



# The State of API 2019





# The 2019 State of API Report is Presented by SmartBear

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We provide high-impact, easy-to-use tools for software teams to plan, build, test, and monitor great software, faster.



## Preface:

This survey was designed to establish benchmarks for the API industry regarding the methodologies, practices, and tools used by software teams to plan, design, develop, test, document, and monitor APIs in 2019. This survey is the second iteration of the SmartBear State of API Survey, which was first published in 2016. The 2019 State of API Report provides insights on how the API industry has evolved since the publishing of the 2016 report and the factors that will contribute to its growth in the years ahead. The report includes actionable advice for organizations to utilize these benchmarks to identify opportunities in their own API development processes.

## Methodology:

At SmartBear, we conducted a global online 52-question survey over the course of two months from November to December 2018 and collected a total of 3,372 responses. The primary audience for the survey were users of the open source, free, and commercial versions of the Swagger, SoapUI, and ReadyAPI tools. Responses were collected via email, in-product messages, online advertisements, social media, and community forums. The findings presented are based upon the completed responses from over 3,000 developers, architects, QA professionals, operations engineers, and product leaders from more than 16 different industries globally. A copy of this report, t-shirts, and five \$100 Amazon gift cards were offered as incentives for full participation.

## Introduction:

In 2016, SmartBear set out to compile one of the most comprehensive reports on the state of the API ecosystem in the inaugural State of API Report. At the time of publishing the report, Swagger had only recently joined the SmartBear team and the 3.0 version of the OpenAPI Specification had yet to be released by the newly formed OpenAPI Initiative. The original report focused on trends and technologies related to API development and consumption, but only went deep into one stage of the API lifecycle — API testing.

The 2019 State of API Report is the next evolution of this industry benchmark report. In this report, we have widened the scope of topics to cover different stages of the API lifecycle including API design, development, documentation, testing, and monitoring. We've also included insight into the technologies, standards, and tooling that are reshaping the API ecosystem. The insights provided in this survey were sourced from a global audience of API developers, architects, testers and product

leaders, and includes contributions from both the Swagger and SoapUI open source communities. The report includes perspectives on companies of all sizes, from early-stage startups to established enterprise organizations, and touches on a wide range of industries, including IT, Telecommunications, Healthcare, Banking, Entertainment, and more.

We have broken the report into two primary sections: **Key Takeways** — which will cover the top trends identified across the 3,000+ responses to 50+ questions, and then a deep dive of results from the survey, organized into eight categories — Tools & Technologies, Consumption, Design, Testing, Documentation, Monitoring, and Challenges & Future Growth.

Whether you're part of a small team that is just launching an API program, or a member of a team within an enterprise organization looking to develop APIs at scale, this report will provide insights to help you set a course for future success in 2019 and beyond.



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## Key Takeaways

- 1 | Three-quarters of organizations are developing both internal and public-facing APIs
- 2 | API teams want tools that are easy to use, seamless to implement, and that fit into their existing workflow without friction
- 3 | OpenAPI Specification (OAS) adoption continues to surge as more organizations adopt a “design-first” approach
- 4 | More investment in API documentation can help API providers offer a great developer experience
- 5 | Nearly all organizations currently have or plan to have an API testing strategy
- 6 | Organizations that view API monitoring as a top priority have a clear advantage when resolving API performance issues
- 7 | Microservices is expected to drive the most API adoption in the next two years
- 8 | Standardization is the #1 API technology challenge facing API teams





## Key Takeaways | In Detail

### 1. Three-quarters of organizations are developing both internal and public-facing APIs

While much of the conversation in the API world is focused on the growing marketplace of public-facing APIs, we found that only a small percentage of organizations are developing public APIs only. 76% of organizations are developing both internal and public-facing APIs, 21% are developing APIs for internal use only, and just 3% of respondents are developing public APIs only.

When we looked at the factors for why organizations are investing in API development, we found that the top three factors are to: facilitate interoperation between internal systems, tools, and teams, reduce development time, and extend functionality in a product or service. We also found that 78% of organizations both develop and consume APIs. The top three factors for consuming APIs were the same as the top reasons for developing APIs.

### 2. API teams want tools that are easy to use, can be adopted quickly, and that fit into their existing toolset

API teams are using an average of five different tools to develop high quality APIs. The top tools for API development include: API documentation tools (55%), functional testing tools (52%), CI/CD tools (51%), source control hosts (48%), and unit testing tools (47%). The number of tools that teams rely on is up from an average of 4.2 tools in the 2016 State of API Report.

The increased complexity of the API tooling ecosystem has led to a greater focus on usability and ease-of-implementation for decision makers when evaluating API tools. We found that the three most important factors when evaluating an API tool are: ease of use (73%), ease of implementation (72%), and integration with existing tools (69%). Ahead of cost or features, teams want tools that



can be easily implemented and adopted by their teams. These tools need to fit seamlessly into their existing workflows and should support the re-use of assets. Organizations can no longer afford to invest in API tools that come with a lengthy onboarding process or tools that require teams to change their processes.

### 3. OpenAPI Specification adoption continues to surge as more organizations adopt a “design-first” approach

When we published the first State of API report, it had only been a few months since the formation of the OpenAPI Initiative, the organization established after the original ‘Swagger’ Specification was donated to the Linux Foundation and renamed to the OpenAPI Specification (OAS) in 2015. At that time, only 25% of respondents reported using the OpenAPI Specification. In just three years the number of teams developing APIs with OAS has nearly tripled, with 69% of respondents developing APIs with OAS. Furthermore, 79% say they work with RESTful APIs that support OAS.

The growth in OAS-adoption seems to align with a growing movement toward a “design first” approach to API development, where development teams are starting by defining the API with a format like OAS, and using that to drive the development of the API. While 25% say they are only using a design-first approach, 22% say they are using both the design-first and code-first approach. One-third of the respondents that currently use code-first only say they are moving to a design-first approach.

### 4. More investment in API documentation can help API providers offer a great developer experience

Documentation has always been a major part of how organizations improve usability and increase adoption of their products. At the same time, organizations that prioritize documentation and provide an exceptional documentation experience have traditionally been in the minority, giving those that do make the investment a real advantage. It appears that a similar situation is emerging in the API space.

While 67% of respondents say they do have a formal API documentation in place, only 37% view documentation as a top priority for their organization. The lack of focus on documentation as a top priority could prove costly for API providers. More than half of API consumers cite ‘accurate and detailed documentation’ as one of the most important factors they consider when evaluating an API. The only factors viewed as more important for consumers were performance and usability.

API providers acknowledge that the lack of prioritization is impacting the quality of the documentation they offer API consumers. 57% of respondents that said API documentation was a top priority also said that they would rate their existing documentation as good or very good. In contrast, only 9% of respondents that do not currently have an API documentation process ranked their documentation as above average. Organizations that are looking for a competitive advantage in the API ecosystem could find a valuable opportunity in making an investment in their API documentation.





## 5. Nearly all organizations currently have, or plan to implement, an API testing strategy

APIs have played a role in every new and emerging innovation in the world of software development in the last quarter century — powering both consumer-facing applications and the internal processes that keep modern businesses running efficiently. And just as we've seen a growth in organizations testing the applications they put out into the world, we have also seen a growth in the importance of testing APIs for functionality and performance.

We found that 91% of participants in the 2019 State of API Report either have, or plan to have, a formal API testing process in place in the near future. Half of all participants said that testing is a top priority for their organization. The focus on testing as a critical step in the lifecycle of an API has fueled widespread tool adoption, with 52% of respondents leveraging functional testing tools like [SoapUI Pro](#) in their API development, and 46% leveraging load testing tools to ensure API performance.

To underline the importance of API testing, we also found that organizations that do not have necessary testing in place could face increased support inquiries or a loss in users as the result of a quality issue. 75% of API consumers say they will proactively notify an API provider when encountering an issue with API quality or performance, and one-third will consider switching to an alternative API.

## 6. Organizations that view API monitoring as a top priority are vastly outperforming those that do not at resolving performance problems

API consumers have high expectations for API providers when it comes to handling API quality and performance issues. 57% of API consumers expect API providers to resolve issues within one day, with 40% expecting the issue to be resolved within 12 hours. When we asked API providers how long it takes to resolve performance issues, 63% said they resolve performance issues within the first 24 hours.



When we looked at the organizations that had the fastest resolution times we found that there was one group that stood out — those that viewed API monitoring as a top priority. In fact, 76% of respondents that said they had a formal API monitoring process and that monitoring is a top priority resolve API performance issues within the first 24 hours and 18% resolve issues in one hour or less.

The biggest obstacles to resolving API performance issues include: determining the root cause of the issue (60%), isolating the API as being the issue (46%), and engaging the correct person(s) to fix the problem (31%).

## 7. Microservices are expected to drive the most API adoption in the next two years

Microservice architecture enables the continuous delivery and deployment of large, complex applications. It also enables an organization to evolve its technology stack, scale and be more resilient with time.

The growth in microservices is only expected to drive continued growth in API adoption. Nearly

three-quarters of respondents in the 2019 State of API Survey believe that adoption of microservice architecture will drive the biggest growth in API adoption in the next two years. This is just one example of the explosive growth in microservice adoption in recent years. In 2016, only 20% of respondents felt that microservices would drive the most adoption. Experience/skills and restraints on resources are viewed as the biggest obstacles to microservices adoption.

## 8. Standardization is the #1 API technology challenge facing API teams

As organizations scale their API programs, the need to establish standards for how APIs are developed and maintained within that organization becomes clear. This is especially true with the emergence of new software architecture formats, like microservices, where organizations can be maintaining hundreds or even thousands of different APIs within their service architecture.

When we asked respondents to share the top API technology challenge they want to see solved in the

coming years, standardization was the #1 response, with 58% of responses. The need for standardization seems to be increasing, as standardization ranked third on the list of challenges organizations wanted to see solved in the 2016 State of API Report. Two of the other technology challenges that organizations want to see solved include versioning and re-use, which can also play a role in how organizations standardize API development processes at scale.

One of the ways that organizations will enforce standardization is to implement internal style guidelines. We found that currently, one-third of organizations have defined internal API style guidelines, but another 32% plan to invest in one in the coming years. IT/Services, Finance/Banking, Healthcare, and Telecommunications were the industries with the highest adoption of internal API style guidelines.





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## Strategies for Developing High Quality APIs

In this section of the report, we will look at the factors that are driving organizations to develop APIs and the ways that teams are evaluating the success of their API programs.

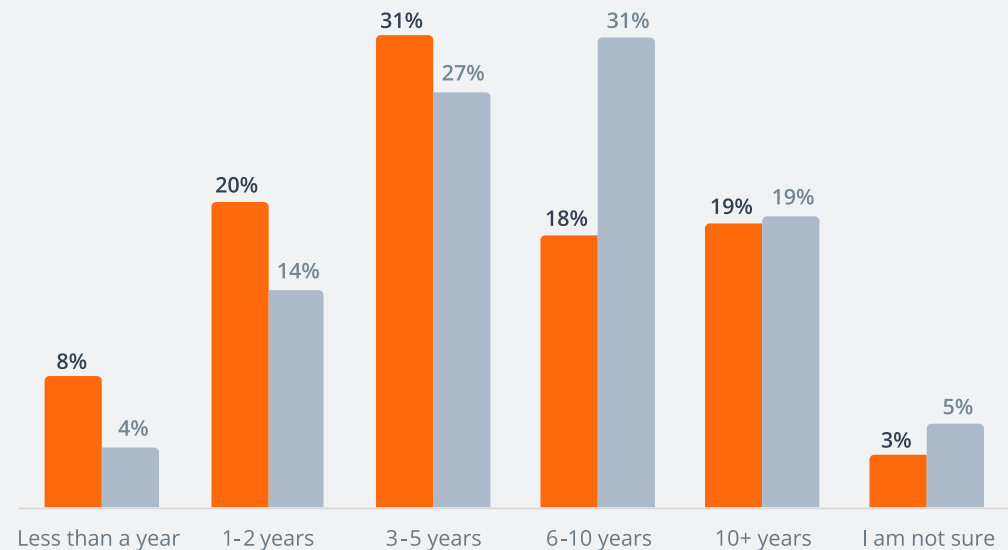
## API adoption continues to rise with two-thirds of organizations only starting to develop APIs in the last five years

While modern APIs have been used in software development for more than two decades, the last 10 years have been marked by a growth in API adoption. Our survey found that 59% of organizations began developing APIs in the last five years. Furthermore, 28% only began developing APIs in the last two years.

The 2019 State of API Report saw a higher percentage of early adopters than the 2016 State of API Report, with twice as many respondents saying that they only began developing APIs in the last year.

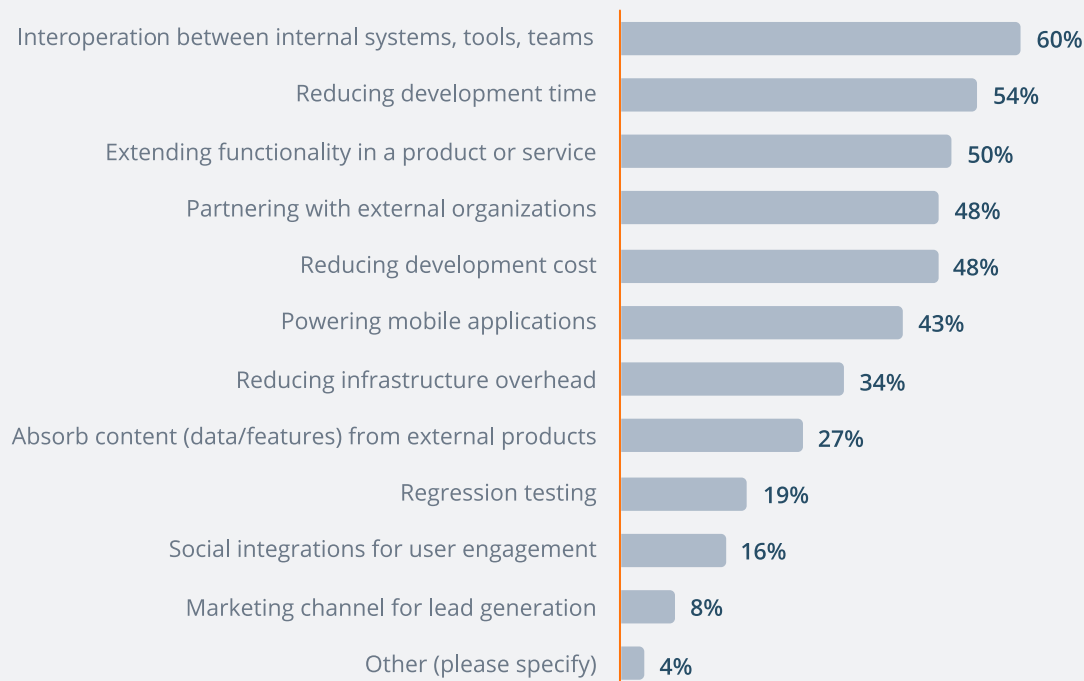
### How long has your organization been providing/developing APIs?

● 2019 ● 2016



## What are the biggest drivers in your decision to develop APIs?

*(Select all that apply)*



## While more organizations recognize the business value of APIs, the biggest drivers for developing APIs are interoperation, speed, and efficiency

The role of APIs in software development has continued to evolve as teams adopt new software development methodologies, and balance time and budget in a world where they are being asked to release updates more frequently than ever before. The primary use case for developing APIs within organizations today is to facilitate interoperation between internal systems, tools, and teams. This is also reflected in the other leading drivers for organizations to develop APIs, which include reducing development time (54%), extend functionality of a product or service (50%), and reducing development costs (48%).

APIs are also opening partnership opportunities for organizations, with 51% citing 'partnering with external organizations' as a leading driver in their decision to develop APIs.



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## “Effective API programs require three key ingredients:

- | API ownership that meets the needs of both internal and external stakeholders
- | Lightweight governance that combines coaching with consistency
- | Ease of API adoption for increased speed and efficiency”

- James Higginbotham,  
Founder, LaunchAny

[Learn More](#)



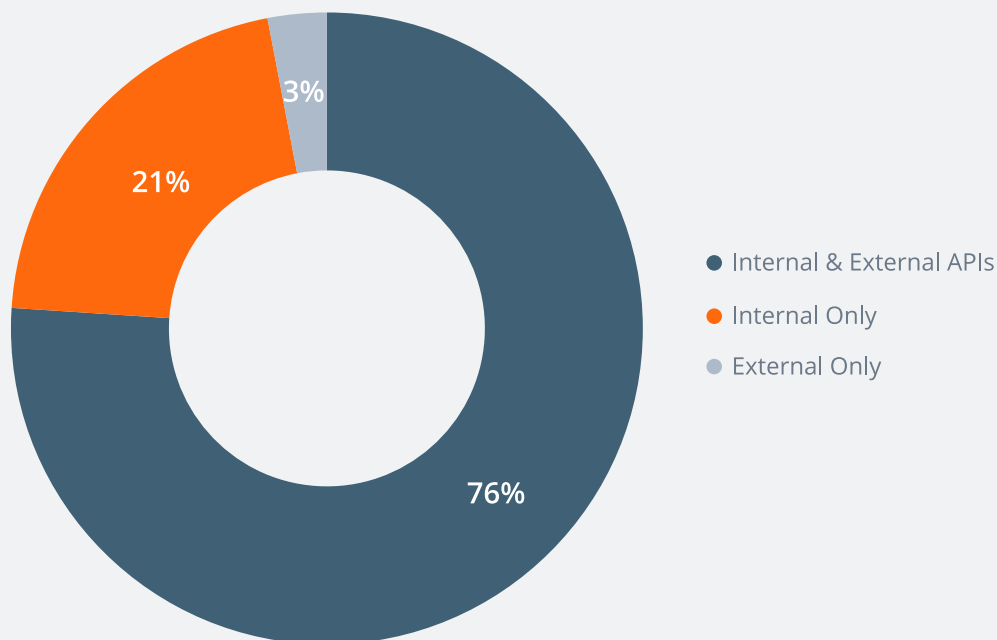
## API teams are balancing a mix of internal and external APIs

As seen with the primary drivers for organizations to develop APIs, which included both internal use cases (e.g. improve interoperation between internal

systems) and external use cases (e.g. partnering with external organizations), we are also seeing that most organizations are developing both internal and external APIs. When we look at the results to the same question in our 2016 State of API Report, we find that the number of organizations that are

developing 'Internal APIs Only' has decreased from 27% in 2016 to 21% today, while the percent of organizations that are developing both internal and external APIs has grown by 15%.

Which best describes the APIs your team develops?



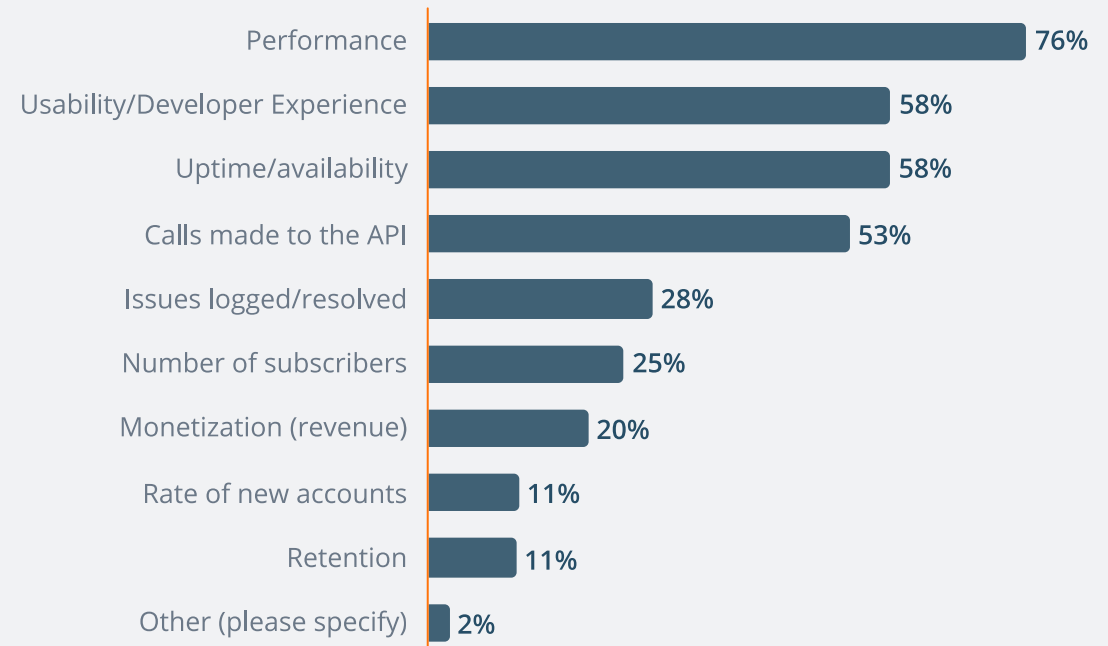
## Performance and usability are defining successful API programs

Performance is the #1 way for organizations to measure the success of their API program. 76% of respondents said that performance was the leading indicator of success for their API program. This was also reflected in the 2016 State of API Report, which found that 68% of respondents use performance as the top factor for measuring the success of their APIs.

In addition to performance, usability is also a top consideration for how organizations are measuring the success of their API program. API developer experience has become a major consideration for organizations that are starting to look at APIs as more than just technical assets. Now, just as a product team wants to provide a great user experience for the software they develop, API teams are also putting a focus on usability when developing services.

## How do you measure the success of your API?

*(Select all that apply)*





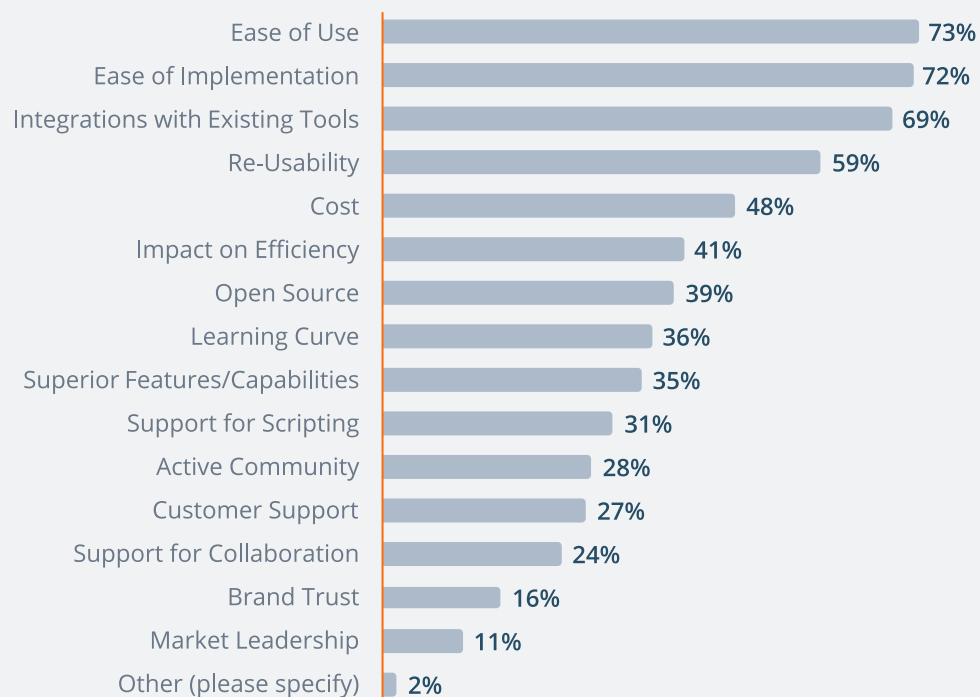
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## API Tools, Technologies, and Methodologies

This section will focus on the tools, technologies, and methodologies teams use to develop high quality APIs. See how your API tooling stack compares with the tooling ecosystem of high performing API teams.

## Which of the following factors are most important to you when evaluating API tools?

*(Select all that apply)*



## API providers want tools that are easy to use, implement, and that fit into their existing systems

Software teams depend on a wide range of tools to develop high quality APIs. When it comes to evaluating these tools, usability and implementation are primary concerns. Participants in the survey also ranked 'integrations with existing tools' and 're-usability' as primary factors for what they are looking for in API tools.

Organizations can no longer afford to invest in API tools that come with a lengthy onboarding process or tools that require teams to change their processes. Ahead of cost or features, teams want tools that can be easily implemented and adopted by their teams.

As the innovator behind the industry's highest impact tools to build, test, and monitor great software, SmartBear is committed to providing easy-to-use tools to help you get any API job done.

[Learn More](#)



## API providers are using an average of 5 different tools to develop high-quality APIs

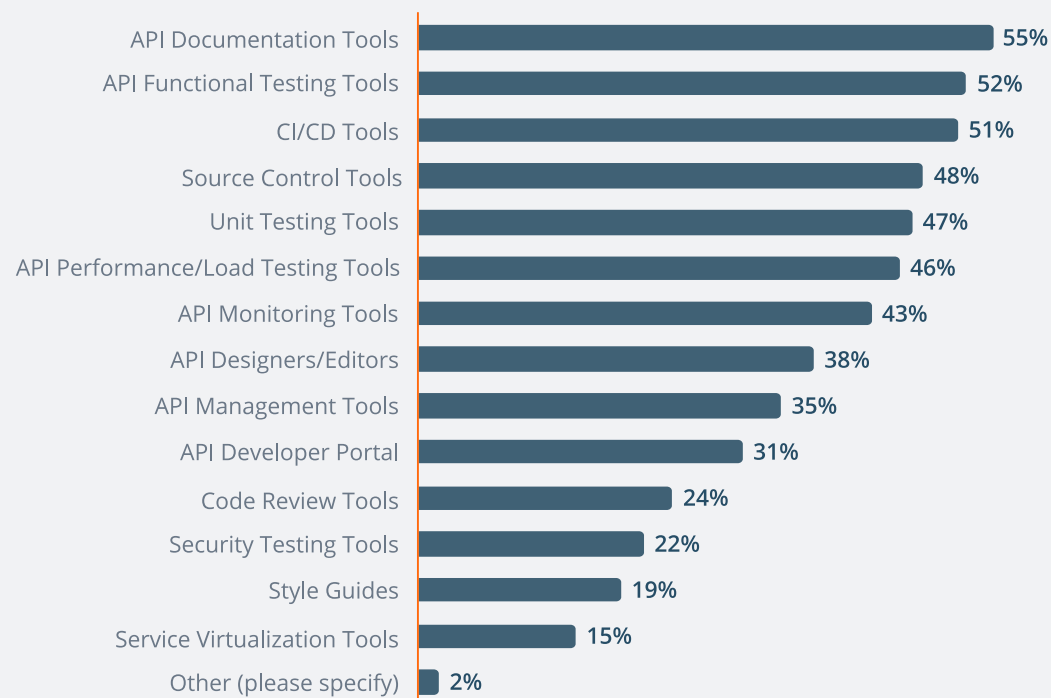
API teams are leveraging a wide range of tools to develop high quality APIs. On average, API teams use 5 different tools in their API development efforts. The number of tools teams rely on is up from an average of 4.2 tools in 2016.

The tools teams use to develop quality APIs touch on all different stages of the API lifecycle, from the earliest stages of planning and design, to the post- deployment stages when the API is publicly available for consumption. One area where tool adoption has seen the most growth is in API documentation, which was the most commonly utilized tool according to the 2019 State of API Survey. API documentation tools were the #6 response in the 2016 State of API Report.

API testing continues to be a priority for teams, with 52% of respondents leveraging functional testing tools and 46% leveraging load testing tools to ensure API performance.

## What tools do you use to develop high quality APIs?

*(Select all that apply)*



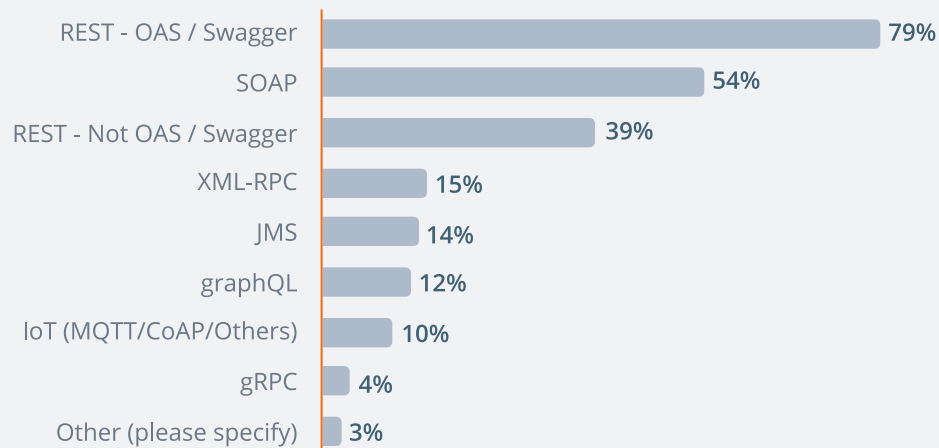
## The OpenAPI Specification (OAS) is defining the use of REST

The OpenAPI Specification (formerly known as Swagger) has emerged as the leading API format with 79% of respondents saying that their APIs

support OpenAPI/Swagger. 39% of respondents also said that they are using REST APIs that are not defined with OAS. Despite the continued movement to RESTful web services, SOAP continues to play a major role in the existing APIs of software teams, with 54% of respondents saying that their APIs sup-

port SOAP. GraphQL, the query language originally developed by the team at Facebook, has been a major topic of discussion in the API space in recent years due to its growth in adoption and is actively used by 12.5% of respondents.

### Which of the following API / Web Services formats do you use? *(Select all that apply)*



“In recent years we saw OpenAPI Initiative emerge as a standardizing body to create an API spec format for the industry. We’re also seeing a similar Linux Foundation group emerge around GraphQL. Whether we’re talking API design style (REST, GraphQL, gRPC), or security (OAuth, OpenID Connect, etc), changes in standards matter most when they affect the end developer experience.”

- Bill Doerrfeld  
Editor in Chief, Nordic APIs



## Mobile and web continue to dominate the API space

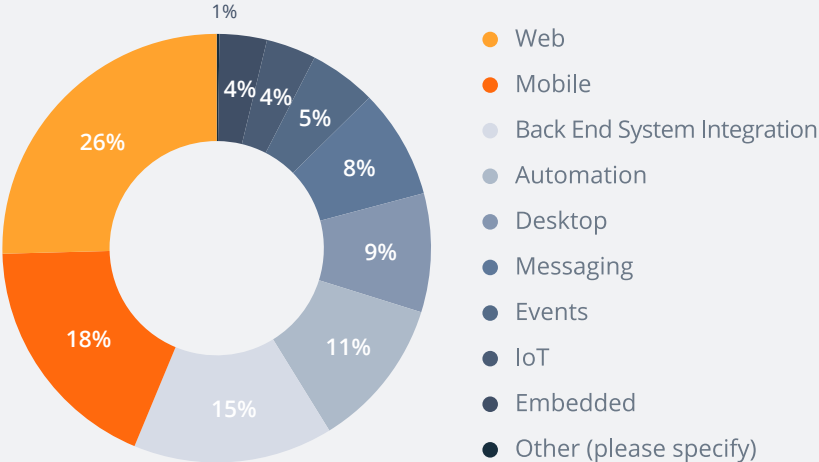
Web and Mobile are the top experiences supported by APIs according to our survey. Back end system integration is also supported by 54% of respondents – another example of how teams are leveraging APIs to connect internal data layers, extend the functionality of their existing APIs, and reduce development costs.

## Agile, DevOps, and CI/CD are the prominent software development approaches for API teams

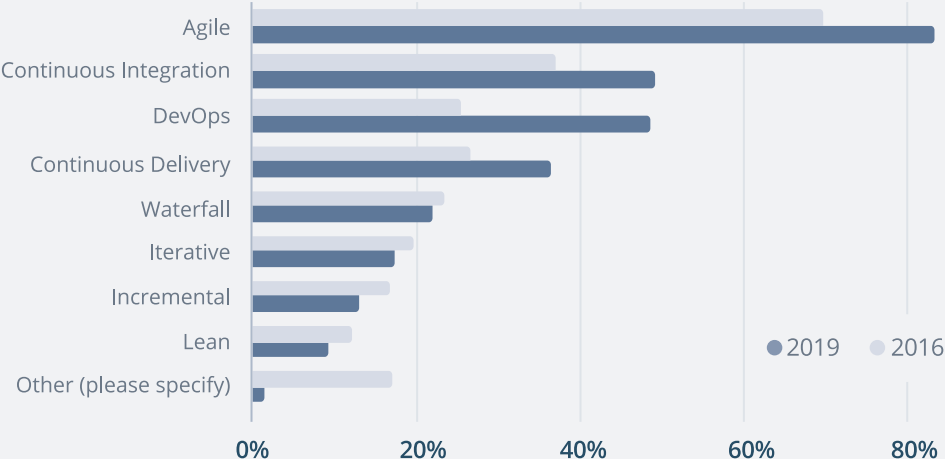
Agile is the prominent software delivery method for organizations today, with 83% of respondents saying that their organization employs Agile in their API development. The most notable change from the

2016 State of API Report was the widespread shift to DevOps. The percentage of respondents adopting DevOps in their organization almost doubled in the last three years. Continuous Integration and Continuous Delivery (CI/CD) also saw sizeable growth, and reiterates the importance of flexible, integration focused tooling.

### Which experiences do your APIs support? *(Select all that apply)*



### Which software delivery methods does your organization employ?



## Jenkins in the dominant leader in the CI/CD space

CI/CD tools were ranked #3 as the most commonly used tools to develop high quality APIs. Jenkins is the overwhelming leader in the CI/CD space, with 60% of respondents using Jenkins as their CI/CD tool of choice.

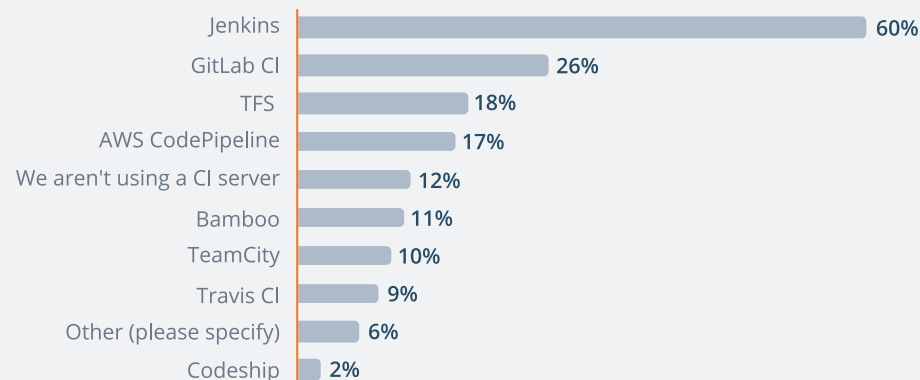
## Amazon, Microsoft, and Google top the list of API management vendors

The API management space has seen a surge of investment from software tool providers in recent years, with some of the most well-known software companies in the world — including Amazon, Microsoft, Google (acquired Apigee in 2016), Oracle (acquired Apiary in 2017), IBM, and Salesforce (acquired Mulesoft in 2018), all staking out a piece of the API management market.

Our survey found that AWS API Gateway from Amazon is the most popular API management tool (28%), followed by Microsoft Azure (23%), and Apigee (12%).

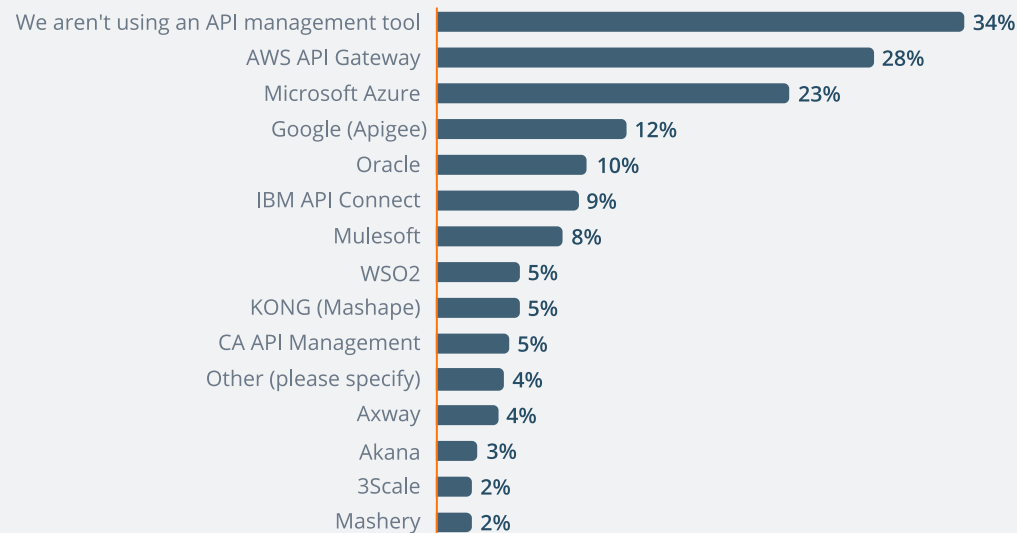
## Do you use any of the following CI servers?

*(Select all that apply)*



## Do you use any of the following API management platforms?

*(Select all that apply)*





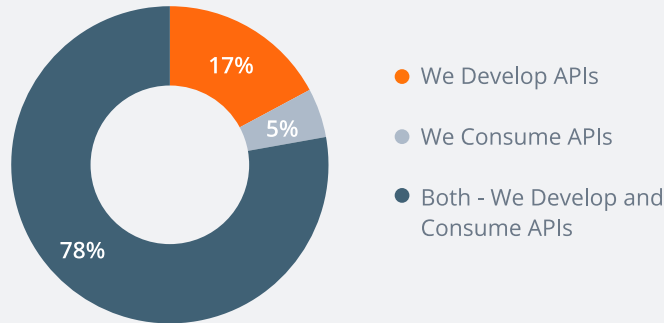
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## API Consumption

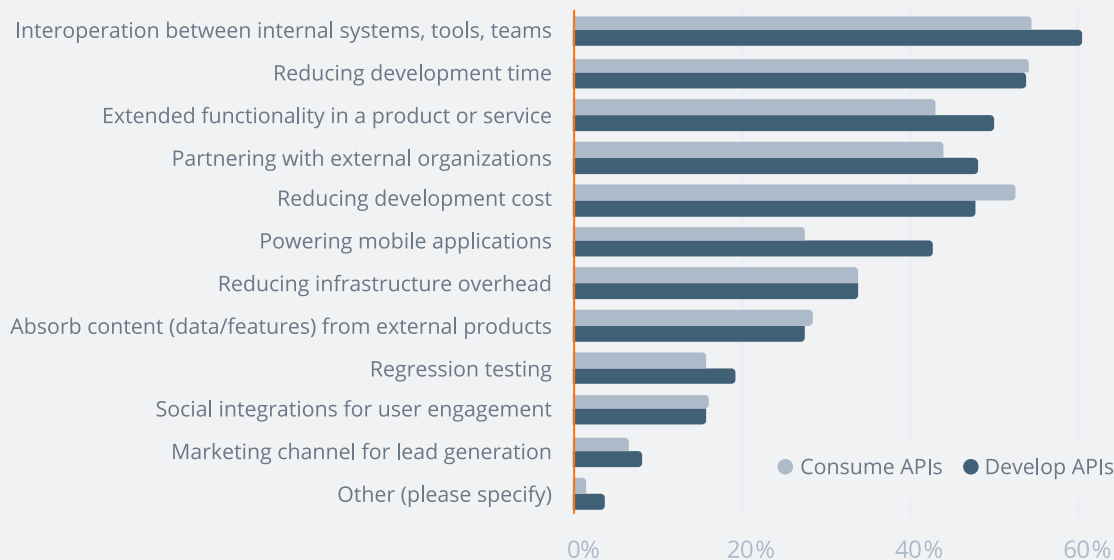
This section shifts the focus from taking the perspective of API providers, and looks to better understand the needs and expectations of API consumers. As we highlight in this section, there is a great deal of overlap between teams that develop and consume APIs.

## Which best describes how you work with APIs today?

(Select all that apply)



## What are the biggest drivers in your decision to develop/consume APIs? (Select all that apply)



## Three-quarters of organizations both consume and develop APIs

More than three-quarters of participants in the 2019 State of API Report both develop and consume APIs. This means that quality and performance are not only important considerations for APIs that are being developed by software teams, but is also critical for the APIs that are being consumed by applications and internal systems.

## The drivers of API consumption reflect the top reasons for developing APIs

There are noticeable parallels between the reasons organizations develop APIs and the reasons why they consume APIs. While there is some variation in order, all of the top factors for consuming APIs also ranked in the top reasons for developing APIs.

One of the most notable differences from 2016 is that 'reducing development cost' has become a more prominent factor for API consumers, with 53% of respondents saying that they consume APIs to reduce cost, up from 36% in 2016.



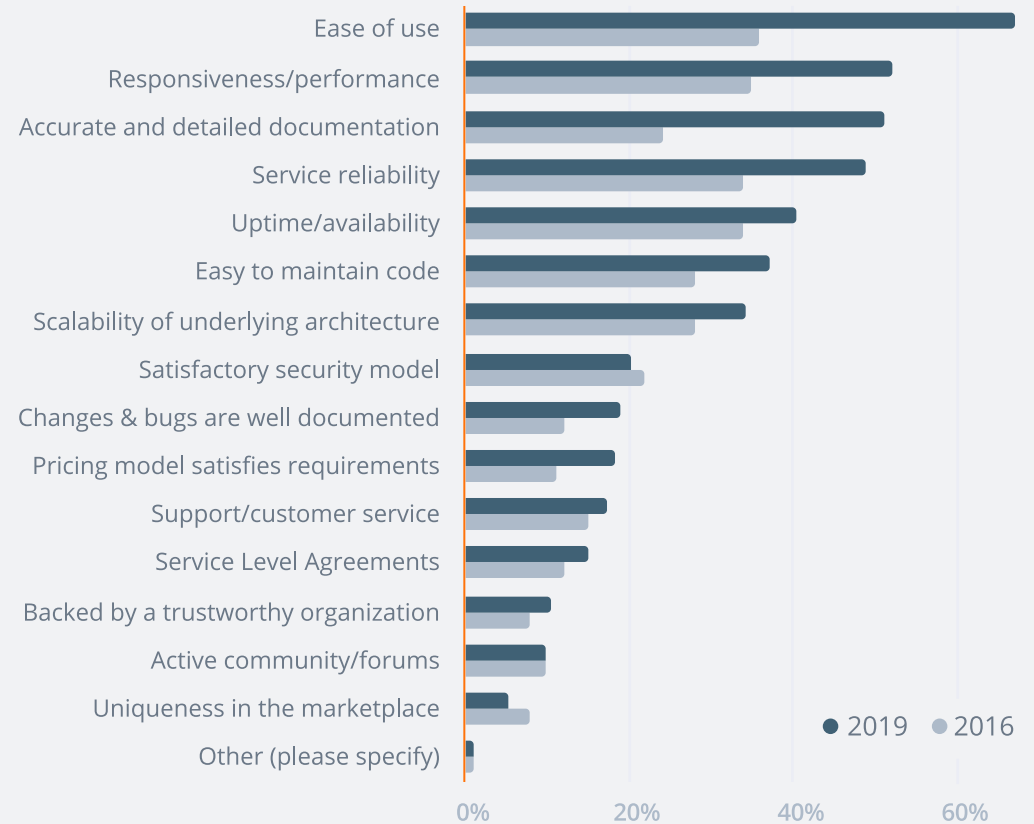


## API documentation is a top consideration for API consumers evaluating APIs

Ease of use, performance, and the availability of detailed documentation were the top three factors API consumers look at when evaluating APIs for adoption.

One of the biggest areas of change from the 2016 State of API Report was the importance of 'accurate and detailed documentation'. In 2016, documentation did not make the top five most important characteristics for API consumers, with less than 25% of participants selecting documentation as an important factor impacting their decision to adopt an API.

## In your opinion, what are the top three most important characteristics you need in an API? *(Select all that apply)*





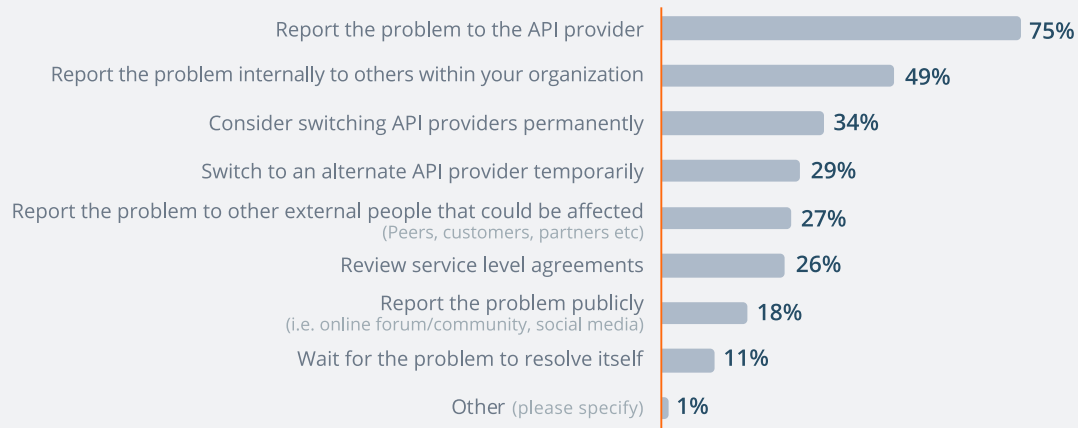
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“The developer portal is where the handshake between developers and API provider really occurs. Increasing the self-service capacity of such developer centers with better usability is key to enabling API providers to stay competitive, especially in spaces with growing competition, like geolocation, IoT, and messaging. To do this, providers should adopt clean, human-readable documentation that is expandable and easily searchable. Sandboxes for immediate testing are now an expectation, as well as a speedy on-boarding time, and SDKs & libraries for specific programming languages.”

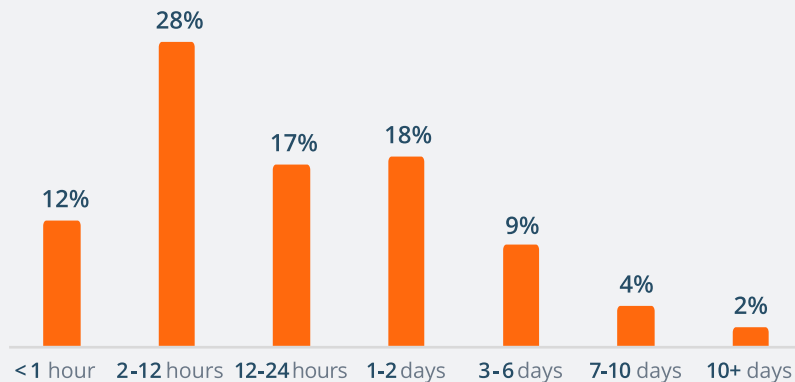
-Bill Doerrfeld,  
Editor in Chief, Nordic APIs



## How do you react upon encountering quality or performance issues with 3<sup>rd</sup> party APIs? *(Select all that apply)*



## What would you say is the average amount of time it should take API providers to resolve an API quality issue?



## API issues could lead to a surge in support cases and loss of users for API providers

A majority of API consumers are proactive in reporting API performance issues, and one-third of API consumers will consider permanently switching API providers when a quality or performance issue takes place.

This highlights the importance of being able to resolve quality issues before they impact end users. In addition to considering permanently switching providers, nearly one-third will switch to an alternative API for at least a temporary basis.

## More than half of API consumers expect API quality issues to be resolved within 24 hours

Organizations are under immense pressure to deliver on quality expectations of their customers. 57% of API consumers expect API providers to resolve quality issues within 24 hours, with 40% expecting the issue to be resolved within 2-12 hours. These expectations from consumers highlight the pressure organizations are under to not only provide high quality APIs, but also the need to have processes in place to identify and resolve quality issues in a timely manner.



## Communication is key when it comes to handling API quality issues

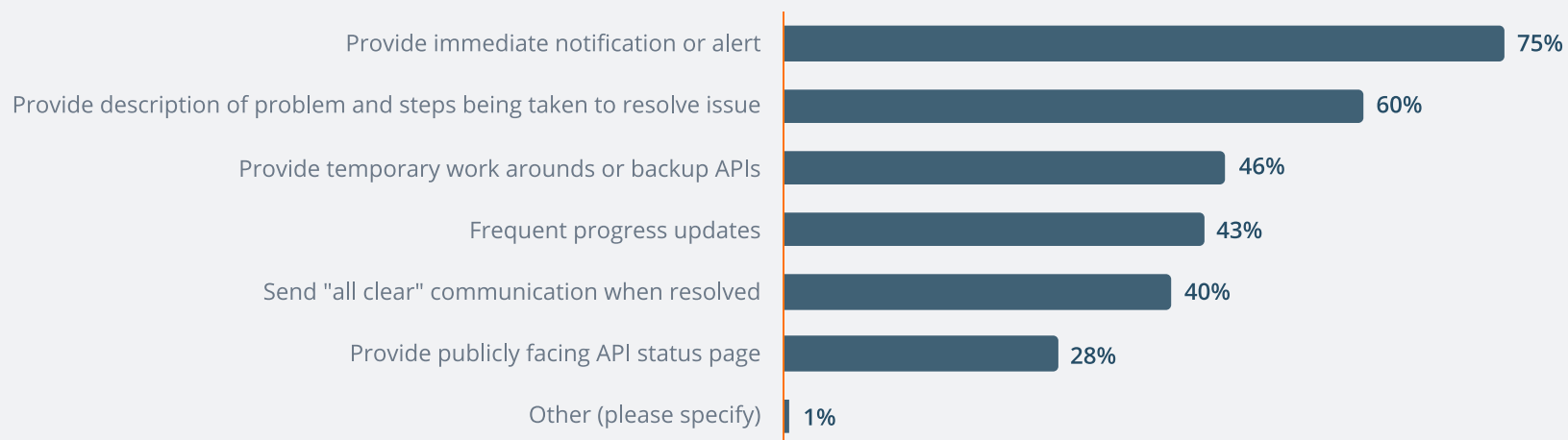
The number one thing API consumers expect from an API provider when a performance issue occurs is to

provide an immediate notification or alert. Two-thirds of participants said they also want to receive a description of the problem and an explanation of the steps being taken to resolve the issue.

Communication is key when it comes to handling

API issues. In addition to notifying users about the issue, API providers should have a strategy in place to keep users up-to-date on the work that's being done to resolve the problem and a direct notification when the problem is fixed.

### What are the most important actions you expect from your provider when an API issue occurs?





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## API Testing and Quality

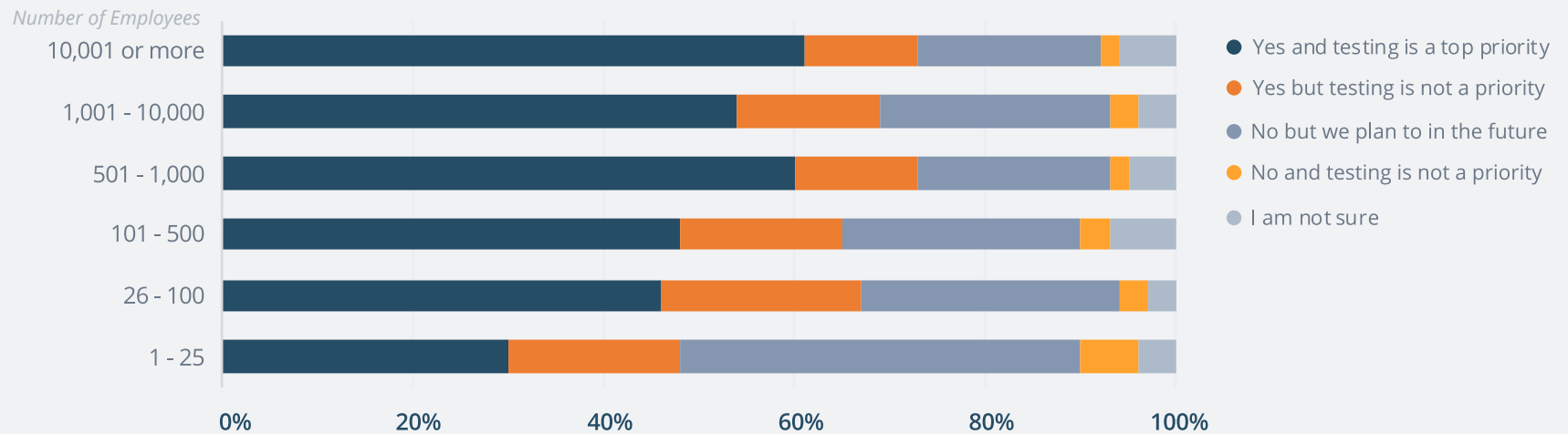
This section takes a deep dive on a critical phase in the API development lifecycle – API testing. We will cover the popularity of different testing methods and the roadblocks teams face when delivering high quality APIs.

## Nearly all organizations recognize the importance of API testing, but only half say it is a top priority

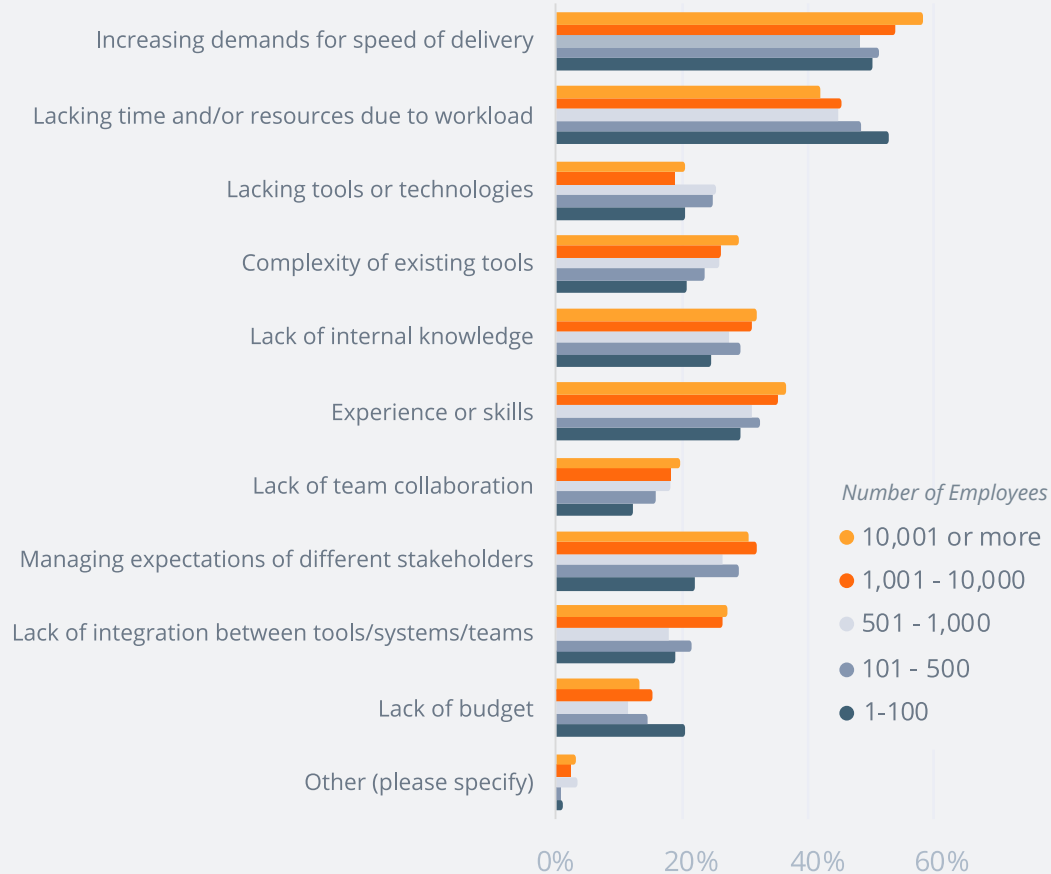
91% of participants in the 2019 State of API Report said that they either currently have, or plan to have a formal API testing process in place in the near future. 49% of participants said that testing is a top priority for their organization.

Organizations with 500 or more employees are 41% more likely to say that having a formal testing process is a top priority than organizations with less than 500 employees.

### Does your organization have a formal API testing process? *(Select all that apply)*



## What are your biggest obstacles to ensuring API quality in your organization? *(Select all that apply)*



## Speed of delivery and lacking time or resources are the biggest obstacles to delivering quality APIs

While a majority of organizations have an API testing process in place, they still face challenges to ensuring API quality in their organization. Increasing demands for speed of delivery and lacking time and/or resources due to workload are the two biggest obstacles teams face for ensuring API quality. These top challenges were consistent across companies of all sizes — from companies with less than 100 employees to enterprise organizations with 10,000+ employees, speed and time are the biggest obstacles to API quality.

Knowledge and experience also stood out as obstacles, particularly in organizations with 10,000+ employees.



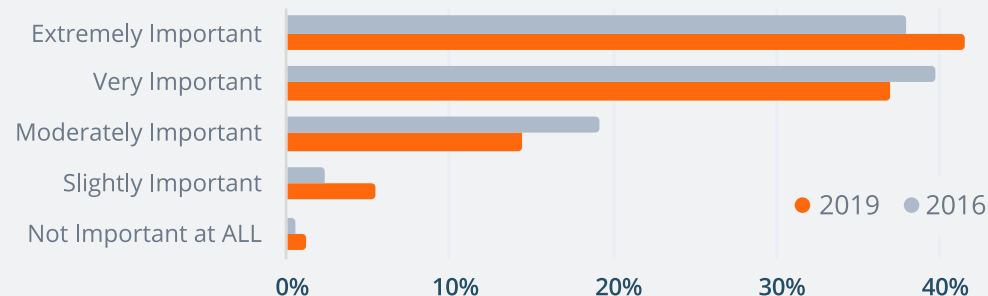
## API quality is viewed as very or extremely important to over three-quarters of organizations

Organizations across industries agree that API quality is a top priority. Those that doubt the importance of developing quality APIs are in the extreme minority. This year's results represented a 3% increase in organizations that responded that API quality is extremely important to their organization.

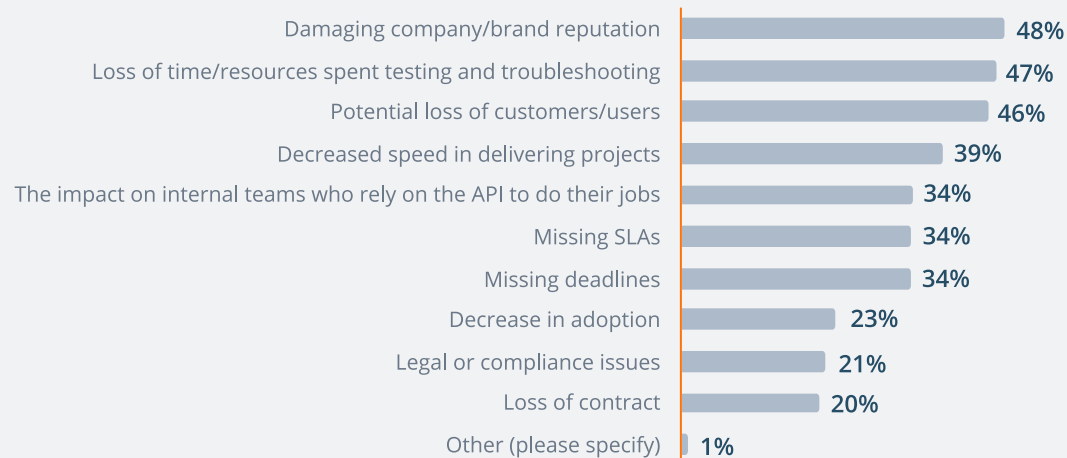
## API providers view negative brand reputation, loss of time, and loss of customers as biggest risks of poor API quality

Damaging company reputation is the biggest concern organizations have around poor API quality today. This reflects a growing trend in the API industry of thinking of APIs as key components of their product portfolio. Respondents also ranked 'Potential loss of customers/users' as the third biggest risk of poor API quality.

## How important to do you think quality is to your organization?



## What would you consider to be the greatest potential risks of poor quality APIs to your organization? (Select no more than three)

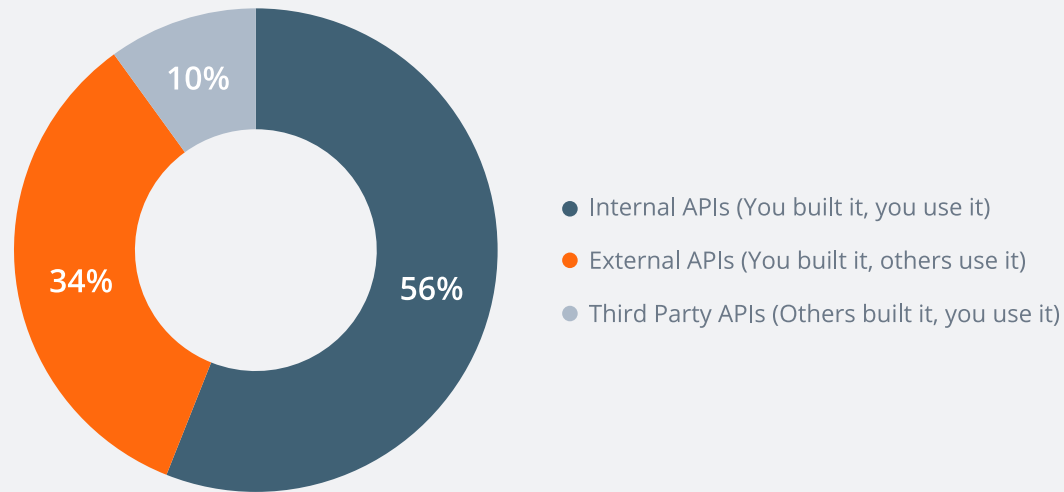




## The majority of API testing is focused on internal APIs

While three-quarters of respondents are developing both internal and external-facing APIs, when it comes to testing, the majority of time is spent testing internal APIs. 10% of respondents are testing APIs from third-party providers.

### Which type of API do you test against most frequently?



## Ensure Quality Throughout the Lifecycle of Your APIs

SmartBear is the industry leader in API testing, with a focus on dynamic data-driven functional tests. Learn how to put your testing strategy into action with SmartBear tools.

[Learn More](#)



A background image showing a group of people in a meeting or office setting, with a blue overlay. The image is slightly blurred and has a dark blue tint. The people are looking towards the left side of the frame, suggesting they are focused on a screen or a speaker.

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## API Monitoring and Performance

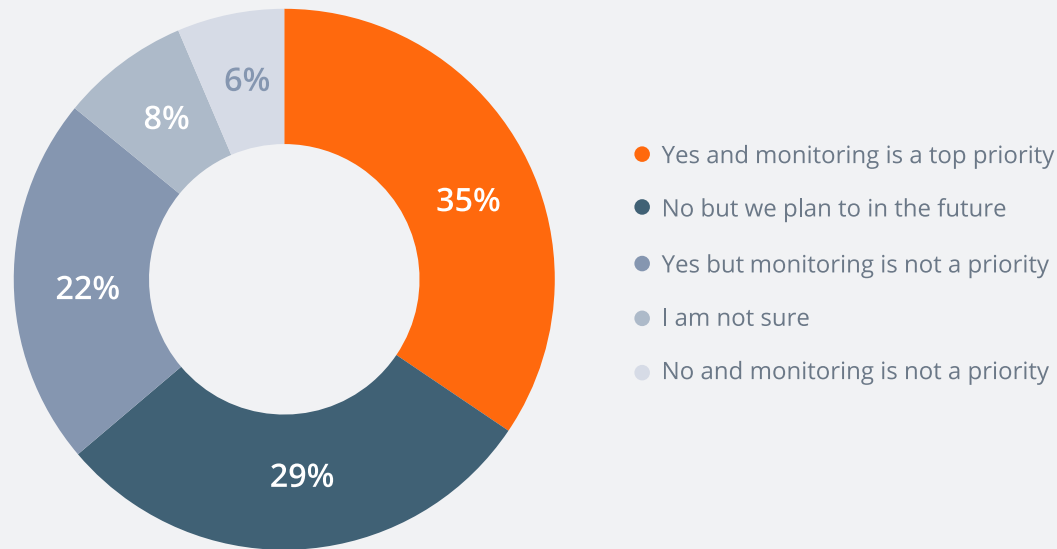
This section takes a detailed look at one of the most important characteristics of a quality API – API performance. See the average time it takes API providers to resolve performance issues, and the obstacles that can slow operations teams down.

**86% of organizations either have or plan to have a formal API monitoring process, but only one-third say monitoring is a top priority**

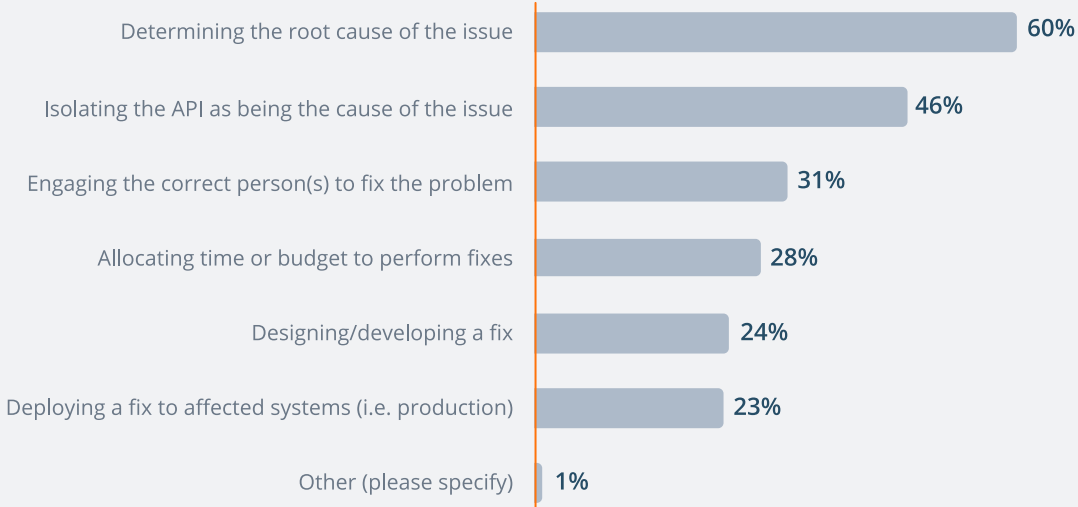
As discussed, performance is a top concern for organizations when it comes to measuring the success of their API programs and determining where to invest resources. One of the best ways to ensure high performance for your APIs is to actively monitor

them for things like availability, performance, and functional correctness. According to the 2019 State of API Survey, 86% of organizations either have or plan to have a formal API monitoring strategy. 34% say that monitoring is a top priority for their organization.

Does your organization have a formal API monitoring process?



### Which of the following do you think are the biggest obstacles to solving API issues? *(Select no more than two)*



### Determining the root cause is the biggest obstacle to resolving API performance issues

Determining the root cause is the number one obstacle teams face when solving API performance issues. This was also the top obstacle identified by respondents in the 2016 State of API Report.

Another major obstacle is isolating the API as being the cause of the issue. This is another example of how implementing an API monitoring process can help negate performance issues, as proactive monitoring can help you isolate issues faster and quickly implement a fix.

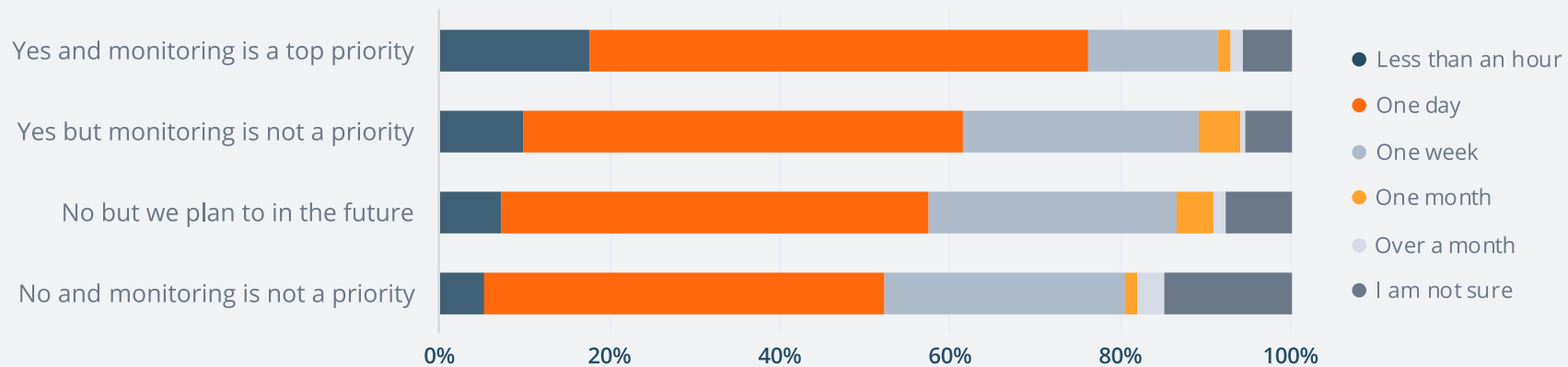
## Organizations that view API monitoring as a top priority are twice as likely to resolve performance issues within an hour

On average, 63% of API performance issues are resolved within the first 24 hours. Knowing that

'Identifying the root cause' is a top obstacle teams face when it comes to resolving API performance issues, we looked at how teams that have a formal API monitoring process compare to those that do not. Organizations that both have a formal process and say that monitoring is a top priority greatly outperformed respondents that either did not have a

formal process or said that monitoring was not a priority. 78% of respondents that said API monitoring was a top priority resolve API performance issues within 24 hours, and 18% are resolved within the first hour. Only 52% of respondents that say monitoring is not a priority report that API issues are resolved within 24 hours.

### How long does it take to resolve API issues, on average?



## API providers risk losing customers if they are not prepared to handle API performance problems

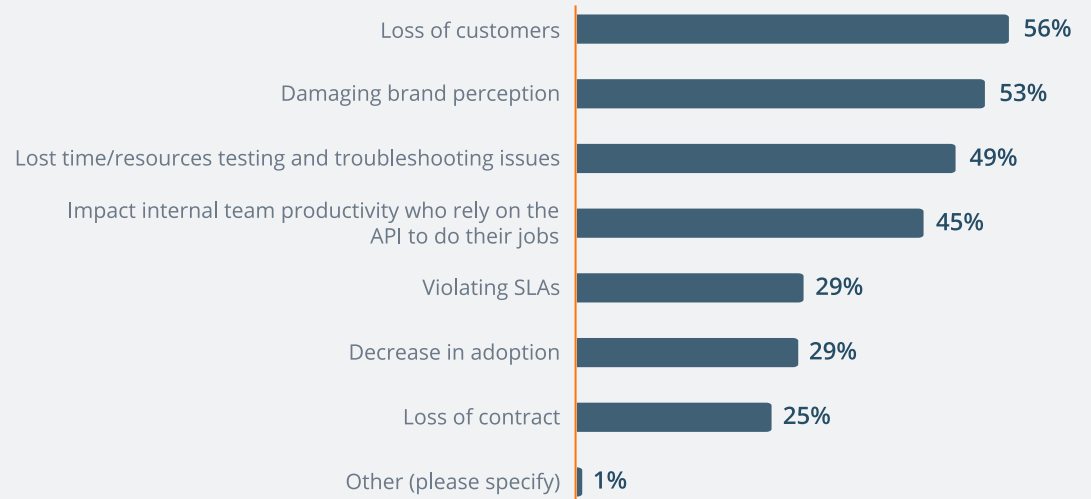
Similar to the risks identified of poor API quality, respondents viewed loss of customers and damaging brand perception as major concerns around poor API performance. Another important consequence of poor API performance is the impact on productivity for teams that rely on the API to do their job.

### Catch API Performance Issues Before They Impact API Consumers

As you strive to deliver world class web, mobile and SaaS applications, make sure the APIs that power them are running smoothly. AlertSite from SmartBear makes it easier than ever to monitor your private, partner, or public APIs - REST or SOAP - effortlessly.

[Learn More](#)

## In your opinion, what is the biggest risk of poor API performance? *(Select all that apply)*



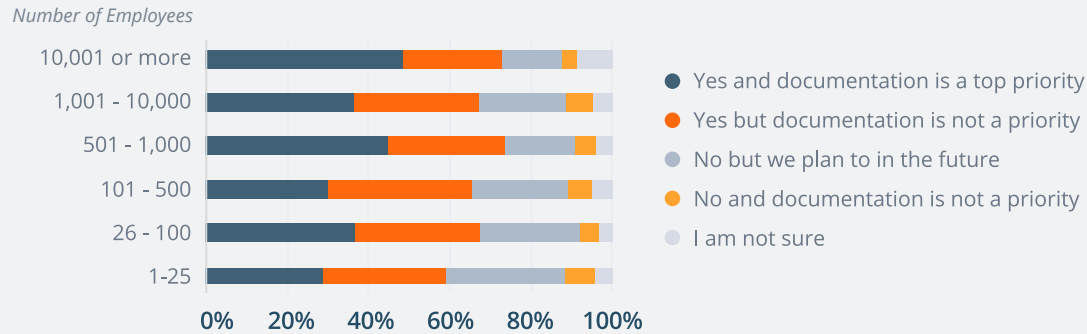
A person is working at a desk with a laptop, keyboard, and sticky notes. The person is holding a pen and pointing at the laptop screen. The background is a dark blue gradient with a faint geometric pattern.

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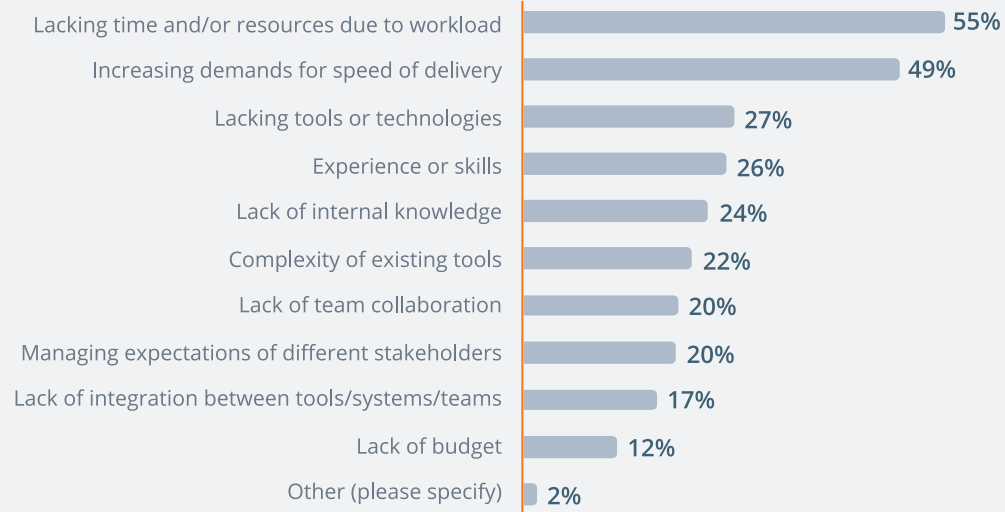
## API Documentation and Usability

In this section, we will take a closer look at the state of API documentation processes. We will also cover how respondents rate the documentation their organizations provide today and where you should focus your efforts if you want to improve your API documentation.

## Does your organization have a formal API documentation process?



## What are your biggest obstacles to providing up-to-date API documentation? *(Select all that apply)*



## Two-thirds of organizations have a formal API documentation process

While 67% of respondents said they do have formal API documentation in place, only 37% view documentation as a top priority for their organization. Larger organizations are more likely to view API documentation as a top priority, with 43% of respondents from companies with 500+ employees saying that documentation is a priority, compared to 32% of respondents from companies with less than 500 employees.

## Lack of resources, time, and tooling support are the biggest obstacles to implementing a successful API documentation process

In a continuation in what we've seen in tasks from different stages of the API lifecycle, lacking time and resources and increasing speed of delivery were the top obstacles organizations face when implementing API documentation. A lack of tooling support was also a major concern related to API documentation.



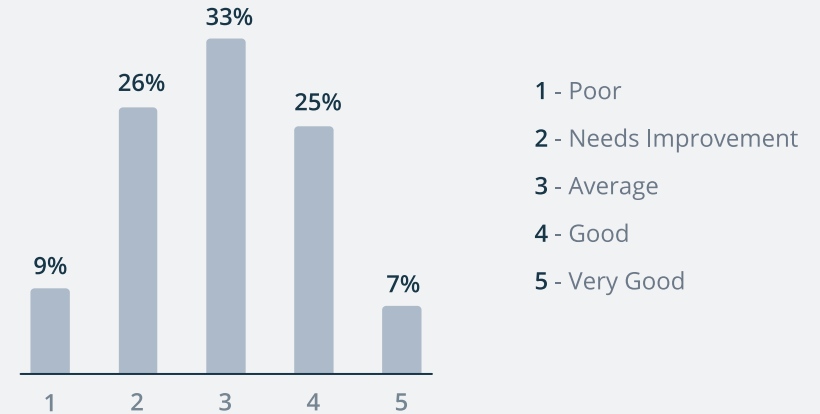


## Only 35% of API providers feel that their organization's API documentation is above average

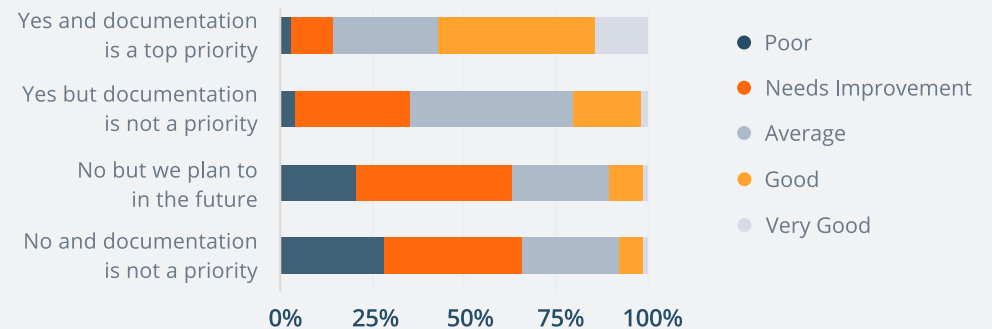
While API documentation is one of the most important factors for API consumers evaluating new APIs, most API providers do not feel that they are providing above average API documentation. Only 32% of respondents said that the documentation they provide is good or very good. 35% described the documentation that they offer as either poor or needs improvement.

A potential factor for why so many respondents felt that their API documentation was average or in need of improvement is due to the lack of investment in a formal API documentation process. 57% of respondents that said API documentation was a top priority also said that they would rate their existing documentation as good or very good. In contrast, only 9% of respondents that do not currently have an API documentation process ranked their documentation as above average.

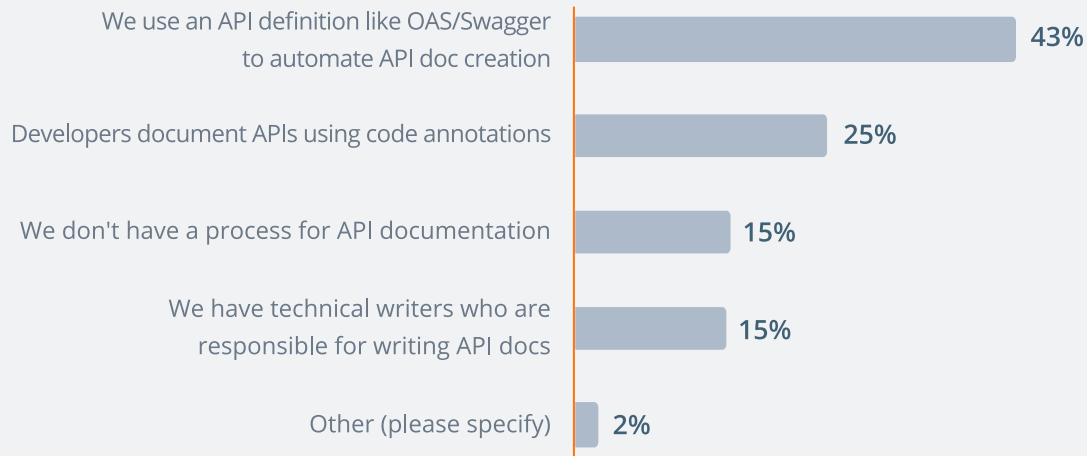
## How would you rate the documentation your organization provides today?



## Comparison: How a formal documentation process impacts perception of API documentation.



## Which best describes how your team handles API documentation?



## Generating API documentation with OAS is the top method for documenting APIs

Automation is playing a major role in how organizations document their APIs. 43% of respondents said they leverage an API standard, like the OpenAPI Specification, to generate API docs. One quarter of respondents are using a “code-first” approach, where developers are responsible for adding annotations to the API code to generate docs.

Only 15% of participants are investing in technical writers to help with documenting APIs.

## Automate Your API Documentation Workflow with OAS

Automatically generate API documentation that’s securely hosted and fully interactive in SwaggerHub.

[Learn More](#)

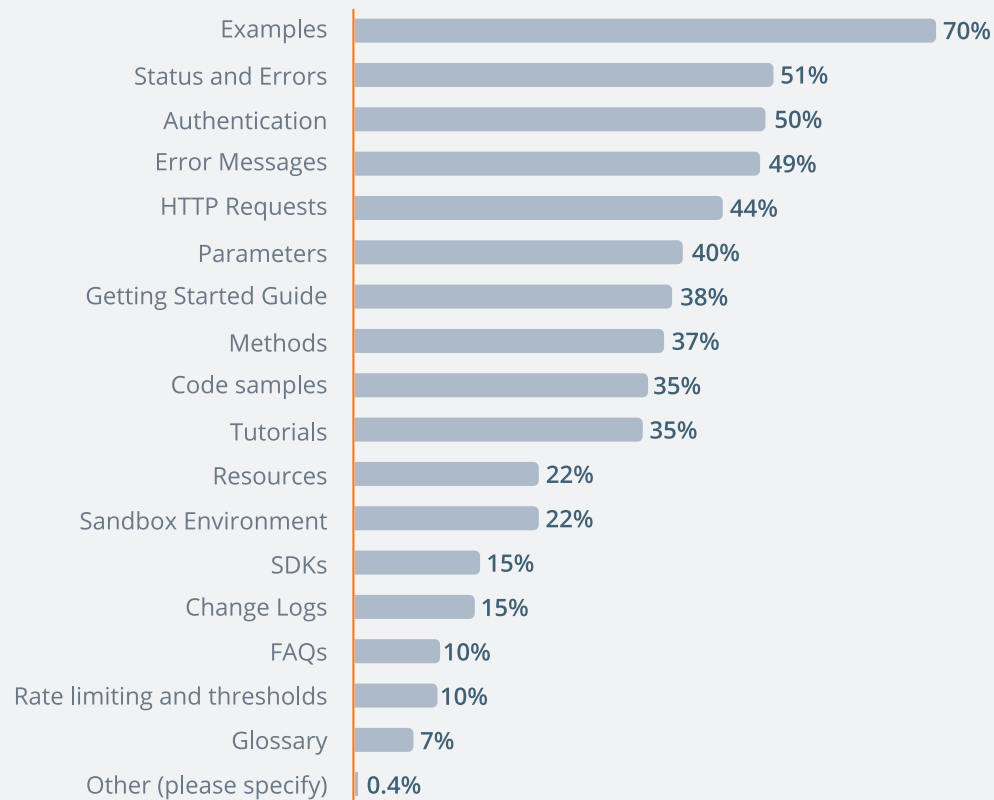


## Examples are the most important thing API developers look for in API documentation

We've established that a majority of participants in the 2019 State of API Survey felt that their existing API documentation had room for improvement. Here we learned which areas would be most beneficial to invest in improving.

Examples were identified as the most important thing developers look for in API documentation.

Please select the top 5 most important things you look for in API documentation.



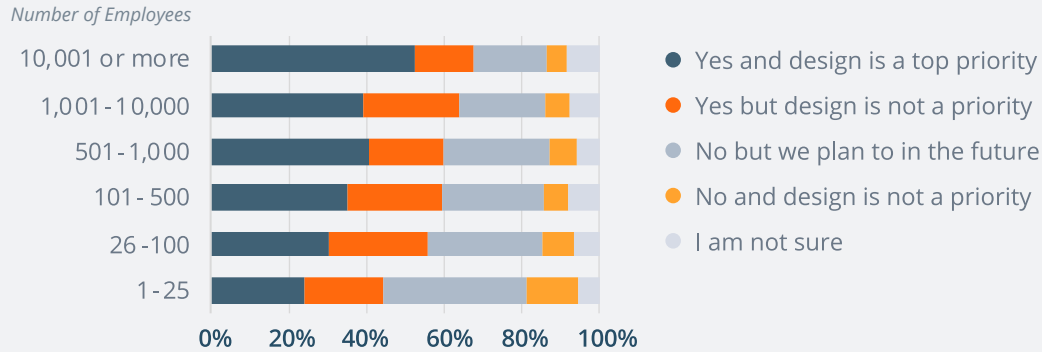


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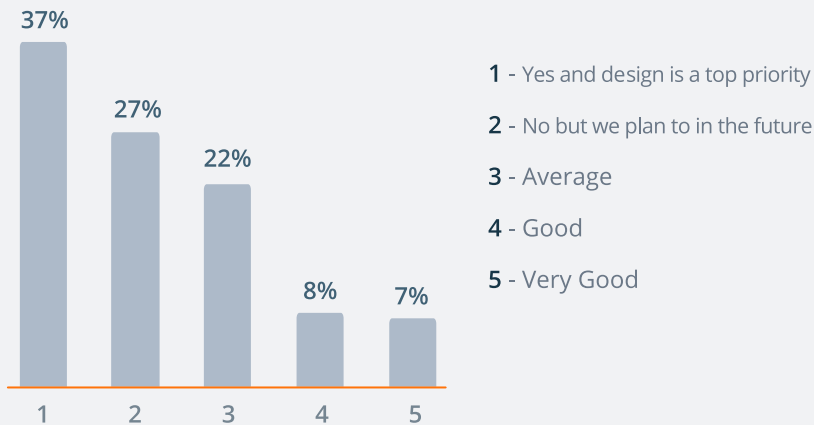
## API Design and Standards

In this section, we will share insights related to API design and how organizations view design as part of their API development process. We will also look at how organizations are scaling their API design workflow and standardizing how APIs are designed across teams.

## Does your organization have a formal API design process?



## Does your organization have a formal API design process?



**The majority of API teams have a formal API design process and more than half of enterprise organizations say design is a top priority**

85% of organizations either have or plan to have an API design process. 37% of respondents said that API design is a top priority for their organization. Focus on API design as a top priority increases in larger organizations. On average, only 34% of organizations with less than 10,000 employees say that API design is a priority, compared to 54% for organizations with 10,000 or more employees.



## The OpenAPI Specification is the de facto standard for API design

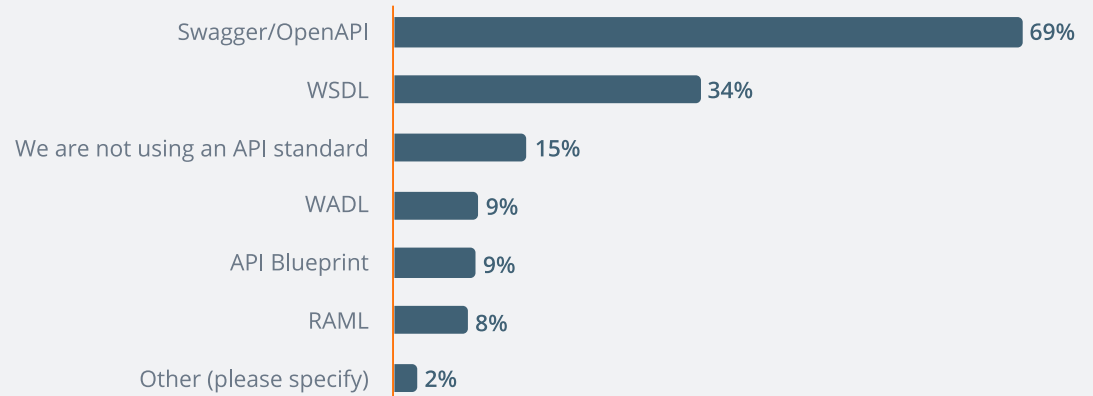
69% of respondents are using the OpenAPI Specification (OAS) in their API development. OAS was the clear favorite standard for RESTful APIs, with other REST-based standards — API Blueprint and RAML — only accounting for 16% of respondents. OAS was only used by 25% of respondents in the 2016 State of API Survey. The explosive growth in OAS adoption can likely be credited to the release of OAS 3.0 in 2017, which was the first official release of the OpenAPI Specification since being donated to the OpenAPI Initiative in 2015, as well as the expansion in tooling support for OAS. It's clear that the industry is rallying around open standards over propriety standards.

## There is no standard method for communicating API changes within teams

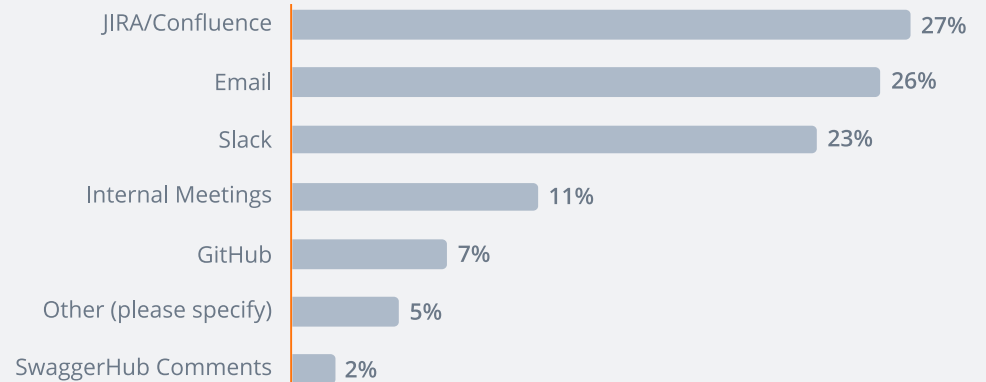
Communicating feedback is one area where there is not a clear preferred channel across the participants in the 2019 State of API Survey. At a time where there are more communication channels than ever before, we are seeing a clear mix in preference between internal systems like JIRA, traditional channels like email, and messaging tools like Slack.

## Do you use any common standard for defining APIs?

*(Select all that apply)*



## What is the main way changes and feedback are communicated to other team members?



“

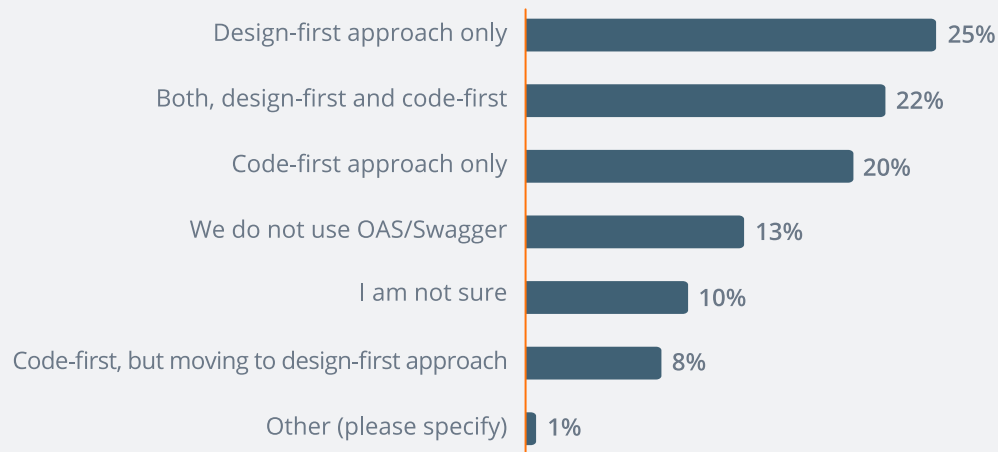
“Growing from 25% to 69% of developers building APIs with the OpenAPI Specification is just astounding, and it highlights the incredible work of OpenAPI community members. It speaks to the importance of having an industry standard for describing and defining APIs in a formal way, as well as to all the tooling benefits that come with that.”

-Marsh Gardiner

Google Cloud Product Manager and  
OpenAPI Initiative Marketing Chair



## What best describes how you work with OAS today?



## Almost half of API teams have adopted a design-first approach to OAS

When it comes to API standards like OAS, two approaches have emerged—a design-first (or definition-driven) approach, which advocates for writing the API definition before developing the API, or the code-first approach which involves using code annotations or another third-party tool for generating an OAS definition in build or run time. While 25% say they are only using a design-first approach, 22% say they are using both a design-first and code-first approach. 20% are code-first only. It appears that design-first is emerging as the preferred approach as 9% of those respondents that are using a code-first approach say they are moving to a design-first approach.





## One-third of organizations have an internal API style guide; IT, Finance/Banking, and Healthcare companies see the highest adoption

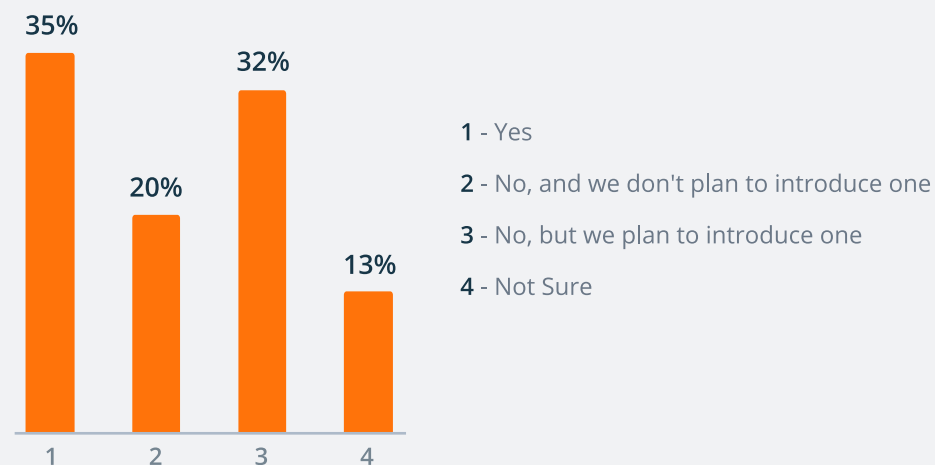
The emergence of the API economy has led to growth in API style guidelines, which are often published for public view to help external stakeholders understand how API providers are governing their own internal design process. While only one-third of respondents say they currently have an internal style guide, 32% say their organization plans to introduce one. IT/Services, Finance/Banking, Healthcare, and Telecommunications are the industries with the highest adoption of internal API style guidelines.

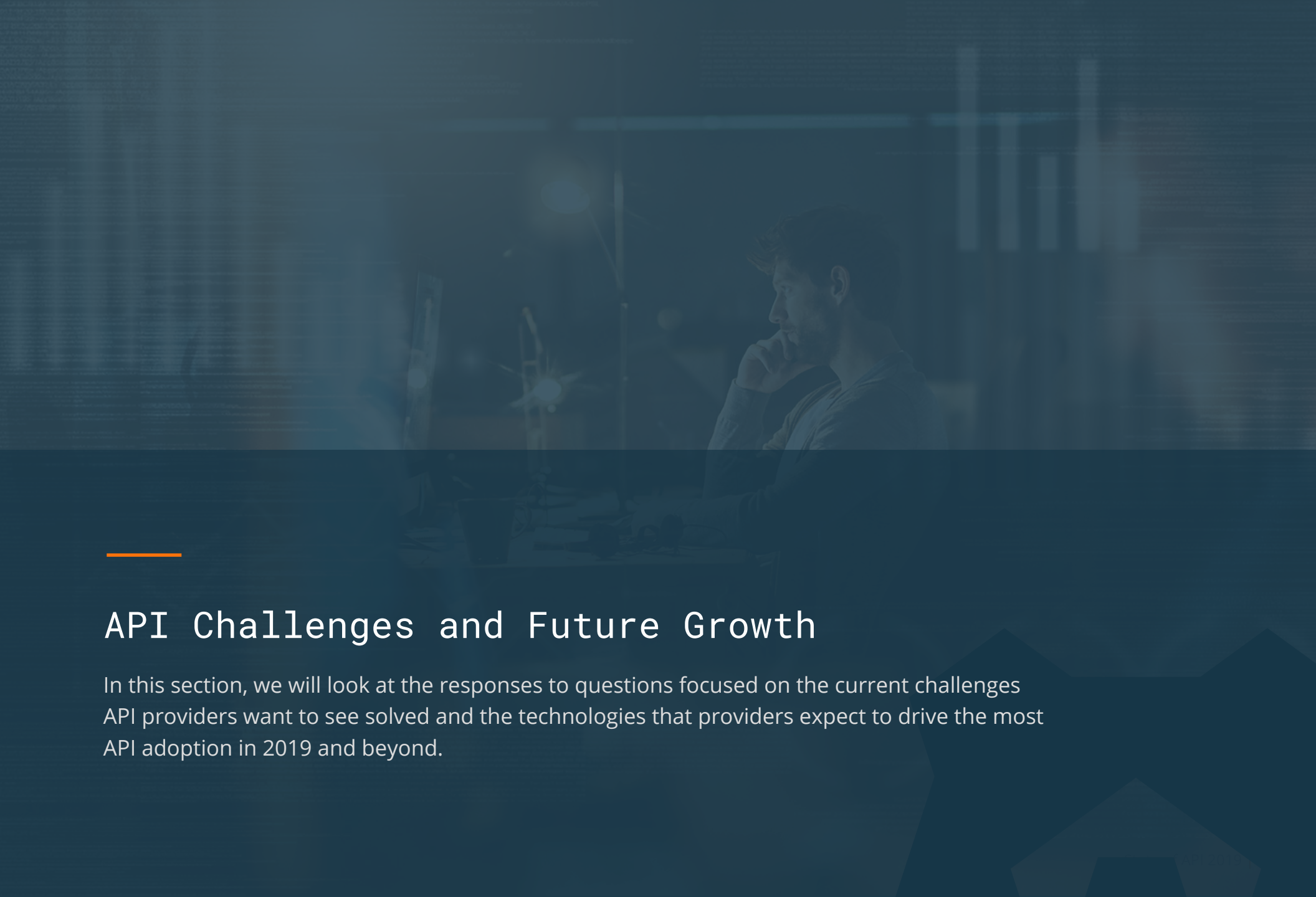
### Design APIs at Scale with OAS

SwaggerHub from SmartBear helps organizations streamline their API design process and scale their API development with OAS.

[Learn More](#)

### Does your organization have an internal API styleguide?



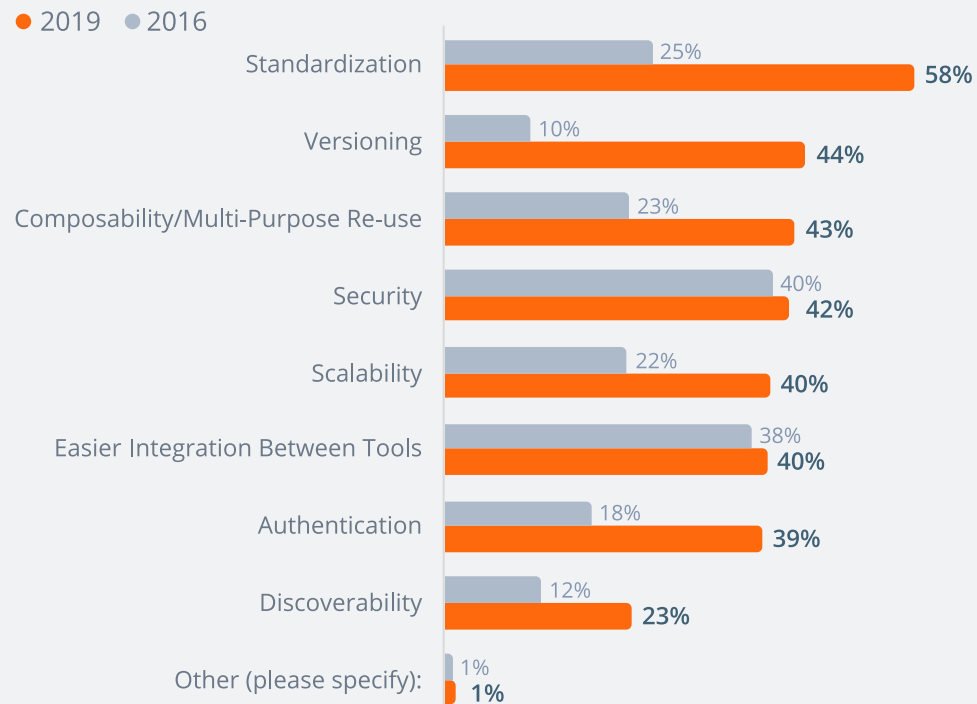
A man in profile, looking at a computer screen in a dimly lit office. The background is dark with some blurred lights and a bookshelf. The overall tone is professional and focused.

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## API Challenges and Future Growth

In this section, we will look at the responses to questions focused on the current challenges API providers want to see solved and the technologies that providers expect to drive the most API adoption in 2019 and beyond.

## Which API technology challenges do you most hope to see solved in the near future? *(Select all that apply)*



## Standardization is the top API technology challenge API teams want to see solved in the coming years

Standardization is the #1 API technology challenge that respondents in the 2019 State of API Survey want to see solved in the years ahead. It appears that the need for standardization has only increased since the 2016 State of API Survey, where standardization was ranked third in the top API technology challenges facing teams at that time. Two of the other top challenges identified by respondents were 'Versioning' and 'Composability/Multi-purpose Reuse'.

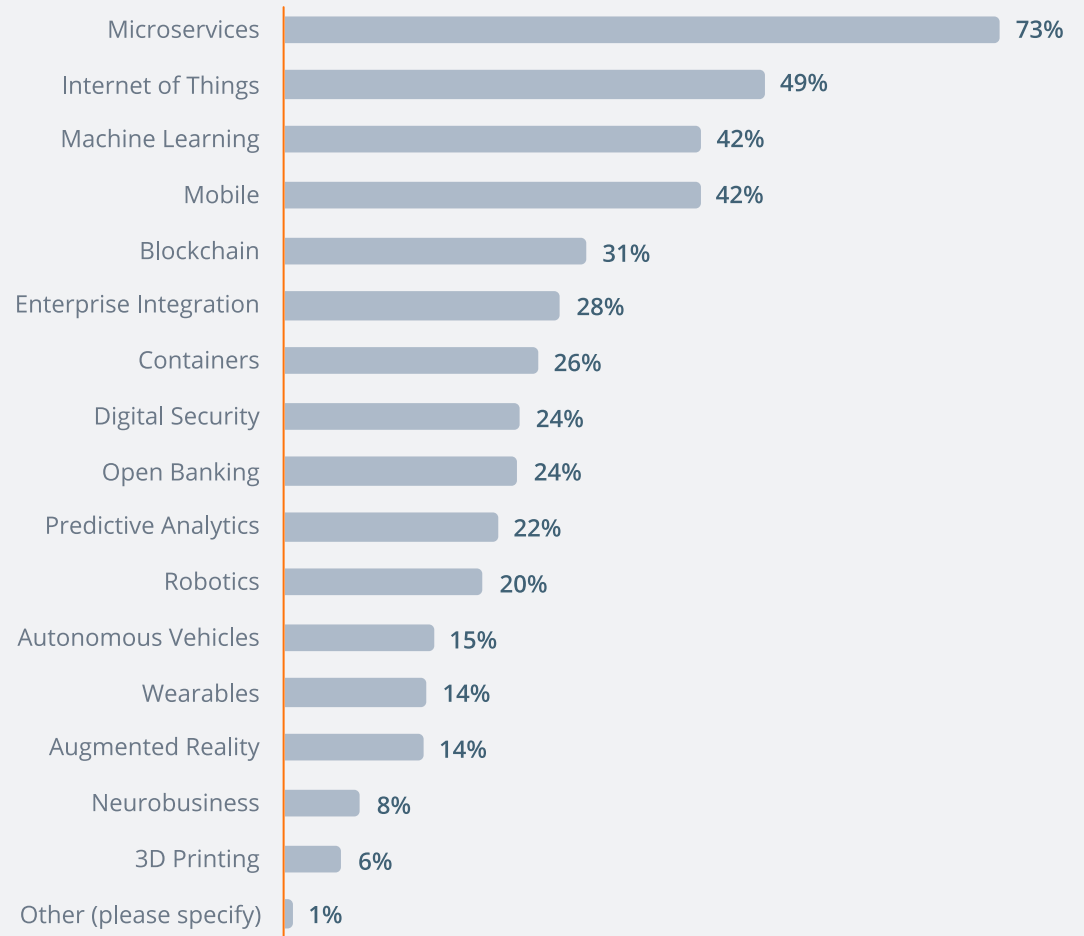
Security, which was the #1 technology challenge identified in the 2016 State of API Survey, ranked fourth in this year's survey but was still identified as a major concern by 43% of respondents.



## Microservices are expected to drive the most API adoption in the years ahead

Nearly three-quarters of respondents in the 2019 State of API Survey believe that adoption of microservice architecture will drive the biggest growth in API adoption in the next two years. This is just one example of the explosive growth in microservice adoption in recent years. In 2016, only 20% of respondents felt that microservices would drive the most adoption. Internet of Things (49%), Machine Learning (42%), and Mobile are also expected to drive adoption in the years ahead.

In your opinion, which of these technology areas do you expect will drive the most API growth in the next two years? *(Select all that apply)*



“

“Yes, the growth of microservice adoption HAS impacted API development. I think the two are intimately intertwined. Constructing microservices from an API-first foundation is a solid strategy, and so an increase in microservices architecture styles will only create a proliferation of APIs. Microservices may also be affecting design choices; for example, we’re seeing GraphQL emerge as an API gateway for microservices.”

-Bill Doerrfeld  
Editor in Chief, Nordic APIs



## What are your biggest obstacles to implementing microservices?

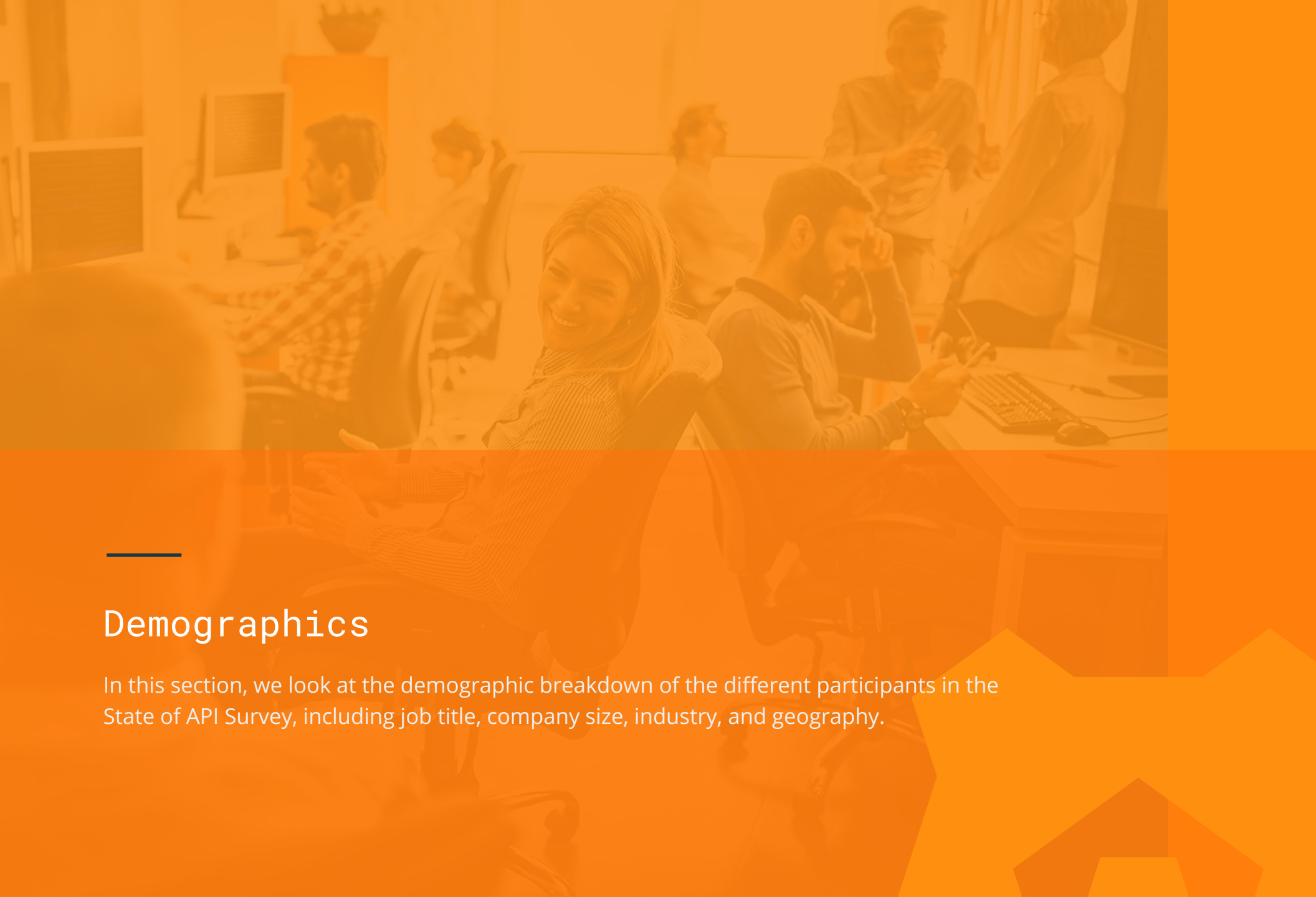
*(Select all that apply)*



### Experience/skills and restraints on resources are viewed as the biggest obstacles to microservices adoption

Anticipating that microservices would stand out as a technology influencing API adoption, we wanted to get a better understanding of the obstacles team face when it comes to shifting toward microservice architecture. Experience or skills stood out as the top challenge facing organizations moving to microservices. Lacking time and increased demand for speed and delivery were also identified as significant challenges.





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## Demographics

In this section, we look at the demographic breakdown of the different participants in the State of API Survey, including job title, company size, industry, and geography.

## The four biggest job functions represented in the 2018 State of API Report are:

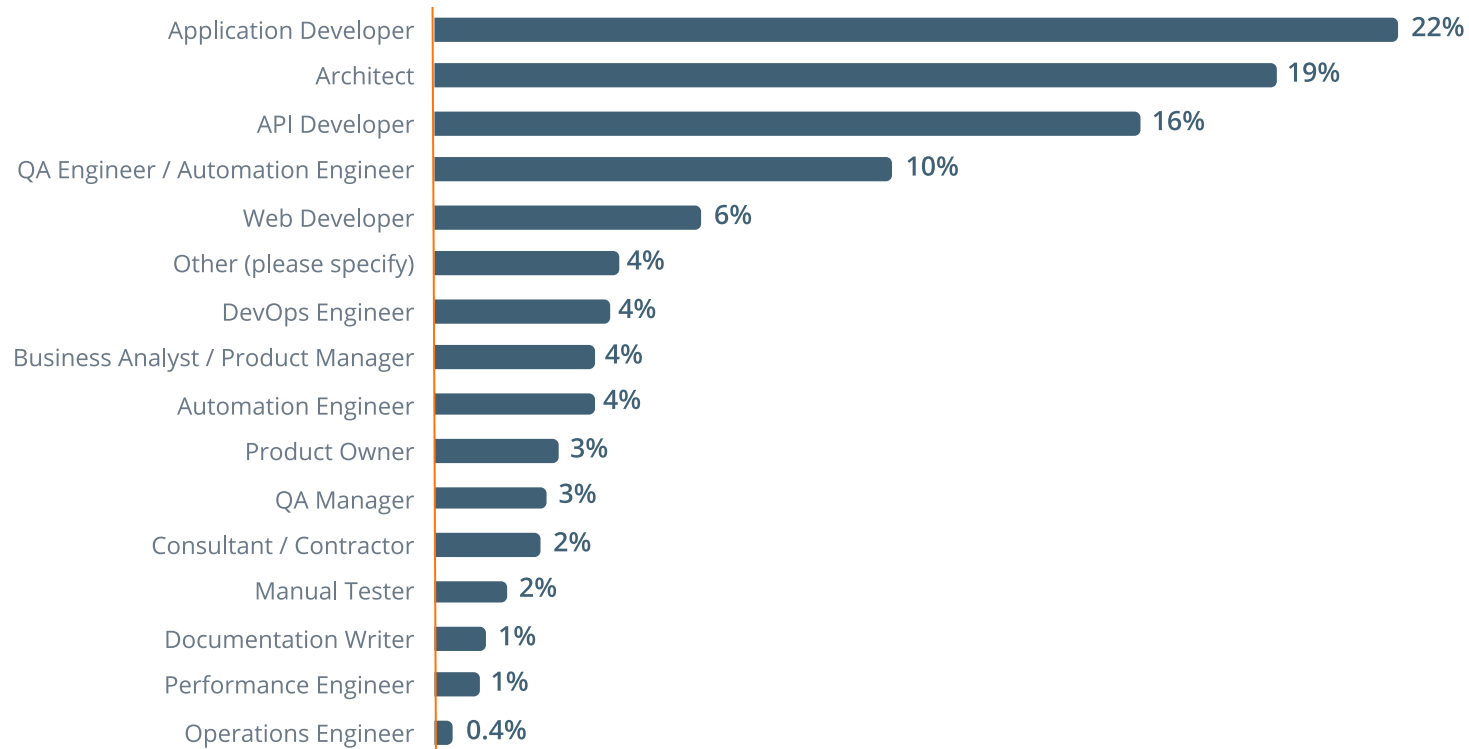
Developers - **40%**

Architects - **19%**

QA Professionals - **15%**

DevOps - **10%**

### Which best describes your role in software development?





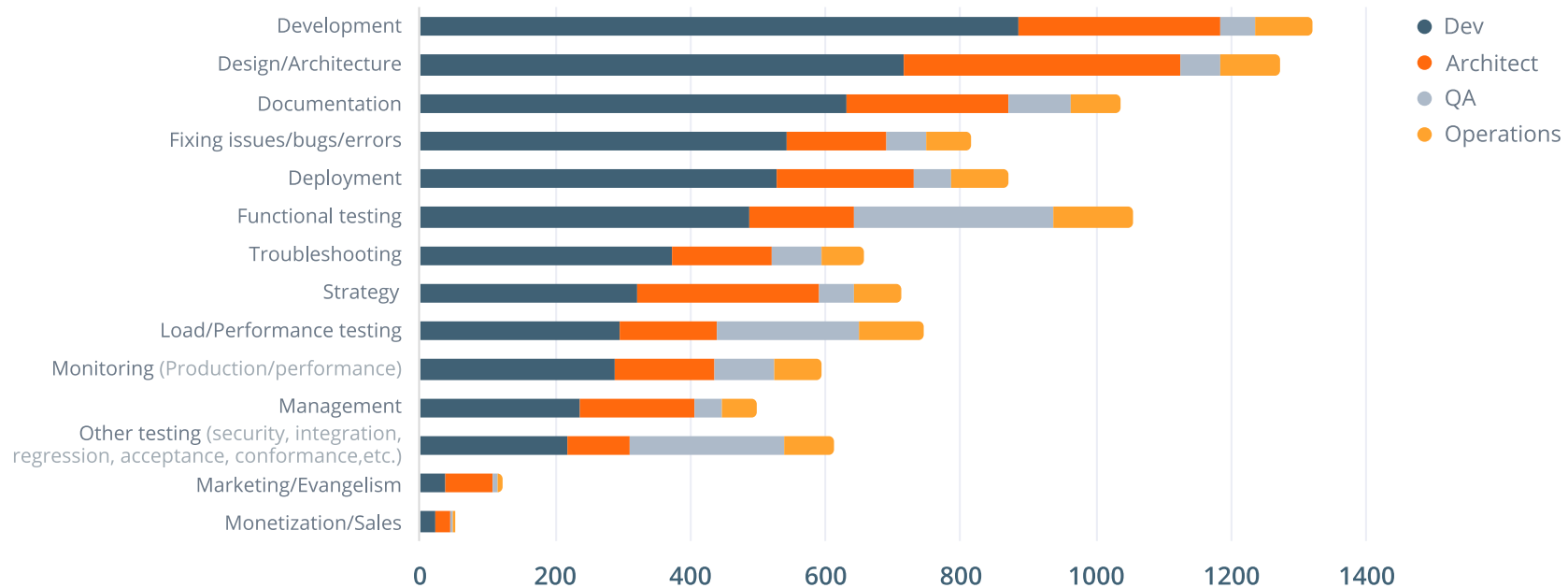
## Development teams continue to 'shift left', while architects own the API design process

As organizations adopt more agile approaches to software development, the lines between different departments become less stringent, with

development, QA, and operation teams sharing many of the same responsibilities. One example of this trend is in testing, where we found that 53% of developers are involved in some form of testing or troubleshooting. This is up from 42% of developers saying that they are involved in API testing in the 2016 State of API Report. API design

is another example of the cross-over between teams, where architects seem to be leading API design efforts with 92% of architects involved in design, and developers also playing a role with 71% reporting involvement in design.

Which of the following API-related responsibilities are you involved in? *(Select all that apply)*

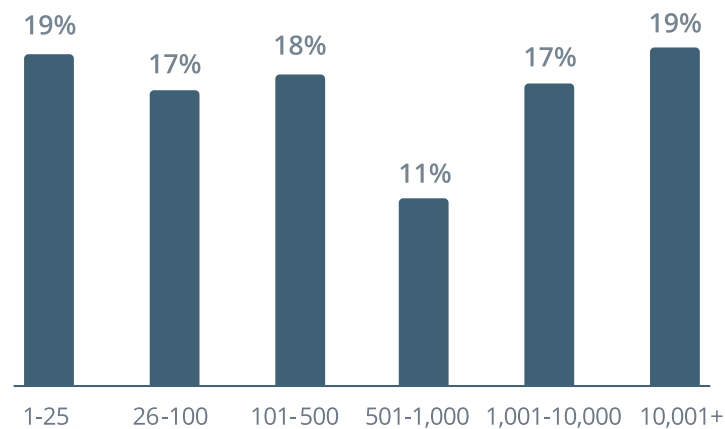


## The State of API provides perspectives from companies of all sizes

We were excited to have input from API developers and consumers from a wide range of company sizes, from smaller organizations and startups to medium-sized organizations, and enterprise organizations.

- | Less than 100 employees - **36%**
- | 100-1,000 employees - **38%**
- | More than 1,000 employees - **36%**

## How many people does your company currently employ?



## The top industries represented in the 2019 State of API Report are:

IT/Services

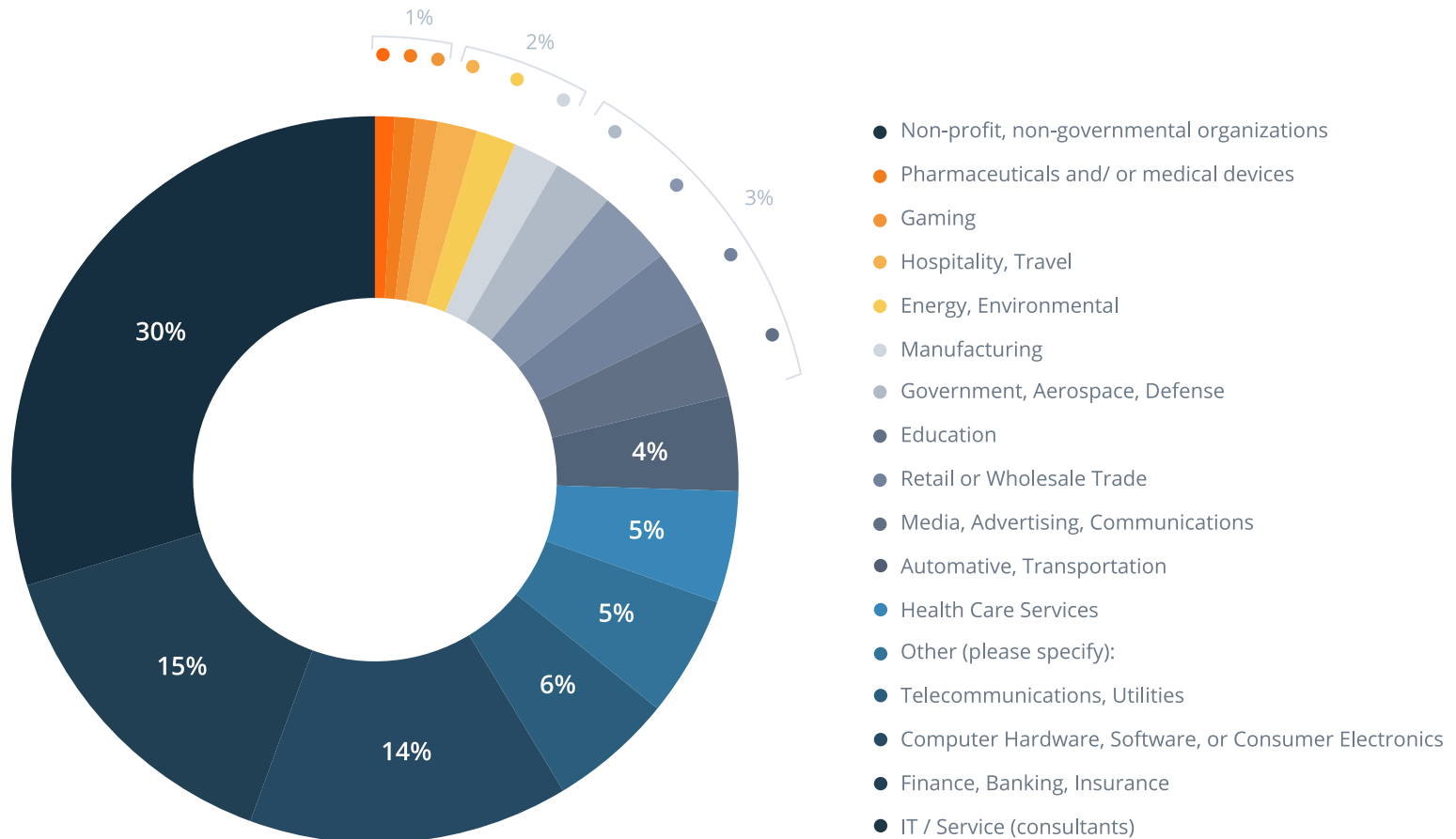
Finance/Banking

Computer Software

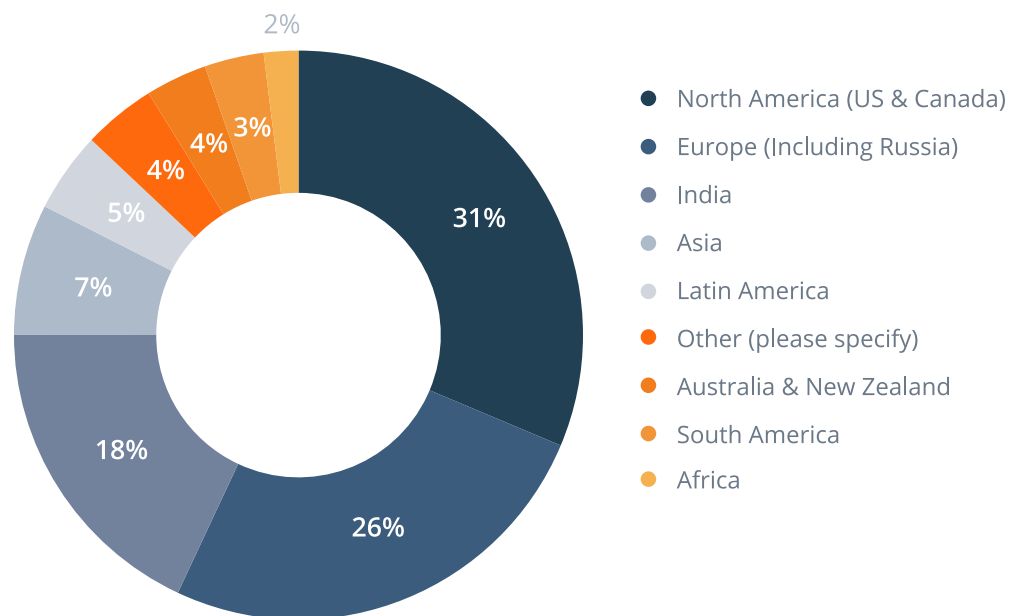
Telecommunications

Healthcare

### What is your company's primary industry?



## Where is your team located?



## State of API is a truly global perspective on the API ecosystem

The State of API is a truly a global survey of the API ecosystem, with the most participants from:

| North America - **31%**

| Europe - **26%**

| India - **18%**



## Ensure Quality Throughout Your Entire API Lifecycle with SmartBear

From the initial design and build of your newest API, through testing and monitoring of critical services, the Smartbear toolset improves your APIs at every stage. Whether you need to design APIs with the OpenAPI Specification, launch an API documentation process to improve developer experience, improve quality through functional or performance API testing, or improve issue response time with API monitoring — *SmartBear has your back.*



[Explore Our API Lifecycle Solutions](#)

# The State of API 2019

