API MANAGEMENT / CLOUD NATIVE / MICROSERVICES / CONTRIBUTED

API Technology Trends in 2021

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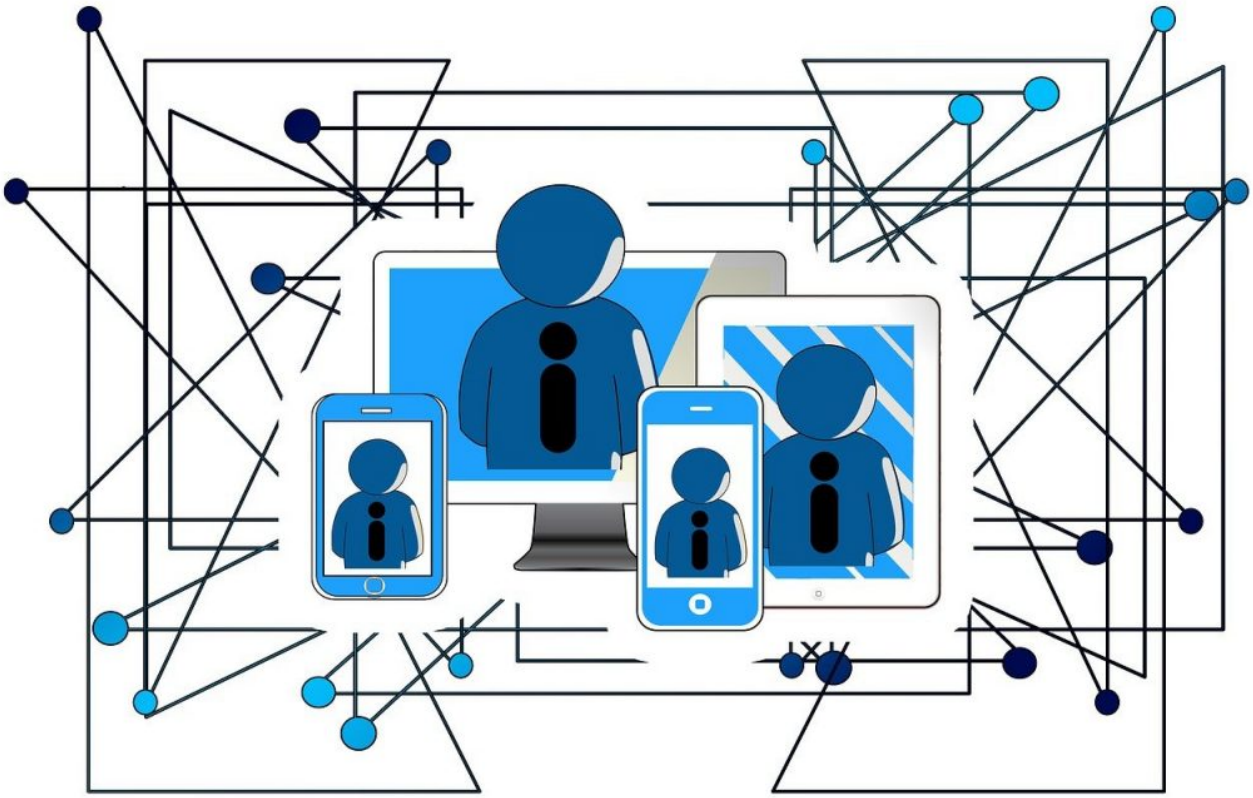

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Keeping pace with the many different technology trends in software development is a big job in itself. Understanding these emerging API trends and how they will affect your next product is one of the many things you need to worry about as you progress through your career as a developer.

In the first part of this article, I'll share a few of the key API technology trends you should watch for in 2021. I'll offer some insight into each and how you can lean into these trends to build better, faster, more flexible software. In the second part of the article, I'll share some of the emerging technologies being used to realize these trends. You'll learn more about how the next generation of APIs is being built, tested, and scaled.

1. Real-Time Data Synchronization

API consumers increasingly want immediate results, so real-time data access is essential. Some tasks, like booking an Uber or ordering a pizza, are relatively easy to build with traditional REST-focused patterns, but other problems like fraud detection and reporting can be more complicated to solve in real-time.

For some industries, real-time API delivery is a mission-critical service. In inventory management, providing real-time notifications when an item is available to buy might be the difference between making the sale or losing a customer.

Finally, real-time data synchronization is essential for many internal processes too.

updated in seconds to ensure

ple except for the fact that API

around the world. This means

ing introduces the likelihood of

rmance optimization.

techniques such as caching, payload limits, rate limiting, and others to optimize the API.

Stress testing your API with real-world scenarios can help you catch performance issues in the development phase, minimizing problems when it eventually goes live. This is why load testing tools are becoming so popular and varied, especially in the API-centric Kubernetes space.

3. Improved Security and Better Third-Party Options

As APIs are more widely used and distributed, their attack surface areas tend to grow. The complexity and variety of APIs used by many organizations only increase the security risk:

> "Simply put, it's impossible to secure what you don't know about. But all too often, organizations simply don't have any idea what's running on their networks. Companies added security tools in a one-off fashion… What's more, traditional tools were not built with the modern, decentralized enterprise in mind and often cause more problems than they solve."
> — **Sean Leach, Fastly**

issues compared to others, but
rds increased awareness and

its as baseline security
mplex DDoS attacks,

tect your API from common
icial intelligence to provide even

4. Widespread Adoption of Microservices

Microservices are now a core focus when building APIs. While once a buzzword in the tech industry, they're clearly here to stay. In an ideal world, microservices will help with scalability, flexibility, and security. Of course, they also introduce their own challenges for API developers.

For example, API gateways are an essential part of microservices. They will forward requests to the respective services based on routing rules you configure. Authentication and security checks are often done in the API gateway so that duplication is not required for each service. If not implemented correctly, this can introduce a single point of failure into your API, so it's not something to be adopted without care.

Microservices also need to communicate with each other internally. Historically, this communication has been done using REST APIs. Nowadays, microservice communication is trending toward gRPC and event-driven architectures, given their speed and reliability (as we'll discuss in the next section). Latency can be a major issue for microservices, so the transition away from REST makes sense, but these new networking protocols are less established and supported.

Technologies Powering These Trends

As API developers focus on real-time data synchronization, global performance, security, and the adoption of microservices, open source and proprietary tools are being

e most notable API development

lopment, you must create
ded in each call. Using GraphQL,
ust define the types and fields. In
s and get the data they need

back as JSON. In the REST model of fetching data, multiple round trips to the server are often needed to get all of the data an application requires — so it can be slow, especially on a mobile device."

— **Richard MacManus, The New Stack**

e. If they also want to get the
est. This saves development
ndpoints with different formats,
ne request. GraphQL is also
werful developer tools (like

gRPC is a modern, open source, high-performance Remote Procedure Call framework. It can be run on any environment and can be used to communicate across backend, frontend, and mobile devices.

gRPC's speed and cross-platform support are key strengths, particularly given the rising popularity of microservices. In many microservice architectures, a request needs to be made to multiple services to compile the response. Response times can get slow because of network calls, and gRPC helps to reduce this latency.

gRPC uses protocol buffers for binary serialization instead of JSON. This makes gRPC fast — even with a large payload of data. In fact, gRPC is roughly seven times faster than REST API calls, plus it has built-in HTTP/2 protocol support. Finally, instead of relying on individually defined API endpoints like REST, gRPC provides an auto-generated SDK that clients can use to make calls to the service.

REST: Tried and Tested, But What's New?

st, REST isn't going away
most common problems have
few years thanks to innovations

request could be processed at a
ultiplexing, where multiple
time. In HTTP/1, multiple
HTTP/2 can achieve parallelism

This is mostly used for time-sensitive data that you want to be reflected in the user interface as soon as possible (like notifications or alerts). Users don't have to refresh the browser just to see the latest updates.

The Web Push API can even deliver messages to users who are temporarily offline. While often used in conjunction with traditional asynchronous protocols (like webhooks or email notifications), widespread use of the Web Push API is opening up new avenues for real-time communication to API consumers.

Conclusion

The software industry evolves quickly, and every developer has to find ways to keep up. New technologies allow API developers to build performant, highly available, secure applications more easily. They also offer API consumers more options for integrating them.

More than ever, the big challenge is picking the right technology for the right use case. For example, a real-time chat API might be a great candidate for gRPC, while a social network API might lean on GraphQL. Similarly, a notifications API might use push notifications to alert users, while a simple two or three endpoint application might limit its offering to a more traditional REST API.

As the variety of APIs being offered grows, API technology will continue to evolve accordingly. The rise in video streaming, cloud native technology, and edge computing ard to predict.

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