Building an Enterprise API Program

Rapid API

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Introduction: APIs are Proliferating

Application Programming Interfaces (APIs) have emerged as a key component of enterprise modernization efforts, particularly in industries such as banking and insurance where the availability of API-based resources provides leading institutions with new channels for reaching customers.

As the connective tissue linking systems and data, APIs play a crucial role in making enterprise systems and services more responsive and adaptable, while enabling companies to monetize their data, cultivate partnerships, and unlock innovation.
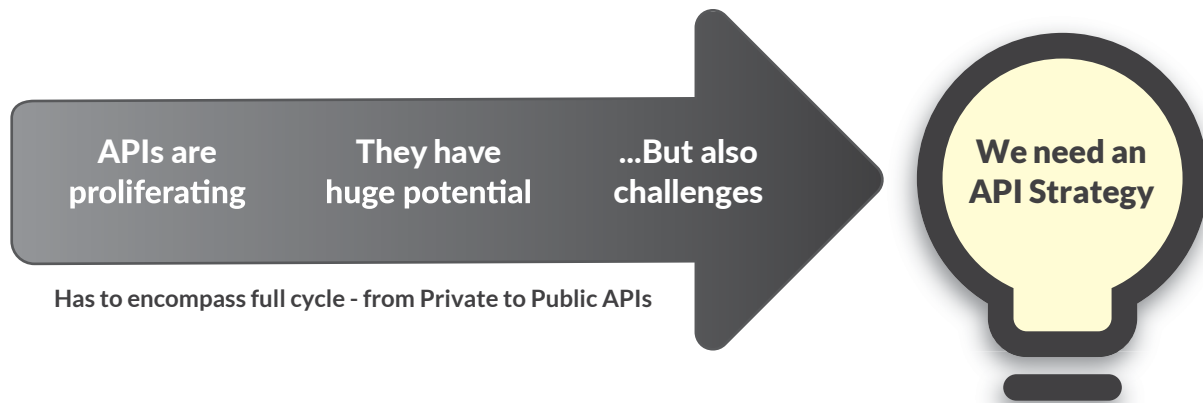
Thanks to increased demand, the API economy is projected to be a $2.2 trillion market[1] in the next few years. IT Research and Advisory Firm Ovum reports that "during the next two to three years, the number of enterprises having an API program is expected to increase by 150 percent."

Sources: Google Searches for "Rest API", 2004-2019
Ovum, "Realizing the Business Value of APIs," October 2014

SendGrid — Acquired - $3B
twilio — Public - $15B
stripe — Private - $35B
Braintree — Acquired - $800M
adyen — Public - $18B
scale — Private - $1.1B

[1] IBM, "Building for the Open API Economy", 2016

The Need for a Strategy

| APIs are proliferating | They have huge potential | ...But also challenges | → | We need an API Strategy |

Has to encompass full cycle - from Private to Public APIs
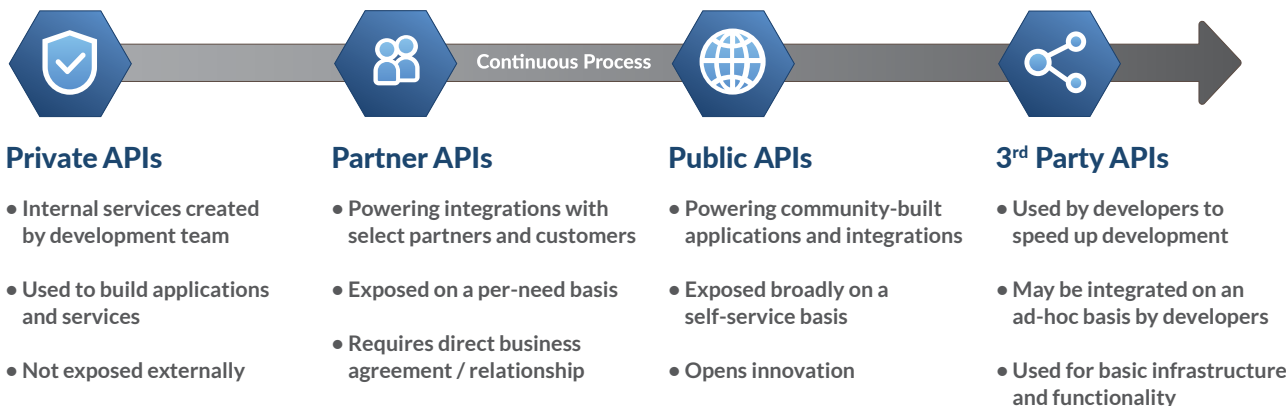
Yet despite the potential, most enterprises have failed to deliver an effective API strategy. In many cases, API programs are developed in a siloed-effort, which results in redundancies, poor integration, and an implementation not underpinned by any real business strategy. This has caused many organizations to make frequent changes to their API programs, causing resource inefficiencies and distabalizing their reputation with developers and partners.

As your organization looks to take advantage of the API economy, you will need to know how to create a sound API strategy, determine the types of APIs to account for when building your strategy, and what process and structure should be in place to consume, share, manage, and monetize the APIs in your organization.
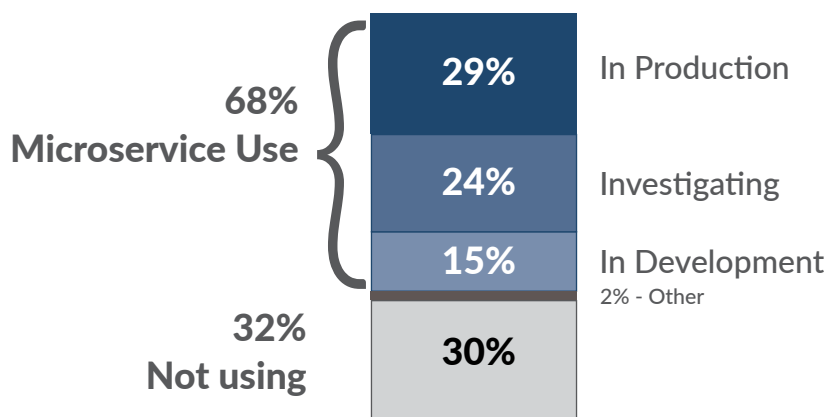
What Types of APIs are Used in the Enterprise?

APIs in the enterprise appear in many shapes and forms - from internally-built tools that are transparent to end users to strategic tools used to drive business relationships and partnerships. APIs can be classified into four main categories: Private, Partner, Public, and external Third-party APIs.

Continuous Process

Private APIs

- Internal services created by development team
- Used to build applications and services
- Not exposed externally

Partner APIs

- Powering integrations with select partners and customers
- Exposed on a per-need basis
- Requires direct business agreement / relationship

Public APIs

- Powering community-built applications and integrations
- Exposed broadly on a self-service basis
- Opens innovation

3rd Party APIs

- Used by developers to speed up development
- May be integrated on an ad-hoc basis by developers
- Used for basic infrastructure and functionality
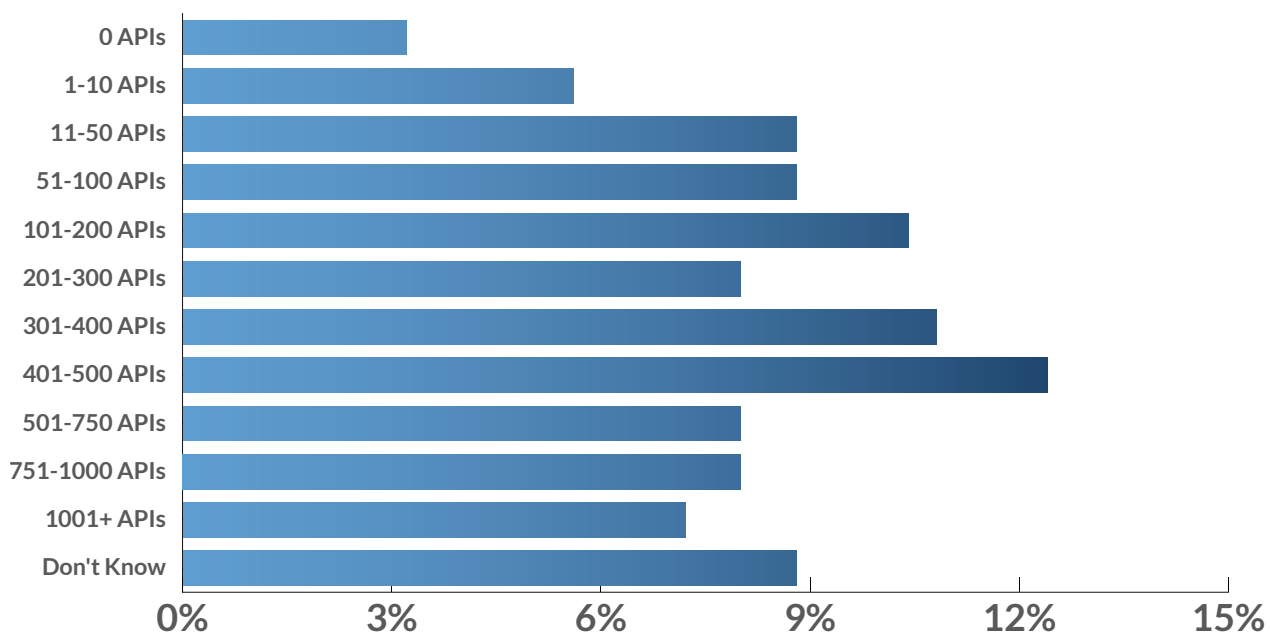
Private APIs

Business software has traditionally been created as a large monolith application, a single code base that takes care of all the app's functionality. Many companies have found monolithic applications to be big and cumbersome with impossible-to-maintain codebases. With a monolith, a change made to a small part of the application requires the entire monolith to be rebuilt and deployed. This complexity results in a big communication overhead and development delays.

68%
Microservice Use

29%	In Production
24%	Investigating
15%	In Development

2% - Other

32%
Not using

| 30% | |

Source: Ngnix Survey, 2015

These frustrations led to a new architectural style in software development where a monolithic app is decoupled into microservices. A microservice is a smaller logical program that functions with its own separate codebase and is independently deployable and scalable. Each service provides a firm module boundary — even allowing for different services to be written in different programming languages. Microservices use APIs to communicate between themselves and form one master program.

## How many APIs are in your Organization?

Source: Imperva API Survey, 2018

Developers use private APIs to connect microservices and create applications and services. They give developers an easy way to plug into back-end systems and application functions, with the goal of accelerating the development process with fewer resources. 50 percent of all organizations have more than 300 private APIs. Most companies see value in "consuming their own APIs" as they are not exposed publicly.

Because each department is developing their own APIs, there are often data and development silos, with the end result being that organizations do not achieve the productivity gains possible with APIs.
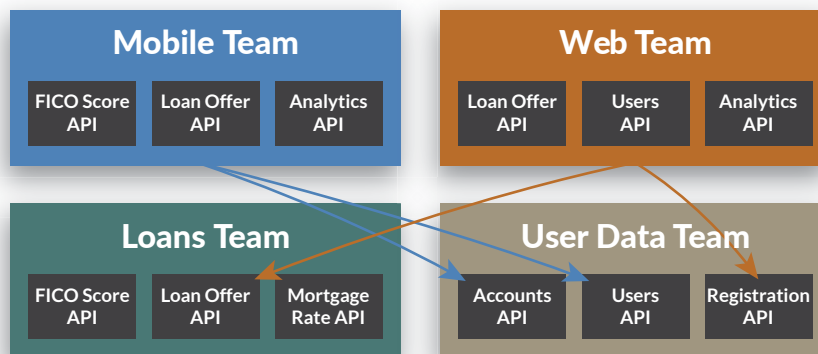

Partner APIs

Partner APIs enable businesses to power deeper integrations by opening up key APIs to channels, partners, and customers. With Partner APIs, you can collaborate with other companies to create unique solutions by determining who has access to your APIs. This enables companies to reduce development efforts while creating stickiness to their applications and services. Companies like Salesforce and Expedia garner a significant portion of their revenue by making their APIs available to partners.

The main differentiator between private and partner APIs is that while private APIs are developed internally and used by one or more internal consumers (e.g. engineering teams working in the same company), partner APIs are used by engineers in other organizations.

**Percentage of Revenue Generated Through APIs**

Expedia 90%

ebay 60%

salesforce 50%
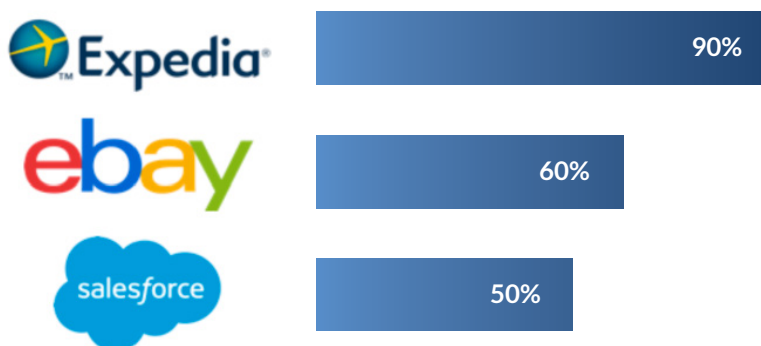
Source: Harvard Business Review, The Strategic Value of APIs, 2015

Public APIs

Public APIs enable you to provide developers access to their software application or web service and leverage them in the development of new features and services. Over the last 15 years, this trend has been on the rise with almost 30,000 public APIs being available for developers to use when developing their applications.

With a public API strategy, companies can create a whole new monetization channel or simply create stickiness to your product. The key is in understanding how external users will engage and connect to your application and how that API should be made available.

Publicly Available APIs
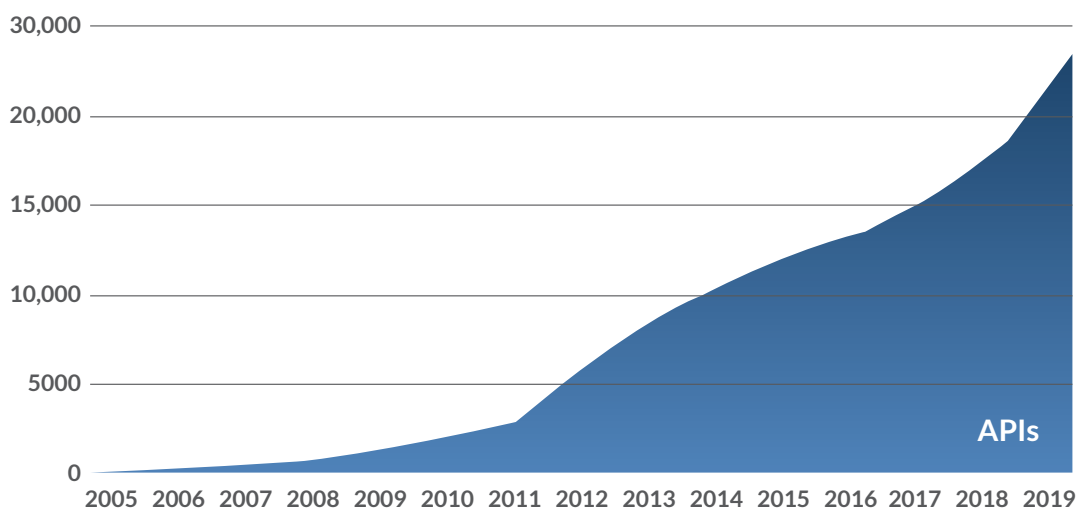
Source: Programmable Web, 2019

Third-party APIs

As companies transition to a microservices model, they have developed a microservice for each "utility" function such as billing, email delivery, or file storage.

Public API companies emerged to provide APIs for the business software functionality that many software developers want to utilize in their apps. Public APIs are microservices that provide common functionality that many developers across business require.

For the $35B Stripe, this functionality was payment processing. For $13B Twilio, it was sending SMS and for $3B SendGrid, it was email delivery. For this new wave of companies, their business is fueled by their APIs.`

This strategy is appealing because it enables:

Faster Development: Ability to integrate existing functionality as opposed to building it from scratch

Better Service: API providers have years of expertise to offer higher quality services

Cost-effectiveness: API companies enjoy economies of scale, and thus can offer services at a lower cost

New Possibilities: Access to technologies like AI, machine learning, and image recognition

But integrating APIs can be hard for your developers as dealing with issues such as different formats (REST vs. SOAP vs. GraphQL, etc.), data, authorization schemas, billing, provisioning, etc. can erode productivity.

Average Number of Days to Build Net New API Integrations

19%	38%	19%	16%	8%
<5	30	60	90	>120
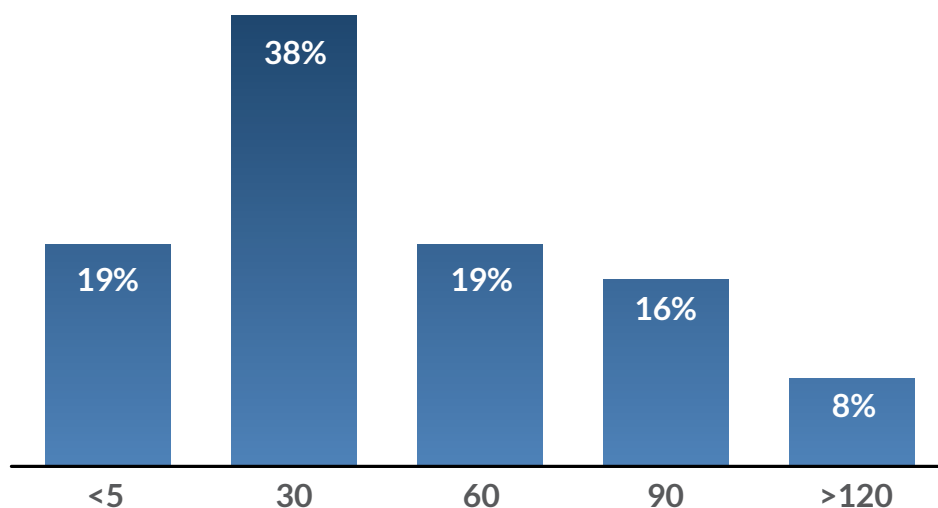
Source: State if API Integration, 2018 Report

And third-party APIs can create risk. Every API is a runtime dependency of your application, meaning:

If an API goes down–**your app is down**

If an API is breached–**your data is leaked**

If an API becomes slow–**your app is slow and unresponsive**

If an API is not compliant–**your app is not compliant**

Third-party APIs accelerate software development and innovation but the risks created by APIs necessitates that companies create a comprehensive API strategy that includes executive support, the right structure, governance, and control.

How to Create an API Strategy

To take advantage of the benefits of the API economy and to avoid the pitfalls, it is imperative that you first determine your business goals — is it accelerating development? Creating product stickiness? Monetizing business assets and datasets? Unlocking innovation? How can you achieve these goals — will it be using private, partner-facing, public, third-party APIs or some combination?

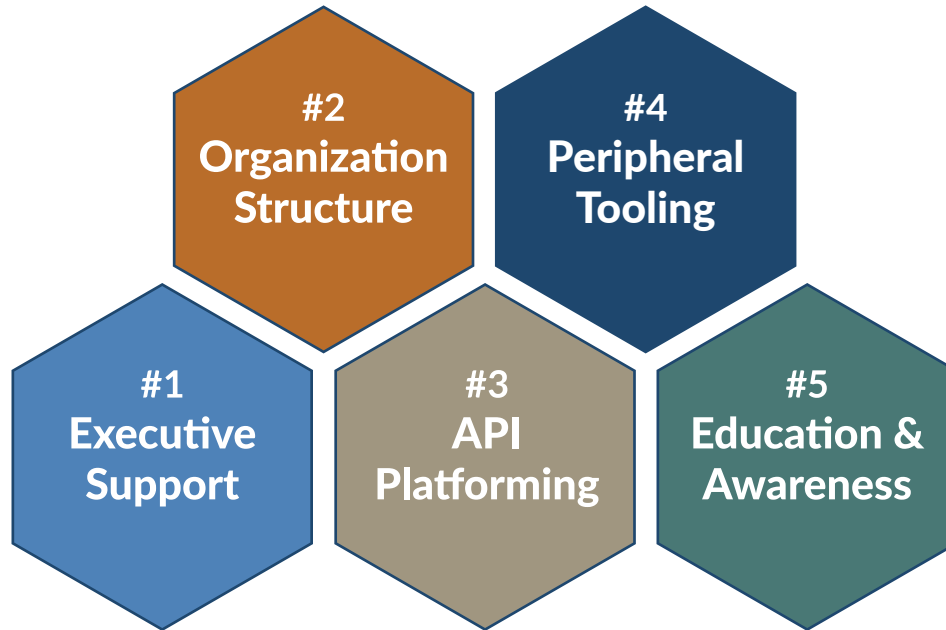**Private APIs**   **Partner APIs**   API Strategy   **Public APIs**   **3rd Party APIs**

Depending on the types of API, it is important to understand what you want to accomplish for each type of API:

- For private APIs and microservices, you need to make it easier for developers to collaborate, share and reuse APIs.

- For partner-facing APIs, you must expose services to partners while making integrations seamless.

- For public APIs, how can you create a public API ecosystem that fuels innovation?

- For third-party APIs, how do you monitor and govern consumption?

Once you determine your organization's goals, you need to put the right components in place.

The 5 Components for Building an API Strategy

#2
**Organization
Structure**

#4
**Peripheral
Tooling**

#1
**Executive
Support**

#3
**API
Platforming**

#5
**Education &
Awareness**

#1 Executive Support

Developer adoption is critical but executive support is the catalyst. The leadership team must buy into the strategy and dedicate resources to:

- Build a team with dedicated headcount and budget.

- Choose the right tooling that will enable the team to standardize and drive unity.

- Allow time for engineering teams to make the transition and commitment.

- Create incentives that motivate teams to share APIs and contribute.

- Establish a culture that enables you to break down silos and operate as a unified company.

Creating a culture and an organization oriented around APIs is not a simple task, and requires many organizational changes and most importantly — budget and patience. But when done properly, it can pay off well and prove transformative for the organization.

"

"Right now we are API-ing every layer, celebrating any use anywhere and knowing we'll have more opportunities in the future."

WIRED 05.06.2019

"

Satya Nadella
CEO, Microsoft

"

"All teams will henceforth expose their data and functionality through service interfaces. Anyone who doesn't do this will be fired."

Amazon Inc., 2002

"

Jeff Bezos
CEO, Amazon

#2 Organization Structure

It is imperative that you determine the type of organization structure needed for overseeing your API strategy. Your company can either go for a single team owning the strategy, a more horizontal structure or a hybrid of both. When setting up the model, it is important to address the following:

- Who approves APIs to be used?

- Who approves APIs to be published?

- Who defines the standards that APIs conform to?

- Who decides & buys APIs tools?

To determine whether to go with Teams Model or Cross-organization model:

Team Ownership	Cross-organization

Optimization - allow teams to define their own tools, cadence and stack based on:

- Product / tech needs

- Team knowledge

- Available resources

Experimentation - allow for more experimentation in the stack

Culture - create a feeling of ownership by different teams

Interoperability - make it easire for teams to collaborate and use other services by making them familiar

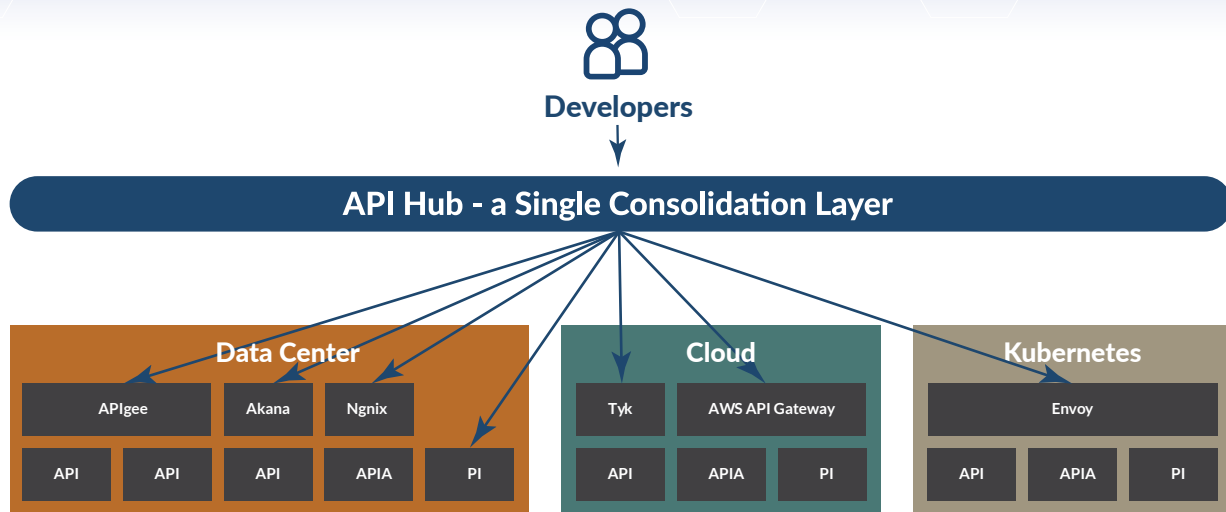**Support** - align the tech stack to have expertise built throughout the organization

Economics - benefit from economies of scale when buying tools in bulk

Optimization - allow to hone and perfect a single stack across the company

Ideally, your organization should opt to integrate components of both types of models, enabling engineering teams to own their own tooling while taking advantage of a centralized support model for ensuring collaboration and support across the organization.

#3 API Platforming

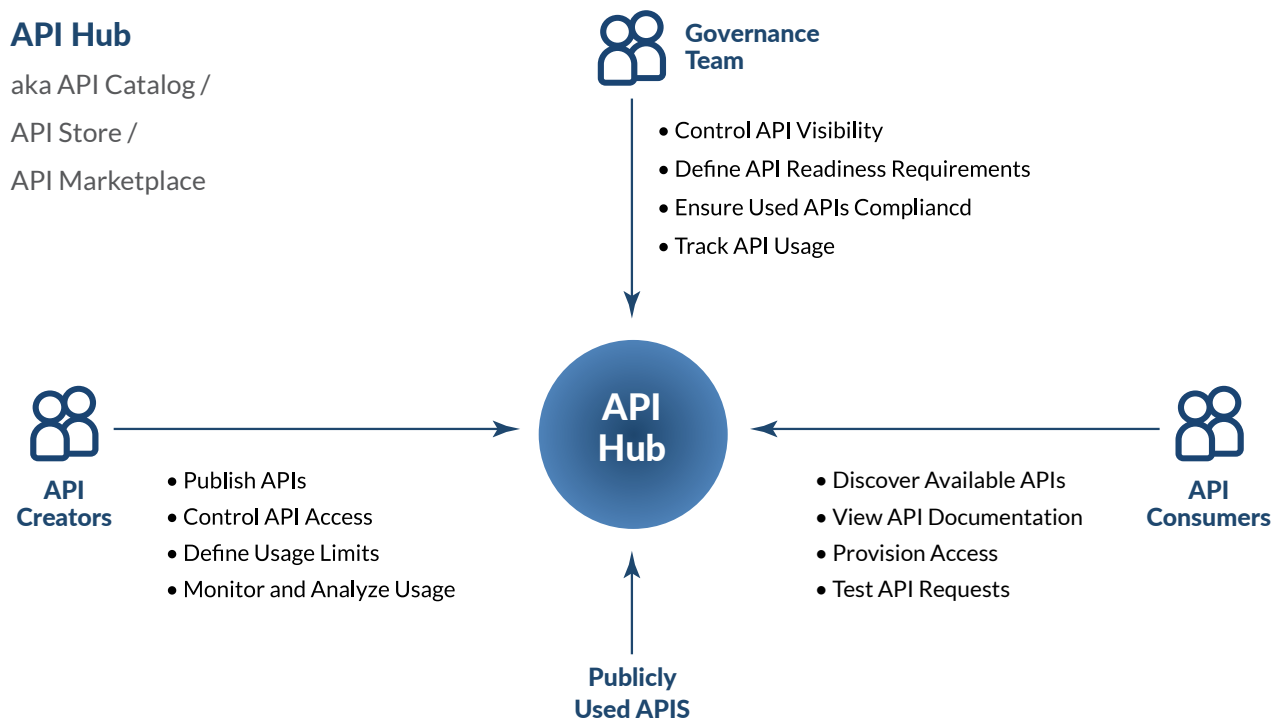Whether you choose a teams-based approach or a centralized API strategy, your organization will need a centralized place to discover and connect to APIs. Although there are a variety of API runtime technologies and Gateways for the data center, cloud and Kubernetes-based infrastructures, a single consolidations layer is needed to find, connect, and manage the hundreds of APIs your organization is using currently.

Developers

API Hub - a Single Consolidation Layer

Data Center

APIgee	Akana	Ngnix

API	API	API	APIA	PI

Cloud

Tyk	AWS API Gateway

API	APIA	PI

Kubernetes

Envoy

API	APIA	PI

An API Hub provides a centralized catalog for helping developers, product managers, IT, and API creators to find, manage, and connect to all APIs — using a single key and SDK. An API Hub enables your organization to create new efficiencies, accelerating the software development process. And an API Hub provides management capabilities that enables you to govern and manage API consumption with enhanced visibility and control.

API Hub

aka API Catalog /

API Store /

API Marketplace

Governance Team

- Control API Visibility
- Define API Readiness Requirements
- Ensure Used APIs Compliancd
- Track API Usage

API Creators

- Publish APIs
- Control API Access
- Define Usage Limits
- Monitor and Analyze Usage

API Hub

API Consumers

- Discover Available APIs
- View API Documentation
- Provision Access
- Test API Requests

Publicly Used APIS

RapidAPI Enterprise Hub

RapidAPI is the world's largest API Marketplace, enabling more than 1 million developers to access more than 10,000 APIs using one SDK, API key, and dashboard. RapidAPI's Enterprise API Hub is a private API Marketplace used by developers, analysts, and product managers to discover and connect to internal APIs, as well as API subscriptions.

RapidAPI's Enterprise API Hub:

• Is branded with your company's identity.

• Can connect to your internal systems.

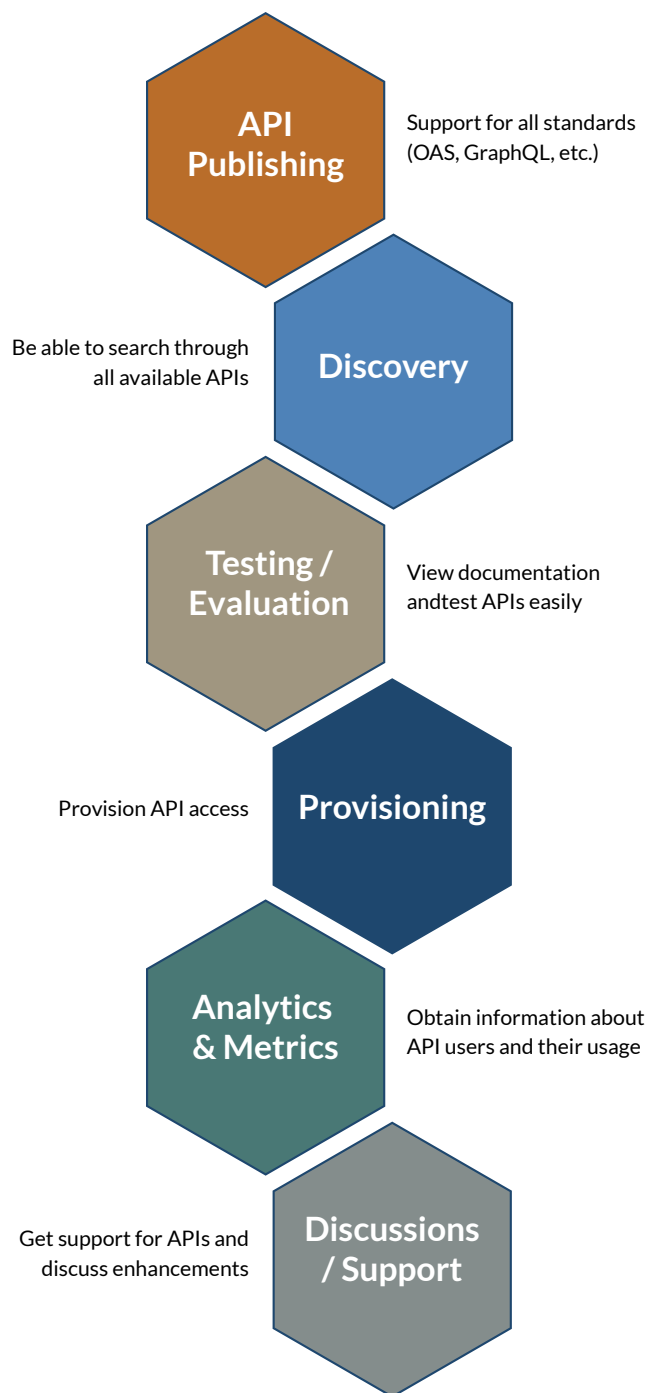• Is deployed seamlessly on premises or the cloud.
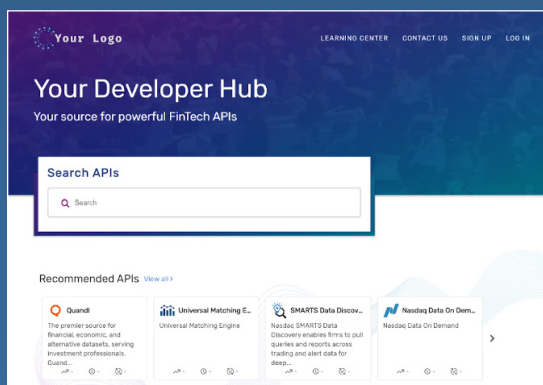
Once set up, engineering teams can publish their APIs into the hub. RapidAPI supports all your APIs, regardless of what API gateways or management solutions they use.

Your IT team can use a dedicated dashboard to manage who accesses the API and how the APIs get consumed. With the dashboard, they can access detailed analytics and monitoring information to ensure:

• Data security
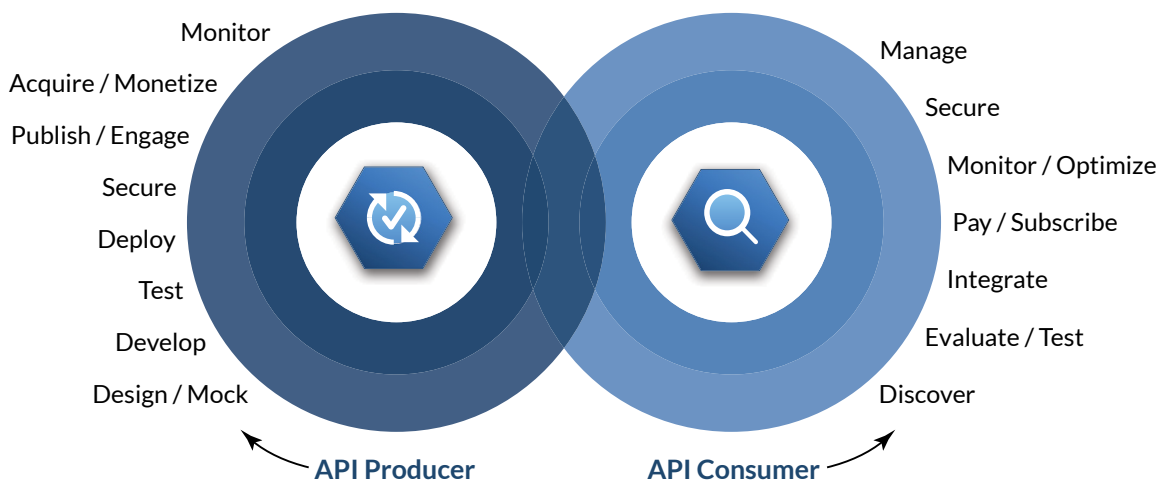
• Compliance

• Adherence to SLAs

Additionally, companies also use RapidAPI's Enterprise Hub as an external marketplace, enabling customers and partners to find, connect, and manage their APIs.

When choosing an API Hub, it is important to look for key capabilities:

API Publishing — Support for all standards (OAS, GraphQL, etc.)

Discovery — Be able to search through all available APIs

Testing / Evaluation — View documentation andtest APIs easily

Provisioning — Provision API access

Analytics & Metrics — Obtain information about API users and their usage

Discussions / Support — Get support for APIs and discuss enhancements

#4 - Peripheral Tooling

Beyond an API Hub, there are a set of tooling that are required for creating a successful strategy across the entire API lifecycle. This tooling includes API design tools, testing and monitoring tools, data, middleware, etc.

Monitor

Acquire / Monetize

Publish / Engage

Secure

Deploy

Test

Develop

Design / Mock

Manage

Secure

Monitor / Optimize

Pay / Subscribe

Integrate

Evaluate / Test

Discover

API Producer   **API Consumer**

API Design

Good API design results in a better developer experience, improved documentation, and increased adoption of the API. Companies like Postman, Insomnia and Swagger provide design tool options.

Testing and Monitoring

Testing tools enable you to "live test" the API to ensure it meets expectations for functionality, reliability, and performance. For monitoring, the right tool enables you to monitor API uptime, complex functionality testing, and performance. Companies like API Fortress, API Metrics, and Runscope provide testing and monitoring to ensure the health of your API.

Synthetic Data

Synthetic data is a "fake" data set that is created algorithmically and is used as a stand-in for test dataset or to validate certain mathematical models. It carries the same statistical properties as the original data so it can be used for AI/ML. Because the data-sets are sensitive, it typically cannot be shared across the company.

Middleware

The last tooling that is typically recommended with any API strategy is the right middleware solution for converting older API types to more modern APIs (REST, GraphQL, etc.). These middleware solutions combine data from multiple sources into a single user-facing API. It is often used for creating APIs on top of existing systems and data sets. AWS AppSync, Dream Factory, and Prisma are all companies in this space.

#5 Education and Awareness

When introducing an API strategy to the enterprise, it makes sense that you educate the team on the latest technologies and best practices.

For example, to generate awareness, you might want to:

- Create an **API Newsletter** to highlight new services and data available and new tooling and reward API publishers.

- **Celebrate wins** by highlighting them and incentivizing both API publishers and users.

- **Schedule events** such as internal hackathons and meetups as starting points for API awareness.

- **Drive visibility for API publishers** to create the first internal champions. Everyone wants their API to be popular!

To educate your team on using and managing APIs, there are several ways you can initially get started:

- Maintain **up-to-date documentation** on API standards and tooling.

- Create **Seminars** and workshops on API development and tooling.

- Invest in **Online Courses and make them available to everyone in the company.**

The time is right to get started!

You already know that APIs are the foundation for any modernization effort and they have the potential to help you change the velocity of your business. Determine the types of APIs that your organization has and view those APIs as valuable assets for accomplishing business goals - whether they are for internal productivity or building a new revenue channel. There often is not one right path but it is important to agree on a path, get executive buy-in, and create an API strategy that will enable you to create differentiation and enable innovation. Get started now as an API strategy is essential for remaining competitive in today's digital economy.

For more information,visit us at https://rapidapi.com/enterprise