

The State of API Report 2020



The 2020 State of API Report is Presented by SmartBear

We provide tools that enhance the process for every aspect of software development. And it begins and ends with quality.





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Preface

APIs are the cornerstone of digital transformation for businesses today. Some might say 2020 is the year of the API, as organizations across the world have had to rely on digital tools while they reimagine modern commerce in the face of a global pandemic. The digital shift in business has accelerated, and for many, the pandemic has provided an opportunity to rethink the tools needed to adapt and survive. But regardless of what tooling a business chooses, APIs are the anonymous underpinnings that have enabled millions to transition from work to home. APIs provided the connections that let disrupted supply chains be rapidly recreated into new partner ecosystems (to deliver vital goods and services). APIs are the backbone of online commerce, and are the reason businesses sustained customer engagement through an unprecedented time in our history. Simply put, APIs define the era in which we live and work.

This is the third iteration of our State of API Report, which was first published in 2016. It was designed to identify industry benchmarks regarding the trends, best practices, methodologies, and tools used by software teams to manage the API lifecycle in 2020. Our goal is to provide insights on how the API industry continues to evolve, and the factors contributing to its growth in the years ahead. Ideally, the information in this report can help organizations identify opportunities for improvement in how they can design, document, test, and monitor APIs across their software development lifecycle.





Methodology

The 2020 State of API Survey was administered online to a global list of API practitioners throughout May 2020. The survey contained 52 questions and collected a total of 3,536 responses. The primary audience for the survey were end users of the open source and commercial versions of the Swagger, SoapUI, and ReadyAPI tools. The findings presented are based on the completed responses from over 1,500 developers, architects, QA professionals, operations engineers, and product leaders from more than 16 different industries globally. To enlist initial interest, a small incentive was offered to early participants of the survey in the form of five \$50 Amazon gift cards and SmartBear branded merchandise.

The State of API Report includes insights across a range of organizational sizes.

Interest continues to be strong in the state of APIs regardless of business size. This year's survey gathers industry insights from a broad range of global businesses engaged in designing and delivering APIs.

Less than 100 employees – **41%** 100-1,000 employees – **29%** More than 1,000 employees – **31%**



How many people does your company currently employ?

The top four roles represented in the 2020 State of API Report are:

Developers – **38%**

Architects – **21%**

QA/DevOps Engineer – **12%**

Product Manager – **5%**

Which best describes your role in software development?



API development is growing across industry verticals.

Interest continues to be strong in the state of APIs regardless of business size. This year's survey gathers industry insights from a broad range of global businesses.

IT Services/Consultants – 28% | Finance Services – 14% | Computer Hardware/Software – 13% | Industry – 6%



What is your company's primary industry?

- IT/Service (consultants)
- Finance, Banking, Insurance
- Computer Hardware, Software, or Consumer Electronics
- Other (please specify)
- Telecommunications, Utilities
- Retail or Wholesale Trade
- Health Care Services
- Government, Aerospace, Defense
- Media, Advertising, Communications
- Education
- Transportation (Airlines, Rail, Shipping)
- Manufacturing
- Energy, Environmental
- Automotive
- Hospitality, Travel
- Gaming
- Non-Profit, Non-Governmental Organizations
- Pharmaceuticals/Medical Devices

Introduction

The year 2020 will be recorded as a significant inflection point in the digitalization of business. The impact of a global pandemic and the ensuing business and societal changes have forced many organizations to reprioritize their API strategy and accelerate digital transformation initiatives.

The 2020 State of API Report builds on the previous year's survey to cover multiple stages of the API lifecycle – design, development, documentation, testing, and monitoring. We've also included questions into the technologies, standards, and tooling that intersect with APIs.

We've broken the report into two primary sections: API Strategy, which covers key trends, sector growth, and the primary challenges identified from the 3,000 plus survey responses; and API Categories, which is a deep dive into results across six major categories: API Tools and Technologies, API Consumption, API Testing and Quality, API Documentation, and API Design.

APIs continue to grow in number and importance. The better you understand the trends, tools, and technologies within the API ecosystem, the more effective you'll be in using them. APIs can drive automation across your SDLC, and ultimately deliver new digital applications faster and with higher quality.

For those of you that took the time to participate in this survey, we appreciate your willingness to share your knowledge and experience to help shape the success of future API initiatives.



API Strategies

In this section of the survey findings, we'll examine the factors that can shape an organization's API strategy in the decade ahead.

API adoption is still relatively new for most organizations, with more than half of the organizations only starting to create APIs in the last five years.

Despite the promise of digital transformation, for some organizations APIs remain a nascent technology that has yet to be exploited for business gain. Of the companies surveyed, less than 20% have spent more than 10 years developing APIs, while the majority of companies (55%) reported less than five years with API development.



How long has your organization been providing/developing APIs?

Interaction between internal systems continues to drive API development, as two-thirds of organizations identified this as their main driver.

APIs are the glue that connect applications and data, eliminating the need to hand-code each unique integration. *Interoperation between internal systems, tools, teams* grew slightly year over year, with 64% of the organizations citing this as their number one driver for API development. Second, and close behind as a driver for API development, is *Reducing development cost/time (efficiency)* at 58%.

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

(Select all that apply)



API development continues to be a blend of internal and external APIs, but business needs still skew internally. It shouldn't come as a surprise that API development within organizations is a blend of internal and external APIs. Year over year, there wasn't a measurable change in the percentages. At 21%, internal APIs are consuming most of the development resources, compared to external APIs which amounted to only 4%. This statistic aligns well with the fact that organizations cited improved *Interoperation between internal systems, tools, teams* as the number one driver for API development.





Performance and uptime are top measures for API success.

Measuring the success of an API has become increasingly important, as organizations rely more heavily on APIs for both internal interoperability and external engagement with customers and partners. For the second year in a row, *Performance* is rated by customers as the highest measure of API success at 72%. Second is the ability to ensure API *Uptime/availability*, cited by 52% of the customers surveyed. While Performance rates number one overall for API success, to the API consumer Ease of Use and Accurate Documentation are the top choices.

How do you measure the success of your API?

(Select all that apply)



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



API standardization continues to be the top challenge that organizations want to solve.

The adoption and growth of APIs continues to grow exponentially. *Standardization* continues to rank as the top challenge (58%) for organizations as they attempt to scale API development. With development increasing, so has the challenge of versioning. The biggest shift, year over year, was the decline of *Composability/multi-purpose re-use* as a challenge.

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)



Microservices is far and away the leading technology area in API growth over two years.

Microservices is rapidly gaining ground with many organizations for its fine-grained modularity, flexibility, and speed, all of which are well suited for today's digital application development. 65% of survey respondents chose *Microservices* as the technology that will most likely drive API growth. Organizations cited *DevOps* as the second most impactful technology on API growth coming in at 42%.

Limited skills and experience pose the biggest challenges to microservices success.

The process of adopting microservices is being throttled by the trouble organizations are having finding developers with appropriate skills. More than half of the people surveyed (52%) cited *Experience or skills* as the primary obstacle to implementing microservices. *Complexity of existing code* adds to the challenge of limited skills, with more than one third (38%) of respondents indicating that what's already in place is too difficult to easily deal with. To sum it up, 67% of the respondents cited the *Lack of people* and time as the biggest obstacles to getting microservices implemented.



What are your biggest obstacles to implementing microservices? (Select all that apply)

API Tools, Technologies, and Methodologies

In this section of the survey findings, we focus our attention on the tools and methodologies that organizations are using to accelerate the API lifecycle and deliver higher quality APIs.

Which of the following factors are most important to you when evaluating API tools? (Select all that apply)



Ease of Use and Ease of Implementation are the top reasons for choosing API tools.

When it comes to building APIs, developers prefer tools that are easy to use and make implementing APIs easy. These findings are consistent with previous surveys, with 70% of customers survey citing *Ease of Use* and 68% surveyed citing *Ease of implementation* as their top reasons for choosing tools. A close third in customer preferences for API tools, at 66%, is *Integration with existing tools*. Combined, these metrics speak to development organizations that increasingly want to remove friction from the API development workflow.

API development shows increased emphasis on source control management (SCM) tools.

API development has grown to be a highly collaborative process. That fact is validated by customers choosing *SCM tools (Git, GitHub, Bitbucket...)* as the top result (66%) for tools used in API development. This represents a significant change over last year (47%) and speaks to the increasingly distributed nature of software development. A close second at 61% is *CI/CD tools*, as more organizations look to DevOps to improve automation and efficiency.

Note also the increased role of service virtualization in API development. Year over year, *Service virtualization (mocking) tools* grew more than 66% in survey responses. The value of *Code review tools* made a big leap as well, from 24% last year to 38% now.

What tools do you use to develop high quality APIs?

(Select all that apply)



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



Web continues to lead API use cases, with Mobile and Back-end system integration close behind.

The days of static websites with limited functionality are gone. The need to meet customer expectations for engaging online experiences no doubt contributes to why survey participants continue to cite *Web* as the number one use case for API support (24%). Use cases for APIs that ranked close behind were *Mobile* (17%), and *Back-end system integration* (16%), which, just like web, are both intrinsically tied to enabling digital commerce. Also worth noting is the increase in API use cases associated with *Events*, which could indicate more organizations are implementing event-driven architectures that can dynamically react to customer behavior.

Agile has firmly established itself as the software delivery method of choice.

The pace at which business moves forces organizations to look for faster ways to build and deliver software. As a methodology for software development, *Agile* continues to be the prevailing choice of the organizations, surveyed at 78%. *DevOps* moves up to a strong second place at 55%, as more organizations recognize the value of automation to accelerate delivery. CI/CD continues to score high and reinforce the value of automated software development.





(Select all that apply)

Collaboration between Dev and Test teams are of utmost importance for organizations.

Modern software development has definitely become a team sport. Dev teams are now located throughout the world, and progress on software takes place around the clock. Collaboration has become so important that 76% of organizations surveyed indicated it merited their highest level of importance. In fact, only 8% of the survey respondents indicated collaboration was only slightly or of no importance. How important is collaboration for your teams within your organization? For example, test and ops teams working together, dev and test teams working together, etc.



What source control management tools do you currently use in your software development lifecycle? (Select all that apply)



The overwhelming choice for source control tools is GitHub.

The continued growth of distributed software development teams working across geographies relies on source control management (SCM) tools to collaborate and maintain order. Topping the list of SCM tools by a wide margin is *GitHub*, cited by 54% of the people surveyed – effectively doubling *GitLab* at 27%.

Cloud vendors Amazon and Microsoft lead customer choice for API management platforms.

As more companies move to cloud, it isn't a surprise that native tools like Amazon *AWS API Gateway* would get a large mention. Amazon's API Gateway leads the list with 33% of the participants marking it as their choice. *Microsoft Azure* comes in third with 22%. Just edging out Microsoft, and somewhat a surprise, is 24% for *We aren't using an API management tool.* In fact, 40% of the participants either don't use an API management tool or use an in-house developed tool.

Do you use any of the following API management platforms?

(Select all that apply)





API Consumption

This section shifts focus from API providers and looks to better understand the needs and expectations of API consumers. As we highlight in this section, there's 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)



Three-quarters of organizations both consume and develop APIs.

77% of participants in the 2020 State of API Report both develop and consume APIs. This rate is similar to the response we saw in our 2019 report (78%). This means that quality and performance are critical for both APIs being developed by software teams, as well as APIs consumed by applications and internal systems.

Interconnected systems, tools, and 3rd party partnerships increasingly drive API consumption.

For the most part, the drivers behind API consumption ranked in a similar order to last year. In that way, they stayed parallel to the drivers behind providing APIs. This makes sense, since API providers and API consumers make up the supply and demand of their unique markets. The three drivers with significant increases year over year were *Partnering with external organizations* (+8%), *Absorb content (data/features) from external products* (+7%), and *Interoperation between internal systems, tools, and teams*(+7%).

Why do you consume/use APIs? (Select all that apply)

Interoperation between internal systems, tools, teams Reducing development cost/time (efficiency) Partnering with external organizations Extended functionality in a product or service Absorb content (data/features) from external products Reducing infrastructure overhead Powering mobile applications Social integrations for user engagement • 2020 Responses Regression testing 2019 Responses Marketing channel for lead generation 60%

Documentation is rising in importance for API consumers, who still value ease-of-use above anything.

While the top 3 most important characteristics in an API remained the same year over year, *Accurate and detailed documentation* beat out *Responsiveness/ performance* for the 2nd position with a significant 13% increase. For context, when we asked the same question in 2016, only 25% of respondents selected documentation as a top factor. This year, 63% of respondents chose it.

Another sizable year-over-year change was responses for *Scalability of underlying architecture*, which decreased by 10%. This could be due to the changing web services market and the scalable nature of services like AWS and Azure.

As an API Consumer, what are the top three most important characteristics you need in an API? (Select all that apply)



Consumers will report API issues directly to the provider – and they'll look for alternatives.

When consumers run into quality or performance issues with 3rd party APIs, they first report the problem and then look at their options. This general reaction is also what we saw in our 2019 survey. Compared to previous years, there's a trend that API consumers are less loyal to the APIs they work with when faced with performance issues. In 2016, only 30% of respondents said that an issue would lead them to look for a permanent alternative API provider. Their instinct instead was to review service level agreements.

In the years since, service level agreements have decreased and the willingness of consumers to

look elsewhere has increased, to 34% in 2019, and now 37% in 2020.

Why are API consumers less loyal in 2020? It's likely a result of more competition in API marketplaces, plus a higher demand on API reliability as tools and systems become more connected and dependent. Downtime of a 3rd party API can translate directly to lost revenue because of poor experience for consumers and the services they offer.

As an API Consumer, how do you react upon encountering quality or performance issues with 3rd party APIs?



(Select all that apply)

What are the most important actions you expect from your provider when an API issue occurs? (Select all that apply)



70% of API consumers expect immediate notice on API issues.

In 2019, we asked respondents about how quickly they expect API providers to resolve issues when raised. Over half of respondents expected fixes the same day or within 24 hours. Expectations are high, and API providers need to deliver consistently to ensure they grow their consumer bases.

When an issue is raised, consumers expect fast and detailed communication about what the problem is and how it's being fixed. That expectation surfaced in our 2019 survey as well.

The change in expectations this year is that more consumers expect an API status page so they can check availability. 28% of respondents expected providers to offer an API status page in 2019. Now, that number's up to 33%. These trends signify that API providers need to be strong and proactive communicators.

API Quality

This section offers a look at how software professionals think about API quality in 2020. We'll look at common obstacles to ensuring quality, associated risks with poor quality, and how organizations view API quality as a business priority.

Deadlines continue to be API quality's biggest obstacle.

Maintaining quality is critical to coherently scaling any API practice. *Limited time due to workload* and *Increasing demands for speed of delivery* were the top 2 obstacles cited by this year's respondents. Across the board, the results to this question were very similar to our 2019 report.

Lack of budget saw a 4% increase this year to 20%, compared to 16% in 2019, and 16% in 2016. This is likely due to the economic impact of COVID-19. Interestingly, budget still is not one of the top obstacles for most teams. The top 4 obstacles more reflect the challenges of internal governing and communication.

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





The first two obstacles tell the story of organizations having less time and more demands for their development teams. Teams then may not have the skills or experience to ensure quality. It could be that an API practice is uncharted territory for an organization, or that the increasing complexity of applications pulls teams into areas where they don't already have those skills and experience.

When a team is under pressure to deliver and learn at the same time, it's reasonable to expect that *Managing expectations with different stakeholders*, the 4th biggest obstacle, would be naturally related. This can be especially difficult as teams have to bridge the communication gap between business expectations and technical execution.

While commonly understood in the world of development, it's worth reiterating that when quality practices are cut short to achieve deadlines, the resulting bugs and subpar performance often forces teams to spend costly time on rework than if the issues had been mitigated on the initial approach.

75% of respondents say that API quality is Very or Extremely Important to their organization.

API quality continues to be viewed as important by organizations, only down from 78% in 2019 and

2016. API quality is defined by the expectations of consumers, which continue to rise year after year as application and data interconnectivity becomes more central to their organizations. As more organizations become API providers, quality is also defined relative to competitors. In our section on API Consumers, we learned that consumers care the most about API characteristics like *Ease of use, Accurate and detailed documentation,* and *Responsiveness/performance.* When organizations look at their API practice, these factors can help with prioritizing improvements.



How important do you think API quality is to your organization? (Select all that apply)

The top risk of poor quality APIs is the time and resources spent troubleshooting issues.

Earlier in this section, we shared how teams view deadlines and time constraints as the biggest obstacle to API quality. Time lost troubleshooting and testing APIs is also considered the biggest risk of delivering poor quality APIs. When paired, these two figures suggest that teams can find themselves in a no-win situation.

Pressure from deadlines can result in teams not being able to ensure API quality. When rushed development and testing produce poor quality APIs, then teams must go back and expend time fixing them. Businesses that take the time to initially ensure API quality don't have the same penalty and can reinvest in a qualityfirst approach for their next application.

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



API Testing and Monitoring

This section takes a high-level look at two critical phases of the API Lifecycle – API Testing and API Monitoring. We'll look at how organizations treat these phases, top concerns, and expected results.

What percent of API changes result in issues in production (outage, rollbacks, performance problems, etc.)?



Most teams push major API issues into production less than 20% of the time.

This is the first year we've asked respondents about how frequently they make API changes that result in issues reaching production. A third of respondents say that they only run into issues 10% of the time or less.

Earlier in this report, we looked at the different software delivery methods. Teams that describe their delivery method as *Continuous Integration, Continuous Delivery,* or *Iterative* were also more likely to have a lower percentage of changes with issues in production. This could be because they release at a higher volume. It could also signal a more mature process with automated quality checks.

Most organizations have a formal API testing process, and larger organizations view testing as a top priority.

90% of participants in this year's report said they either currently have, or plan to have, a formal API testing process in place in the near future. This was also the case in our 2019 survey. Larger organizations tend to have more formal processes in place, but it's interesting that almost half of small organizations now do as well.

Does your organization have a formal API testing process?





Does your organization have a formal API monitoring process?

Over half of organizations have a formal API monitoring process, and 32% say they plan to.

As mentioned earlier, consumers view *Responsiveness/ performance* as a critical characteristic of the APIs they utilize. API monitoring is a key practice to ensure high API performance. In this year's survey, we found that roughly a third of respondents (31%) have a monitoring process in place and view it as a top priority.

There's also a significant group of respondents (23%) who have a formal monitoring practice, but they say that their organizations do not view it as a top priority. Compared to last year, the number of organizations that have a formal API monitoring process is relatively flat (53% in 2020 vs 56% in 2019).

While only 53% of respondents have a formal monitoring practice in place, 77% view Availability as one of their top 3 concerns with web services.

The top concern for API providers in 2020 is the *Availability* of their APIs. This was true in 2019 as

well, selected by 30% of respondents. If an API is unavailable for whatever reason, there's a cascading effect that impacts all the services that rely on it. As the digital ecosystem continues to grow, the monetary impact of API availability is more prevalent than ever.

API *Functionality* is the second top concern in 2020, just as it was in 2019. The work to make sure that

APIs return the correct response starts in the design phase, and spans across the software development lifecycle to testing and monitoring. Many teams use API mocking or service virtualization as a method to generate and test API responses earlier in the SDLC. Virtualized services let different teams work in parallel on the same API once a design is outlined.

As an API Provider, please rank your top 3 concerns with APIs / Web Services.



API Documentation in 2020

In this section of the survey, we'll explore how organizations are handling API documentation, a critical element in the API lifecycle and vital link between API providers and consumers. API documentation can sometimes be the difference between a successful API that receives ample adoption, and one that's problematic and ultimately avoided.



Does your organization have a formal API documentation process?

API documentation is more likely to be formal as organization size grows.

The size of the organization determines the likelihood of a formal API documentation process. According to survey respondents, 89% of organizations with 1,000 employees or more have a formal API documentation process and rate it as a top priority. In fact, the value of API documentation is so universally recognized that less than 5% of those surveyed did not have a formal process, and didn't plan to have one. Even in small organizations with less than 25 people, 35% of the respondents indicated API documentation is a priority and they have a formal process.

Two thirds of organizations see limited time as the biggest obstacle to API documentation.

According to 64% of the survey participants, *Limited time* is the biggest obstacle to providing up-to-date API documentation. Following that, 47% of the organizations surveyed deal with API *Documentation that is now out of sync with the API implementation*. Lastly, for 29% of respondents, they could deal with the problem of outdated API documentation if they had more personnel.

Most teams utilize OpenAPI Specification definitions to automatically generate API documentation.

When it comes to automating API documentation, 37% of the survey respondents utilize OpenAPI definitions to automate the creation of their API doc. The machine-readable nature of the OpenAPI definition makes it easy for open source tools like SwaggerUI to use this definition and render the documentation. Just under a third of the survey participants indicated they use code annotations as a method to create their documentation. Without the option to render machine-readable code, 15% of the organizations use technical writers to create API documentation.

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



Which best describes how your team handles API documentation?







• 2020 Response

2019 Response

API documentation represents big opportunity for improvement.

Documentation is so important to the successful adoption of an API, and yet 43% of survey participants indicated their documentation was poor and needs improvement. Most organizations (52%) rated their API documentation *Good* to *Average*. Only 5% of the survey respondents felt their API documentation was *Very good*.

Topping the API documentation wish list is the need for more examples.

Of all the elements that make up successful API documentation, the desire for *Examples* is the top choice for the second year in a row, coming in at 70%. A close tie for the next three spots is *Status and errors* at 51%, *Authentications* at 50%, and *Error messages* at 49% of survey respondents. From the exhaustive list of items and active responses across categories one begins to understand the value seen in documentation, and the scope of work required to create and maintain documentation.

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





API Design and Standards in 2020

In this section we'll review the survey findings associated with API design, and how it can establish the foundation for reinforcing standardization, foster a design-first methodology, and ensure alignment with business goals. Organizational size determines if a formal API-design process is in place. As APIs continue to grow within an organization, the challenges associated with building and managing those APIs grow as well. Results from the survey show that 86% of organizations with 10,000 or more employees state they have, or plan to have, a formal API-design process. Compare that to small businesses of less than 100 employees, in which 58% don't have one.

Does your organization have a formal API design process?







Customers' preference for OpenAPI continues to be high, but there's dramatic growth for GraphQL and gRPC standards.

API standards continue to emerge to meet new challenges, with some showing increased adoption. Year over year, the number of customers selecting GraphQL and gRPC have shown dramatic gains, almost doubling for gRPC and just over a 50% gain for GraphQL. Yet, despite growth in these areas, the overwhelming choice of developers continues to be the REST OpenAPI Specification. Originally, this API standard was introduced in 2011 as Swagger, then later in 2017, it was formally released as the OpenAPI Specification. Today, 82% of the survey participants cite the OpenAPI/Swagger as their API standard of choice for defining APIs.

Dev teams move away from email in favor of collaboration through Jira and Slack.

Team communication is shifting away from email, as technology professionals find it easier to collaborate via project management tools like Jira, and collaboration tools like Slack. Email dropped in mentions by almost a third, while Jira and Slack increased incrementally. The leader at 27% of respondents was *Jira*, with *Slack* a close second at 24%.

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





What tools does your organization use to design APIs?

How important would it be to integrate your API design tools with your source control management tools?



API designers rely heavily on Swagger OS and SwaggerHub for tools.

Integrated development environments, or IDEs, like those associated with Visual Studio are a popular choice for API design. In this year's survey, IDEs were cited by 51% of the participants as one of the tools their organization uses to design APIs. Postman, an API testing tool, is mentioned by 44% of survey participants. Developers continue to show a strong preference for Swagger open source, and SwaggerHub – the team-based, commercial version of the product. A total of 79% of participants recorded Swagger as their API design tool of choice.

Source control tools need to integrate with API design tools.

The distributed nature of development is driving up the importance for integrating API design tools with Git (and other source control management tools). Of those surveyed, more than half (55%) indicated this was *Extremely* or *Very important*. Most organizations take a blended approach to API development, preferring a combination of Design-First and Code-First. Two distinct API development approaches exist – Code-First (a focus on developing the API code first from business requirements), and Design-First (a focus on designing the API contract from business requirements before developing code). In a shift from last year, where Design-First was the top choice, 28% of the 2020 survey respondents use both Design-First and Code-First in their API development. Neither approach is wrong, and it would appear organizations are willing to support both as long as API delivery and quality meet SLAs.

What best describes how you work with OAS/Swagger today?



Organizations realize the value of API style guides, but for some it's still an aspiration.

With standardization being the number one challenge cited by organizations building APIs, you'd think API style guides would be a given. This year's survey data indicates that 64% currently have an API style guide or plan to add one. However, behind that metric is the reality that for half of those organizations, an API style guide is an aspirational goal. For another 24% of the respondents, they don't have a style guide and one is not planned.

Does your organization have an internal API style guide?



Key Takeaways

- **1** | API standardization continues to be a top priority, especially for big companies.
- 2 OpenAPI continues as a dominant API standard, with dramatic growth for GraphQL and gRPC.
- 3 Microservices tops in API growth, with DevOps gaining ground.
- 4 | API consumers are less loyal than they've been in the past.
- **5** | Cloud vendors emerge as the customer choice for API management tools.
- 6 Aggressive deadlines kick off vicious cycles that impact API quality.
- **7** | Email out. Jira and Slack in.



Key Takeaways | In Detail

1. API standardization continues to be a top priority, especially for big companies.

The growth of open APIs in the last decade has been nothing short of astonishing, but that number is dwarfed by the volume of internal facing APIs. As organizations grow and mature with API technology they naturally begin to create more APIs, create more versions of APIs and start to encounter challenges with managing their APIs. In order to ensure the API created complies with established rules and standards they might turn to an API style guide to govern how it's development. From the results of this survey we find that less than one third of the organizations actually have an API style guide. This poses a bit of a problem for organizations to reinforce API standardization.

Without standardization APIs development becomes bespoke and developer productivity declines. API costs and time to market increase to accommodate changes. APIs that intersect with sensitive data or ones used in regulated environments might expose the organization risk compliance violations. It is little wonder that in this year's survey, API standardization was chosen by 58% of the respondents as the number one technology challenger they would most hope to solve in the near future.

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

The options for API developers continue to grow as the opportunities for incorporating APIs into different technical use cases expands. Software Architects see the potential for APIs beyond just linking applications – from supporting a variety of architectural types, including IoT, to event-driven and microservices architectures. Still, today the predominant standard for API developers is the OpenAPI Specification (OAS), formerly Swagger. In this year's survey, OAS was chosen by 82% of the respondents as the standard of choice for defining APIs. Worth noting is the surge in popularity for GraphQL, an API that simplifies data query, which has moved up 60% year over year. And gRPC, an open source remote procedure call (RPC) framework, which has increased year over year by 75%.

3. Microservices tops in API growth, with DevOps gaining ground.

One of the fastest growing IT architectural approaches is microservices, a set of fine-grained, self-contained services designed to implement a business capability. The speed to develop and deploy microservices makes them a perfect complement to cloud architectures. For the second year in a row, survey respondents chose microservices as their top choice (65%) for technology that will drive the most growth in APIs.

DevOps and its influence on API growth is also interesting. As organizations look to improve efficiencies in the SDLC, APIs are becoming ideal enablers for automations within CI/CD pipelines. In this year's survey, DevOps is the second highest choice of respondents for technologies to spur API growth, coming in at 44%.

One last point on this: Microservices and DevOps aren't really technologies -- they're mind shifts. This highlights how cultural changes around Microservices and DevOps drive API growth, as opposed to a single technology. It's worth noting as time goes by.

4. API consumers are less loyal than they've been in the past.

We asked API consumers how they respond when they encounter issues with APIs. Compared to our previous two surveys, this year's data showed an increase in respondents who start searching for a permanent replacement. As more organizations offer digital services, the market is getting more competitive and API consumers have more options to choose from.

Simultaneously, API consumers have higher expectations of API providers as applications become more interconnected. Since a provider's API failing can directly impact the consumer's application and the consumer's audience, there is less tolerance for quality issues.

5. Cloud vendors emerge as the customer choice for API management tools.

IT professionals will sometimes confuse API gateways with API management platforms, when in fact they're just a part of the solution. Many of the original API gateway industry leaders are recognized for providing API management capabilities – some more than others. When asked how they prefer to expose public APIs, 31% of the survey participants chose API gateways. Following a trend from a year ago, survey participants once again picked cloud providers Amazon (33%) and Microsoft Azure (22%) by large margins over their competitors. Amazon continues to lead this survey question, but the surprise second place finisher was for Not Using an API Management Tool.

6. Aggressive deadlines kick off vicious cycles that impact API quality.

Respondents told us that the #1 obstacle they face to ensuring API quality is time restraints. As companies are trying to monetize their capabilities, and new vendors enter emerging digital markets, there's pressure to rush development. However, when we asked about the risk associated with poor quality APIs, respondents flagged the time it takes to troubleshoot and fix issues as the biggest cost.

If companies push their API development too quickly and shorten the time it takes to launch quality APIs, they'll find themselves spending more time in rework. This could kick off a vicious cycle where dev teams have to carry the burden of rework while already lacking the time to ensure quality on their next project. This year's data reinforces the military credo that "slow is smooth and smooth is fast." A focus on a quality-first approach, with an organizational awareness of this reality, can prevent this type of cycle.

7. Email out. Jira and Slack in.

Collaboration between development and test teams was rated at the highest level of importance by survey participants at 76%. It's therefore logical to assume the tools best suited for collaborating would be the developers' communication channel of choice. Let's face it, the plethora of email, message boards, collaboration channels, chat windows, etc., was eventually going to shake out to reveal a winner and loser.

In this survey of technology professionals, email is trending down by almost one third year over year, while Jira, the project management platform is leading at 27%. To no surprise, the close second for team collaboration is Slack, which was chosen by 24% of the survey participants.



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