

The Future of APIs

7 trends you need to know

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Introduction

The API ecosystem is evolving rapidly. The availability of a myriad of new data sources, coupled with a growing demand for real time data is accelerating the adoption of protocols that support streamlined data and event-driven APIs such as gRPC, GraphQL, and Apache Kafka. The dominance of REST is being challenged by AsyncAPI in the quest for more efficient microservices. The result is increased complexity of the API ecosystem.

Controlling API complexity is critical for businesses to reap the benefits of accelerated development, to improve more efficient IT architectures, to enjoy stronger security postures, and to refresh business approaches. Gravitee.io's mission is to bring effortless control into the API space and to simplify complexity with everything we create, even this eBook.

Within this guide, you'll find predictions on what the evolution of APIs means for technology leaders and how they can proactively meet these challenges these with insight and planning.



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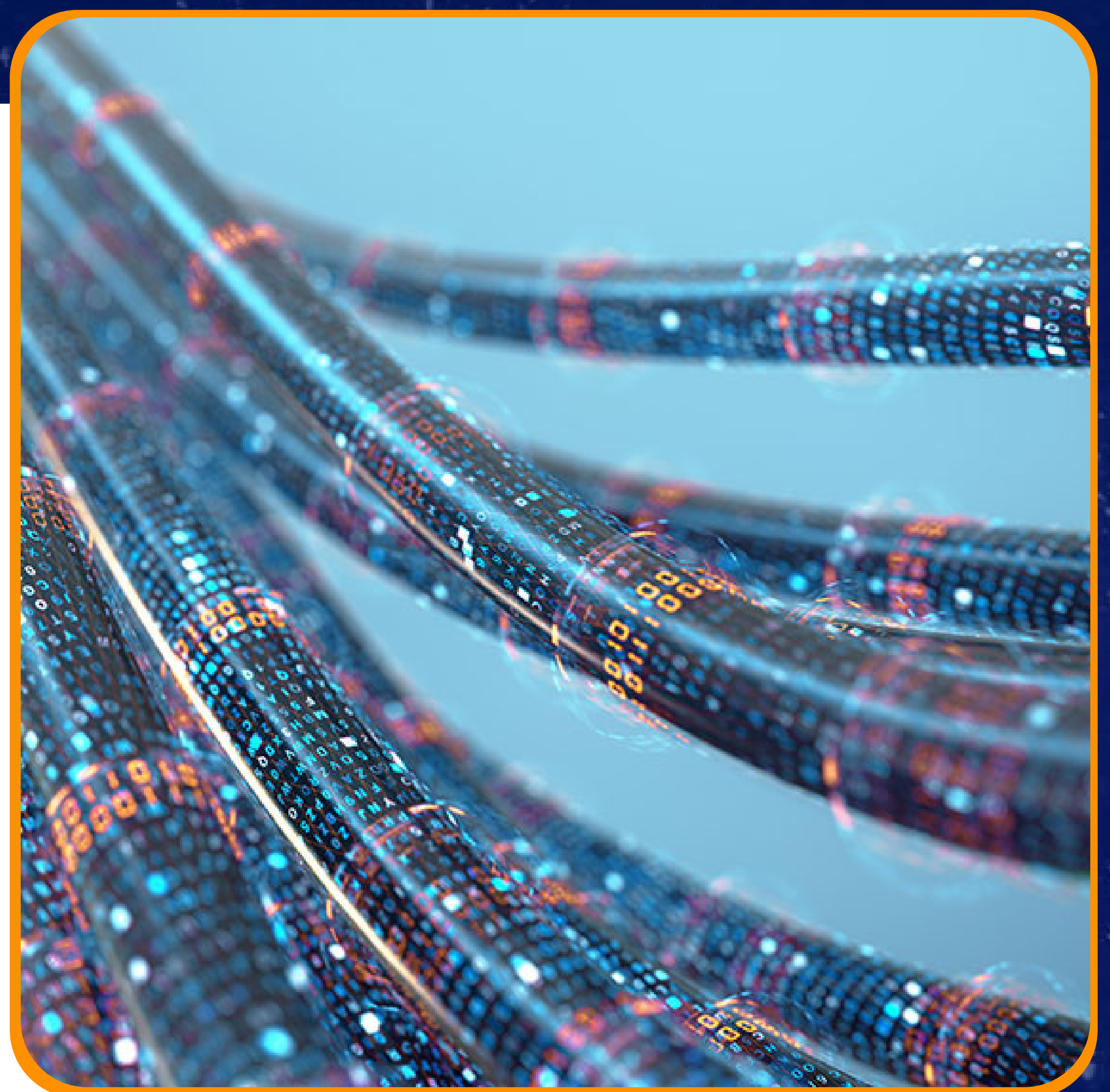
API-First As The Norm

Adopting an API-first strategy will be increasingly common in the future. In fact, Postman's 2020 State of The API Report found that 39.2% of teams have already designed and defined APIs and schema before they even begin development.

By focusing on building APIs that can serve all applications, governed by a contract between services that all teams follow, organizations can gain significant efficiencies. Adopting this approach can help teams confidently mockup APIs and test dependencies based on the agreed API definitions, minimizing the time it takes for APIs to be completed and making it easier for multiple development teams across organizations to work in parallel.

Well-designed, fully documented, consistent APIs significantly reduce the risk of failure. They encourage API use and facilitate code reuse, meaning feature delivery times will be significantly reduced. The use of mock APIs can help the identification and resolution of many problems before time is spent on coding.

Source: [2020 State of The API Report](#), Postman.



“ We have API-only platforms and we layer various applications on top of them.”

Senior Engineer,
Water Technologies Provider

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APIs For All

Maximizing the success of an API-first strategy will mean equipping the whole business — not just developers — with the tools they need to collaborate successfully. Fintech challenger Tide is using the Gravitee.io API Design Studio to close the gap between product management and development. Product managers working on a value proposition can create a mind map-style API shell that can be rolled up into a Swagger document for an engineer to build from. Having this ability deepens shared understanding of the product and enables earlier cooperation and technical discussion, accelerating code delivery.

Some major pharmaceutical companies use a similar pattern to automate data collection and sharing in their laboratories to reduce the time to scientific discovery. In recent years, some companies have been training research scientists in using Python, not just for graphing results, but to build integrations with APIs. Previously, only their developers worked on creating bridges between the physical equipment running experiments and data stores.

“ Using the API gateway, even before we have a single developer looking at the API, we already have something running and we can start testing against it. ”

Senior Solutions Architect,
Pharmaceutical Manufacturer



Due to the scale of automation which companies like these are aiming to bring to their research, they decided to enable scientists to build, consume and perform unit testing on their own APIs. Now, business analysts, who previously would have talked to the business and then written specifications, are embedded in hardware integration teams, and generating APIs. Typically, analysts are now create mock APIs together with scientists, using the Gravitee.io API Design Studio and creating mock data. This means that even before a developer starts work the team can have something running and can test against it.

The API definition files created in this process can be used to automate the documentation and application of security policies and effective governance of the API, significantly speeding development and deployment.

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Automation Of API Standards, Governance & Control

API Gateways with integrated Identity and Access Management (IAM) will become common core infrastructure elements to enable the API curation, observability, consistency, and governance required by an APIs for all approach and the secure integration of APIs across internal and external boundaries.

One typical business challenge we see is technology companies that have gone through a series of successful acquisitions, resulting in numerous development teams, each with their own legacy code and processes. Often these teams are building streams of data ingested from millions of data lakes and quality monitoring systems. Generally, streaming data is done within a group owned security boundary.

As systems are integrated across the business, these streams shift from having a single producer and single consumer to multitudes of consumers across security boundaries. Addressing the challenges of crossing these security boundaries, controlling access to message brokers, and managing permission for access to data which does not have a predefined endpoint will require the tight integration between API Gateway and IAM.

Ensuring consistency of schemas is essential to efficiency when working with multiple development groups. This is particularly important with streaming technologies using technologies like Apache Avro or Protobuf, where tweaking latency performance is required.

Using a schema registry is an effective pattern to build controls for these challenges. The schema registry is a central authority of schemas and versioning, designed with up-front rules of who owns what schema, and who can evolve the schema. When this is coupled with the message broker, leveraging the registry teams can be confident of the version of the schema, and see how to interpret it.

Tide, working with numerous banks as data providers, manages significant variability in API maturity, through clarity of its own API standards which it rigorously enforces through processes and automating governance, security, and hygiene in their API Management system. Where third party APIs are found, the team dedicates engineering resource to working with the partner to bring APIs up to the required quality level.

This combination of control, collaboration, and automation is critical to maintaining development velocity.

“ An API is useless unless it is delivered with consistency and quality. ”

Guy Duncan, CTO, Tide

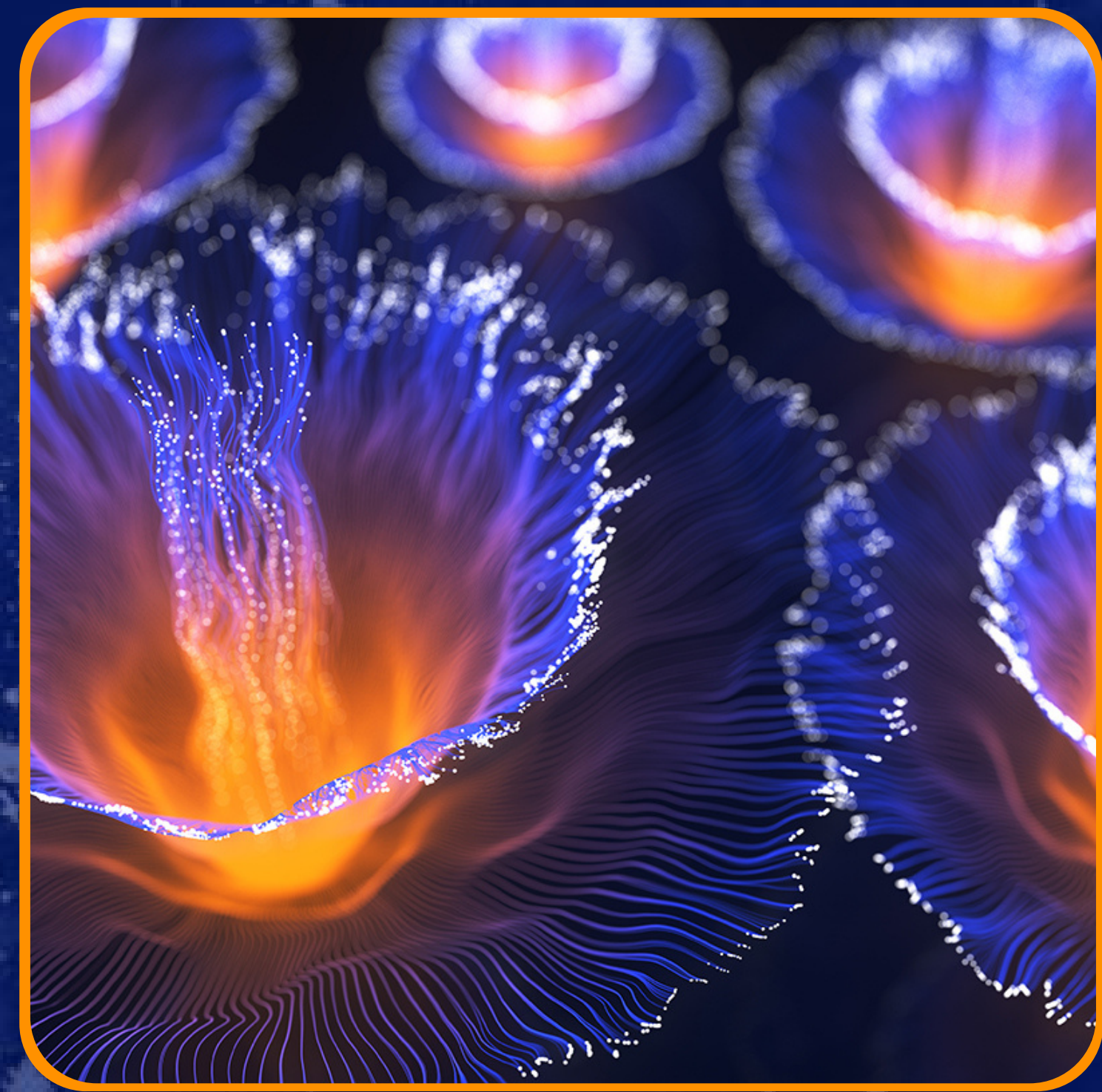
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Machine Learning Evolves From API Consumer To API Controller & Security Enforcer

APIs are an essential part of the data pipelines feeding most machine learning systems, with the machine learning algorithms increasingly calling APIs directly.

Less common, but seen as a valuable emerging tool, is the application of machine learning technology to manage the provisioning and control of APIs based on consumption data. For example, using the ML to identify anomalous connection or consumption patterns, then working with the [API gateway](#) and IAM to throttle or withdraw API access and trigger alerts so the behaviour can be investigated.

Further into the future expect ML systems to drive increased resilience by enabling self-healing systems to work round bottlenecks and halted processes.



“ In the next two to three years we will see a massive increase in applying ML for API management and provisioning. With decomposed federated architectures, it becomes a zoo pretty quickly, ML is something that can help us there. ”

Guy Duncan, CTO, Tide

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The Death Of The API Key

“ It is interesting to see that people view API security as one of the main fault points around APIs, as there are well established protocols around authentication and authorization. ”

David Brassley,
Chief Architect & Co-Founder,
Gravitee.io

Gartner have predicted that by 2022 the most frequent vector for enterprise web applications breaches will be [API security issues](#).

As the complexity and extent of the API ecosystem grows, and with it the attack surface, API security must become more nuanced.

API keys as a simple text string are notoriously accident prone; left in comments to source code, embedded in firmware, accidentally emailed, and historically have tended to be left active for months if not years.

The adoption of fully integrating [Identity and Access Management \(IAM\)](#) with [API management \(APIM\)](#) and API design tools is

accelerating. Combining IAM and APIM enables token generation for API access based on current permissions, for flexible durations, with fine grained control over data flows based on role or other attributes. This lends itself to application on service mesh architectures. By using a single identifier for all activity, auditing is enhanced, and enforcing security programmatically, for example with step up authentication, is simplified.

Consumer expectations of using biometrics and social media accounts to log in are easily met via common frameworks such as OAuth2, as is supporting legacy authentication technologies.

The security and usability case for combined IAM and APIM is compelling and will soon consign API keys to a niche history.

“ In increasingly complex systems you have a mixing of concerns, you have business logic code, you have access management code. What would be nice to do is separate those concerns, making it so even as you enforce it everywhere you can isolate those actual actions of access management. Certain technologies like service mesh could be a good possibility in that regard. You could decouple microservices from transport between the microservices, that might be a possibility. ”

Senior Engineer,
Water Technologies Provider

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The Demise Of Direct Database Access

Nuanced API security will see the demise of direct database access being provided in many API first organizations.

Tide, for example, have already implemented an OpenID based IAM system for its customers. The IAM, an integrated part of the API manager, ties individual permissions to APIs, which in turn unlock the relevant API features and functionality that unlocks the data required.

So instead of directly accessing data, it all flows via the APIs, which are the only route to the endpoint.



“ Traditionally, you would always talk about database permissions, we are now talking API permissions, you have to provision API provision which then gets you to the data, as opposed to directly having access data. At Tide, we say it all comes through API, through the endpoint and data can only accessed via that. This is a huge seismic change compared to 5 years ago. ”

Guy Duncan, CTO, Tide

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Monetizing APIs Internally & Externally

Monetization of APIs is moving from aspiration to implementation as API Gateway technology matures.

The visibility into API consumption that the latest generation of gateways provide enable APIs to be evaluated in terms of the ROI they deliver through the data they enable to be consumed or the business use cases they deliver against. Access to this visibility of value enables the justification of investment in API development.

In combination with IAM to control access, advanced API gateways can now also enable APIs to become directly revenue generating rather than relying on traditional logical flows via applications.

“ We want to accelerate the monetization of those APIs that have the greatest value to us. Monetizing them either through monitoring and just making the business aware of the importance of that API, or by wrapping up data, creating data marts etc. We think that is incredibly important. ”

Guy Duncan, CTO, Tide



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Effortless Control Of Your API Ecosystem With Automation

SOAP is not entirely washed up, REST is not sleeping, but the future of APIs lies in exploiting new dynamic protocols. The teams that take advantage of the advances in APIs and [API Management](#) to “automate the boring stuff” can look forward to more secure, more reliable systems, increased delivery velocity, and more time to solve those big problems.

[Gravitee.io](#) offers an effortless route to bring the entire API lifecycle into effective management – in days, not months – via a free, feature-rich, open source platform.

Is it time for your team to [take control of your APIs](#)?



“Firewalls are ubiquitous, they are everywhere, we think API gateways are going to become the next core infrastructure like a firewall.”

Guy Duncan, CTO, Tide

About Gravitee.io

Effortless control of your API ecosystem

Our API Platform is the richest Open source solution available. We help organizations unify APIs into an easy-to-use and secure space.

The Gravitee.io Platform has everything your business needs to integrate your APIs all in one place, allowing you to manage and secure your APIs effortlessly. Built using an intuitive, configure rather than code approach.

Start with the Open Source Edition of API Manager or Access Manager and effortlessly expand to the Enterprise Edition to benefit from API Designer, Alert Engine and Cockpit.



To discover more about the Gravitee.io full lifecycle API Management Platform, visit www.gravitee.io or [book a demo](#) today.

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