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API 101: Modern technology for creating business value

A guide to building and managing the APIs that empower today's organizations

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The modern API: What it is and why you need it

Application programming interface, or API as it's universally referred to, is a technology almost as old as software itself, designed to allow data to flow between different applications. Today, modern APIs enable much more than inter-application data exchange; they are the foundation of new business processes, the lifeblood of customer-centric innovation. APIs speed new business processes into production, to quickly exploit opportunities and drive revenues.

This white paper provides an actionable overview of best practices for building and managing modern APIs, the technology engine that drives business growth and value creation, 21st-century style.

The conduit of digital ecosystems

Increasingly, sophisticated new processes are created between companies, not just within. Along with their business partners, the most advanced organizations form a **digital ecosystem**, which Gartner defines as an "interdependent group of actors (enterprises, people, things) sharing standardized digital platforms to achieve a mutually beneficial purpose."[1] As to what that mutually beneficial purpose may be, Gartner notes, "Business ecosystems offer unprecedented access to the capabilities, resources, and talent on a global scale that sets the stage for innovation."[2]

APIs are the conduit of digital ecosystems, allowing mobile deposit and myriad other seemingly "magical" processes to occur.

Digital deposits in consumer mobile banking provide a perfect example of a digital ecosystem in action. No longer do customers need to trek to a branch office to deposit a paper check. They can now open the bank app, take a picture of the front and back of the check, specify the amount and, somewhat magically, money is transferred into the customer's account within a day. Many backend systems must be integrated for online banking to occur; mobile deposit requires a highly integrated system of applications, databases, transaction processes and services to interact together almost instantly.

APIs are the conduit of digital ecosystems, allowing mobile deposit and myriad other seemingly "magical" processes to occur. Specifically, by facilitating communication within, and beyond, corporate boundaries APIs:

- Enable business systems to connect to each other
- Accelerate partner connectivity
- Increase customer stickiness
- Increase speed and agility
- Improve business processes

The seismic change in the API landscape

Processes like mobile deposit were unimaginable even a decade ago; since then, the API landscape has changed significantly. The highly structured SOAP data exchange protocol of yesteryear has been largely supplanted by the built-for-the-web REST protocol, improving business outcomes by allowing legacy applications to work more effectively with newer technology. The complexity of SOAP slowed operations and innovation, a hindrance that has been largely reversed by REST. For example, basic online banking has been available for well more than a decade, yet robust, reliable web and mobile banking has been fully enabled only within the past several years.

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[1] "Insights from the 2017 CIO Agenda Report: Seize the Digital Ecosystem Opportunity," Gartner. **gartner.com/imagesrv/cio/pdf/Gartner_CIO_Agenda_2017.pdf**
[2] Digital Business Ecosystems & The Platform Economy," Gartner. **gartner.com/technology/topics/business-ecosystems.jsp**

Quick API primer

APIs typically come in the form of REST, SOAP, and RPC with REST APIs being the most common web services API used today.
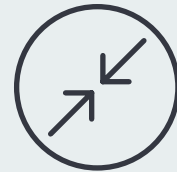
REST

Representational State Transfer (REST) is a concept that allows for flexible patterns over any protocol, through mostly HTTP/ HTTPS. Most popular today.

SOAP

Simple Object Access Protocol (SOAP) uses XML to define API request and response structure. Still in use, but slowly falling out of favor as it is relatively rigid.

RPC

Remote Procedure Call (RPC) is a inter process communication which allows calling a function in another process (local or remote).

Likewise, over time, point-to-point integrations between two applications have been replaced by more complex integrations. Point-to-point integrations are fragile and prone to break, causing productivity and revenue losses. They're often quick-fix integrations intended to be temporary but end up permanently in production. Over time they've been replaced by more sophisticated, complex multipoint integrations that are sturdier and more reliable, yet require comprehensive management.

In response, API management platforms have proliferated, enabling widespread API adoption within digital ecosystems and beyond. The resulting broad monetization of APIs has yielded the API Economy, in which companies sell their APIs to other organizations on a subscription basis, utilizing value-based metering to determine fees.

Read on to learn more about best practices for building and managing modern APIs.

iPaaS: A better way to build APIs

Ad hoc, hand-built point-to-point integration has given way to a strategic approach. Many organizations have embraced integration platform as a service (iPaaS) technology to assist in building their digital ecosystems. An iPaaS is a cloud-based platform enabling the deployment, management, and governance to connect software applications and services across different environments. An iPaaS should allow the user to create integration pipelines and convert the composite into an API, a process that is much faster than writing and testing an API from scratch.

iPaaS is most often used in large business-to-business (B2B) environments – i.e., digital ecosystems – that need to integrate on-premises applications and data with cloud applications and data. As a cloud-based platform, iPaaS scales to meet the increased data volume from multiple environments. Because legacy production environments are almost always involved, an iPaaS should support real-time integration with the goal of minimum disruption.

Gartner estimates that enterprise iPaaS crossed the $1 billion threshold in 2017. It reached more than $1,075 million in 2017 and grew 72 percent year over year in terms of providers' subscription revenue when compared with 2016.[3]

A superior alternative

When considering their iPaaS options, buyers should be aware of the difference between legacy and modern integration solutions. Legacy iPaaS providers are older, existing integration companies that have modified their tools to work with cloud services. Modern iPaaS solutions are born in, and architected for, the cloud.

Because they are optimized for the cloud environments that enable today's ecosystem-driven digital transformation, iPaaS solutions offer operational efficiencies and business outcomes superior to two traditional alternatives:

- **Hand-built APIs** create very high downstream maintenance overhead, requiring programming resources to address any change in the surrounding computing environment that may affect the API. They are also vulnerable because professionals familiar with the particular APIs may not always be available. For these reasons, hand-built APIs frequently break, jeopardizing the flow of business and revenues.

- **APIs provided with an application** incorporate integration expertise limited to that application's development team. They are inefficient because each application has its own API; collectively, they present a high learning curve for professionals wanting to work with multiple APIs. Lastly, while application APIs may function adequately, they do not incorporate the bilateral high performance and reliability required to keep enterprises running at peak efficiency.
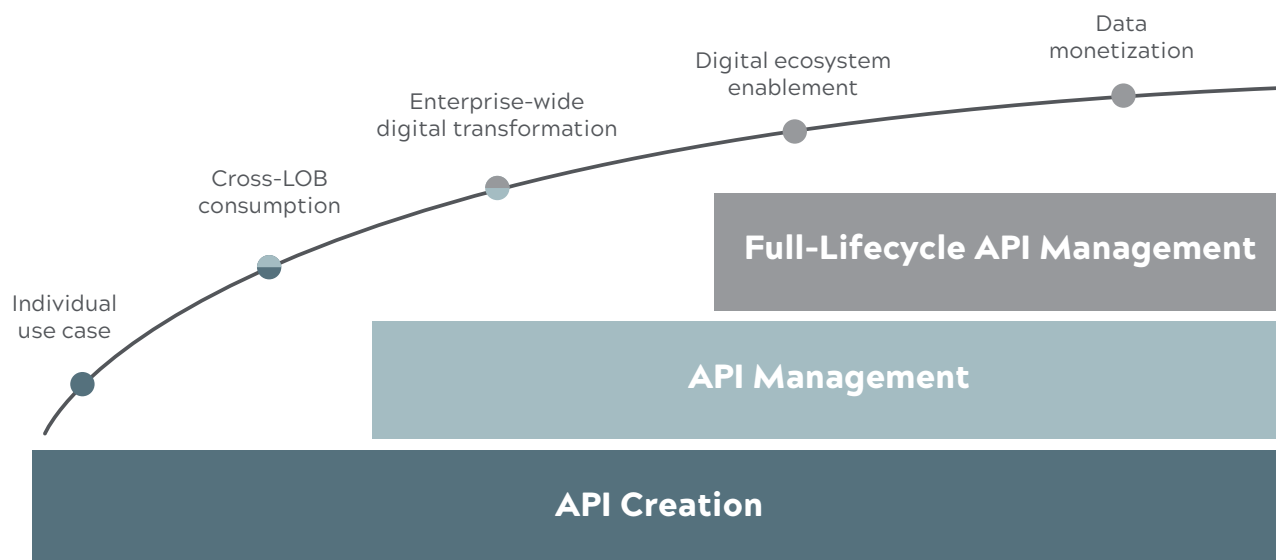
The API Integration Maturity Curve

Figure 1: The API Integration Maturity Curve comprises three phases: building APIs, managing them, and full-lifecycle API management.

[3] Gartner report Market Share Analysis: Integration Platform as a Service, Worldwide, 2017 - Published 7 August 2018 - ID G00366592. gartner.com/doc/3885665/market-share-analysis-integration-platform

Modern API management: Where are you on the maturity curve?

As modern APIs proliferate across enterprises and digital ecosystems, effective management becomes an issue of paramount importance. The API Integration Maturity Curve illustrates the management requirements that correspond with the ever-higher benefits organizations can derive from the strategic use of APIs.

In developing strategies for API integration, it's important to consider the API Integration Maturity Curve, the stages of which are:

API Creation: The first level of API maturity involves meeting the needs of individual use cases – in other words, solving a business problem. For example, to get new employees productive more quickly, onboarding processes must be automated. As a first step, the developer needs access to an API that updates an HR portal showing individual employee data.

API Management: The next level of maturity is achieved when lines of business, such as sales and marketing teams, use APIs to achieve interconnectivity. As the integration strategy matures, enterprises effectively adopt a strategy of enterprise-wide digital transformation; by connecting any system to any other within their organization, and exposing those connections internally as APIs, critical data flow is achieved.

Full-Lifecycle API Management: Achieving full maturity includes enabling a digital ecosystem via connections to external partners. When a digital ecosystem has been created, the corresponding full API integration maturity can catalyze new revenue streams through data and API monetization. Specifically, Full Lifecycle API Management encompasses:

- **API creation** with an iPaaS platform that provides system and technology integration, to enable both application and data integration use cases. The iPaaS platform exposes all functionality as an API endpoint.

- **API management** through the iPaaS platform's facilities. These include API gateways, proxies, developer portals, and analytics to distribute securely, market, and monitor API consumption/monetization.

User profiles and requirements

APIs touch a wide range of user constituencies inside the enterprise and beyond. Each group has different concerns that, ideally, the iPaaS can meet. In fulfilling different users' requirements, an API strategy typically maps to the API management maturity curve – API creator, API managers, and API administrator in the sections below.

API creators need the right support and guidance. Whether "citizen integrators" or developers, API creators want fast, easy application and data integration. They may be building integrations for individual use cases (one integration) or for consumption across multiple lines of business (LOB), which involves many integrations. These users want to:

- Consume REST and SOAP APIs

- Create REST APIs

- Access rights and security policies to enable private, partner, and public APIs

- Upgrade legacy access capabilities through SOAP to REST transformation

Because they are driven by time-to-value, API creators require pre-built connectivity to business system and enterprise technology. This enhances their ability to implement business logic to drive data transformation. The iPaaS platform, therefore, should provide a foundation with integration endpoints, and REST and SOAP APIs. The platform should also deliver underlying business logic as pass-through data flows that are exposed, instead of individual connections to each system that is integrated into the environment. Enterprises must also implement the desired security with private or public API access and keys or authentication, as required.

To ensure achieving maximum value from their efforts, API creators need to be guided by:

- An API creation (execution) strategy
- Clear security management and access control policies
- A cloud-first technology environment that facilitates hybrid cloud API connectivity

Together, these capabilities and guidance comprise an enterprise API Gateway.

API managers require the right development resources. In addition to API Gateway capabilities, the API manager - who typically is building intra- and inter-enterprise integrations, including web services - is focused on having the necessary governance, visibility, and security resources to deliver multiple integration projects at scale. API managers may also be building API products for external distribution and monetization. This manager should be provided with:

- A developer portal
- API governance capabilities such as traffic monitoring
- API analytics to gain granular detail into the APIs' operations and performance

The Open API (Swagger) specification is central to API consumers' efforts. APIs created by the iPaaS platform should be able to integrate with any API management platform by using OpenAPI specifications generated by OpenAPI-compatible integration platforms. The specifications should be easily generated into a single Swagger file that can be downloaded.

The REST APIs from all related tasks for the project are imported via this file into any API management platform of choice, including:

- Apigee
- Microsoft Azure
- 3Scale
- CA Technologies' Layer 7
- Amazon API Gateway
- Kong, and more

The sum of these resources is an *API Design* capability.

API administrators require tools that facilitate granular visibility, management dexterity, and more. API administrators typically handle a very large number of integration points and/or a large library of APIs for internal use and deployment across a digital ecosystem of partners. APIs may be monetized, as well, and must be professionally maintained like any commercial software.

In addition to API Gateway and API Design capabilities, API administrators require tools to help them perform important tasks that accompany API monetization. With an emphasis on governance, visibility, and lifecycle management, these tasks include:

- Developer management
- API usage analytics and monitoring
- Administration
- Traffic shaping and management
- Integrated, interactive API testing
- API versioning and lifecycle management

How to determine API and management requirements

It can be a challenge to determine exactly which capabilities are vital today and which will be in the future. The Venn diagram in Figure 2 illustrates the overlap between API creation and API management, with enhanced management requirements (full API lifecycle management) listed on the next page.

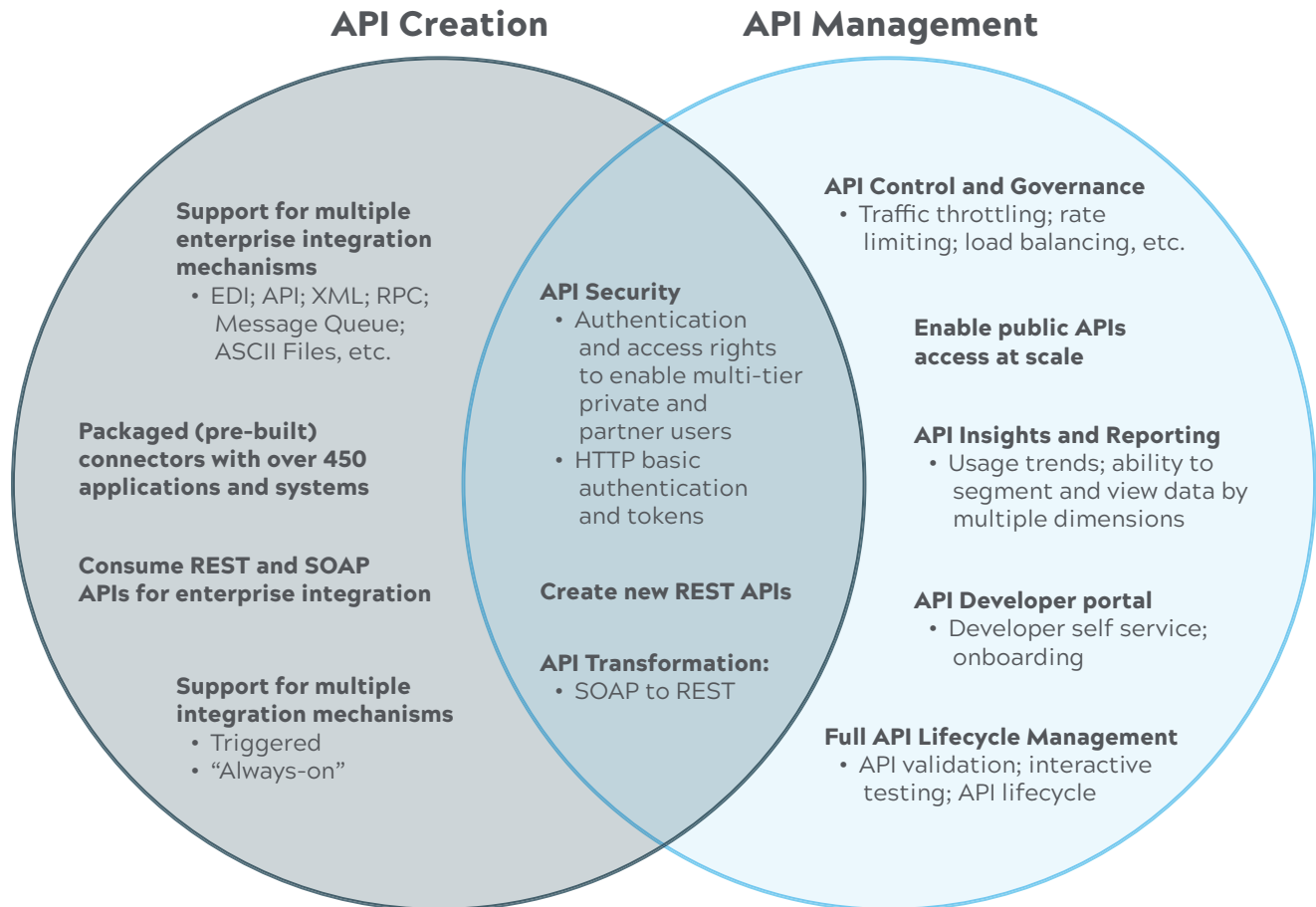## Overview of API creation and management requirements

Figure 2: An organization's API needs will grow over time, requiring an iPaaS platform that evolves commensurately.

Whether an iPaaS platform provider offers its own management and full lifecycle management capabilities, or partners with a third party for the latter, the combined solution should offer:

- Best-of-breed API creation through the iPaaS platform
- Broad catalog of pre-built connectors
- Best-of-breed API Management

- A focus on no-code/low-code solutions
- Cloud-first and hybrid deployments
- Advanced analytics
- Integrated testing and lifecycle management
- Developer portal
- Advanced threat detection
- Seamless API proxy deployment.

Solutions that do not meet these stringent criteria can result in serious downstream business impairment. Buyers should beware API and third-party full-lifecycle management solutions that:

- Have limited pre-built business system and technology connectors

- Require moderate to heavy code development

- Have limited deployment options (either cloud or on premises; no hybrid)

- Lack developer portal

- Lack integrated testing

- Lack advanced threat detection

- Are not built for enterprise scale

From here to modernity: A checklist for API longevity

The foundation of any high-performance, high-value API environment is the right application and data integration solution; the right solution will make it infinitely easier to adhere to best-practice API development and management processes.

The right iPaaS platform has a modern architecture to span both legacy and cloud-based deployment environments. The platform must be able to coexist with current technology and be used to create new data, application, and process integrations whenever it makes business sense to do so. Instead of a "big bang," the iPaaS technology can be phased in over time, project by project – without a forklift upgrade.

The components of a modern, manageable architecture

- 100% REST-based architecture reads and writes data between applications incorporating HTTP and HTTPS Uniform Resource Identifier (URI), affording library-less integration functionality.

- Parity between on-premises and cloud deployments smooths the transition between the two environments without short-changing performance on-premises, or in hybrid combinations of the two.

- Elastic scale-out architecture of cloud-based deployments allows new compute resources to be added in near real-time, to seamlessly support new workloads or spikes in processing requirements.

- Multi-tenancy lets development teams create integrations once and then serve multiple businesses and projects, while meeting security, performance, and business requirements.

- API-readiness allows users to consume APIs of any application they want to integrate and build APIs to any application in REST format, thus removing the burden of manual updates.

- Native support for poly-structured data (such as hierarchical and relational data [JSON]) enhances the performance of data-interchange formats that are critical enablers of modern application integration.

- Pre-built capabilities for ASCII, EBCDIC, and other common formats ensure that data from mainframe and other legacy applications can be quickly integrated into the evolving environment.

- Multiple integration modes accommodate event-based, real-time, batch, or scheduled activity.

- Big data and IoT integration allow very large amounts of data to be quickly ingested from virtually any source, including IoT device logs.

By choosing a modern iPaaS, organizations can be assured they can embark on the best management path forward – whether using the platform's integrated API management functionality or a best-of-breed third-party solution for API full lifecycle management – to quickly exploit opportunities and drive revenues.

Case Study | TBWA Worldwide

TBWA Worldwide is a global agency network owned by Omnicom Group that oversees more than 300 ad agencies around the world. As TBWA grew and added more agencies to its brand it needed a way to streamline their agency and employee account management without stifling growth.

In the past, their IT group hand-coded integrations that were increasingly time-consuming and unable to keep pace with growth. At the same time, IT wanted to connect legacy data repositories to the cloud and automate their account management process. Lastly, they faced a daunting challenge of migrating more than 11,000 employee accounts from Google Suite to Microsoft Office 365 in less than 30 days. Realizing that an API Management solution alone wasn't going to keep pace, they turned to SnapLogic's unified integration platform.

"We were stuck and couldn't get people up to speed with this API management tool," said Andy McCown, Director of Software Development, TBWA Worldwide. "It would have taken us more than 90 days to complete the migration, and that was when I called SnapLogic to speed up our project. SnapLogic has changed how we approach API integrations, creating APIs now takes hours instead of weeks."

Using SnapLogic's no-code integration platform, the TBWA team automated employee accounts for faster response times. Furthermore, by tying together decades-old legacy data sources with its cloud-based accounts, TBWA agencies can now obtain access to data in real-time, resulting in higher customer engagement and satisfaction. Lastly, the SnapLogic Enterprise Integration Cloud enabled a 67 percent improvement in time to migrate the 11,000+ employee accounts from Google Suite to MS Office 365 with a faster setup time.

SnapLogic: A unified integration platform

SnapLogic's self-service integration platform-as-a-Service (iPaaS) enables innovative companies to grow their business strategically while increasing organizational agility and productivity. With SnapLogic in place, organizations across industries can reduce the time needed to complete integration projects for departmental or enterprise-wide initiatives.

The SnapLogic Enterprise Integration Cloud (EIC) is a comprehensive integration platform that not only enables API creation and management, but connects applications, big data, data warehouses, devices/machines, and suppliers/partners. Powered by Iris AI, no-code Integration Assistant saves time and increases integration pipeline accuracy. Combined with more than 450 pre-built intelligent connectors, organizations of all sizes can gain the following results, on average:

- 83 percent improvement in time to go live
- 1 month to deploy an integration project
- 2.6 full-time employees required to complete an integration project

To learn more about how SnapLogic can set the foundation for high-performance API creation, management, and full lifecycle management, visit **snaplogic.com**. Or try the EIC right now by **signing up for a free 30-day trial**.