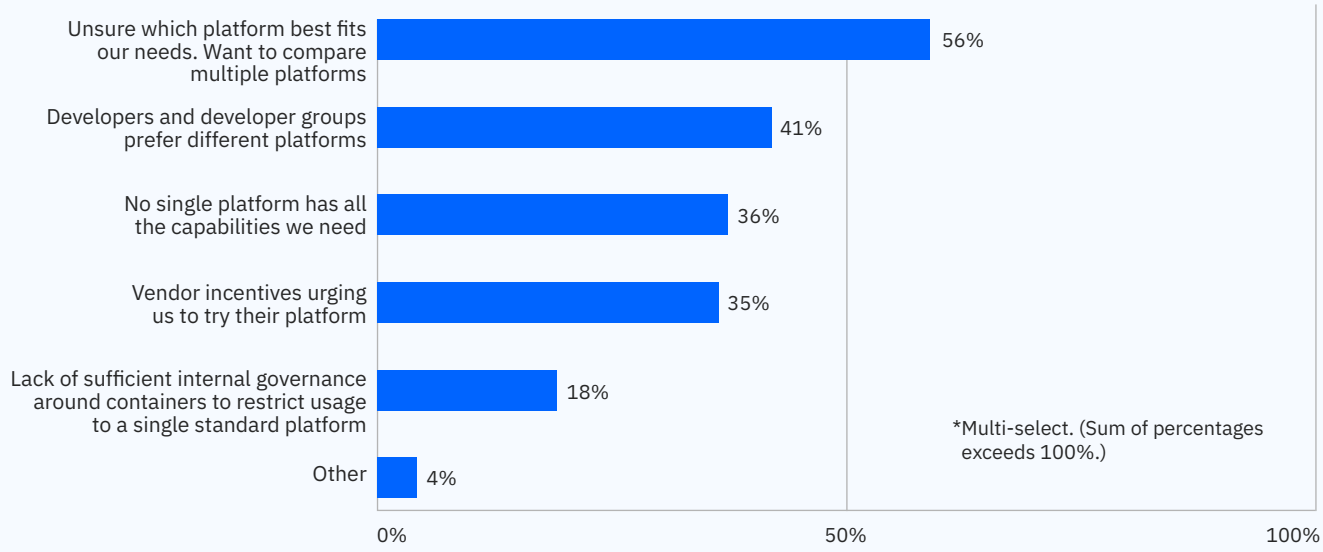
Comparing the platforms

Although Docker is the most widely used or considered software image management and orchestration platform, almost 40 percent use or would use more than one vendor because of uncertainty about which will fit best. This is due to varying developer preferences or no single platform having all the capabilities needed.

Primary platforms



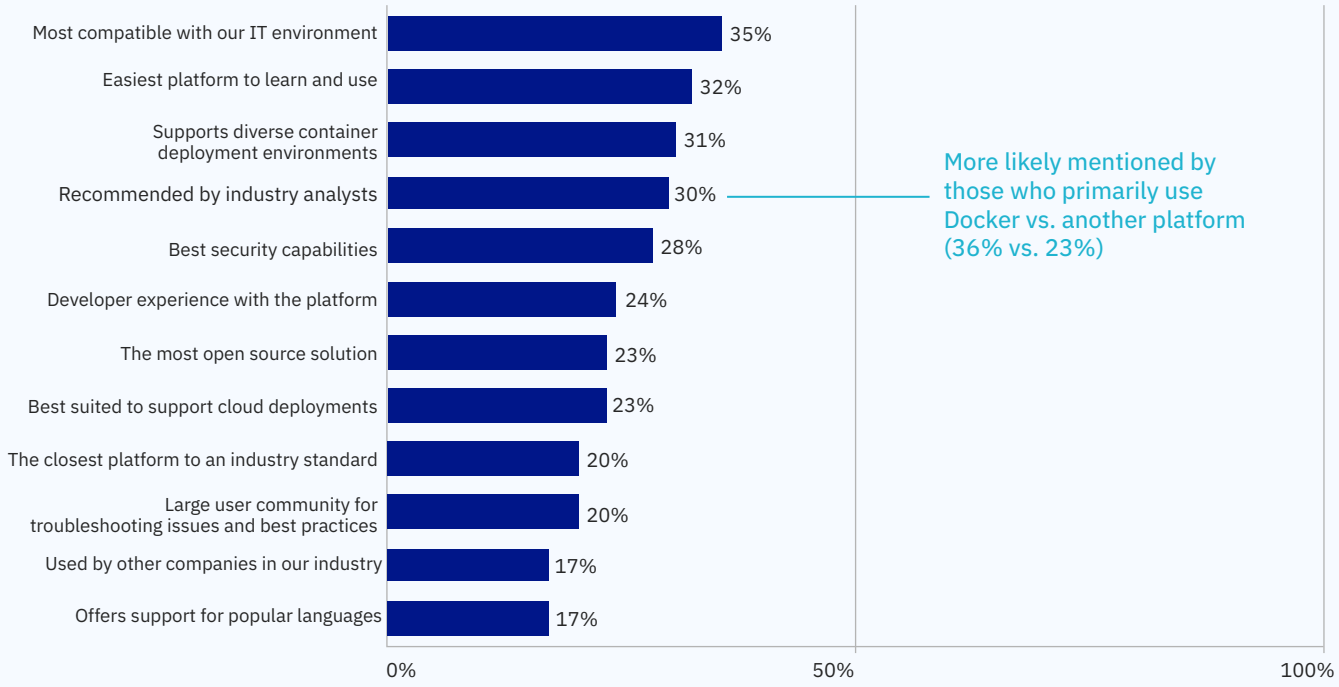
Client reasons for multi-platform usage



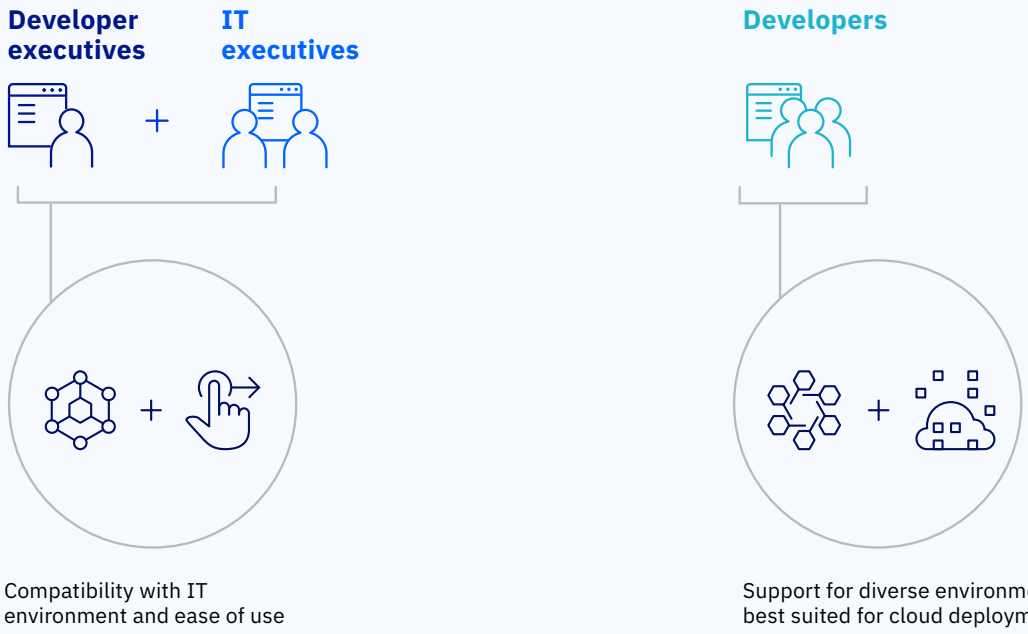
Choosing a primary platform

Compatibility and ease of use are commonly among the top three most important reasons for using a platform.

Top client reasons for using a platform



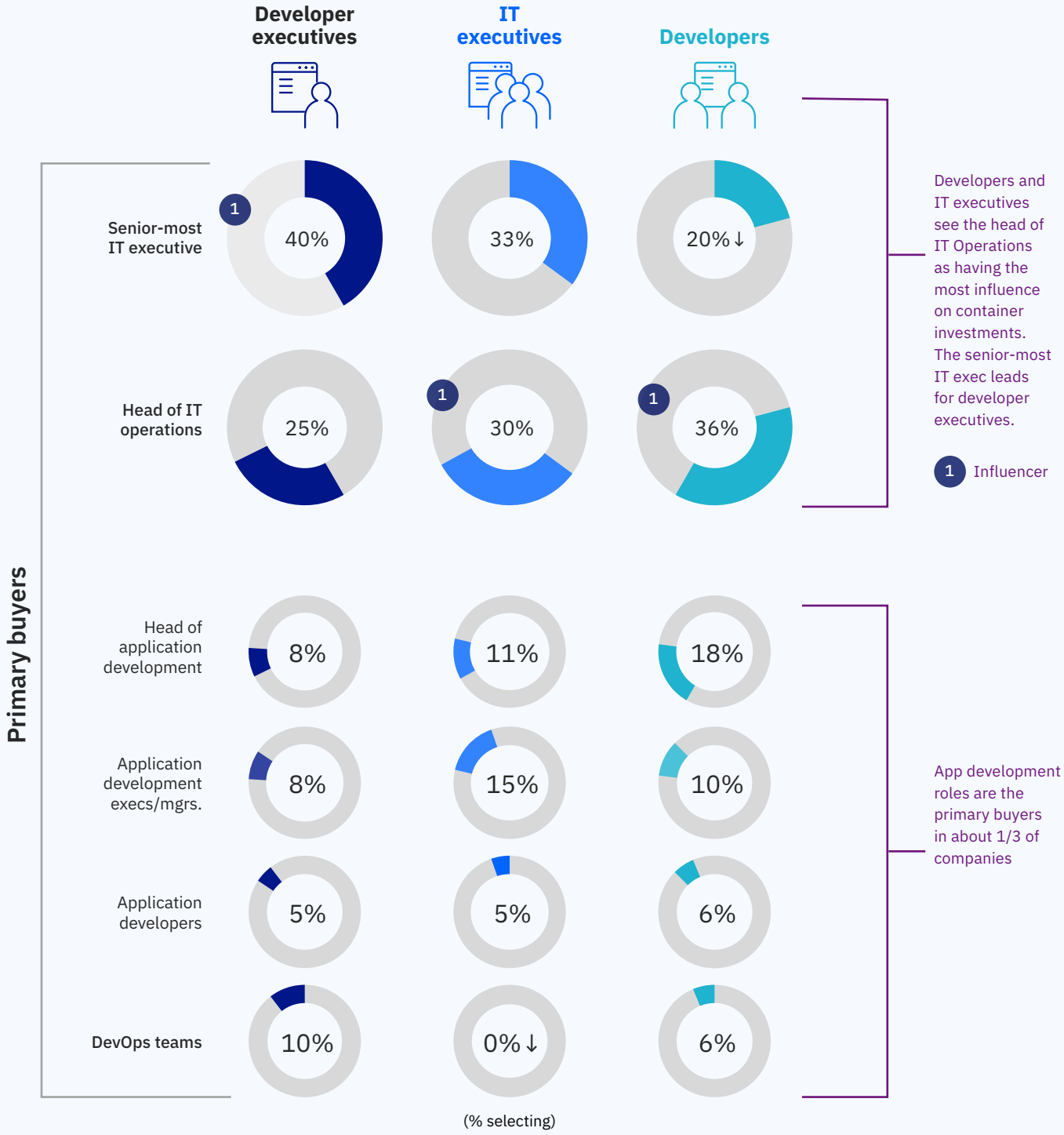
How to choose a primary platform



Investing in containers

The senior-most IT executive or head of IT Operations is the primary buyer for container-related investments in most companies; they are also commonly the leading influencers.

The investors and influencers



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About the research

This report presents findings from research conducted by IBM during a two-week online survey in August of 2017. Respondents were comprised of 206 developers, developer executives, and IT executives across 16 industries in 7 English-speaking markets (US, Canada, UK, Australia, India, Malaysia, and Singapore). Interviewees did not know the study was sponsored by IBM.

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