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The application programming interface sprawl is reaching a critical threshold as AI adoption accelerates. Since APIs are the key language of data transfer that AI uses, ensuring API producers are using best practices has never been more important.

APIs: The Key to AI and Application Connectivity

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Introduction

The application programming interface (API) landscape in most organizations is complex. The organizational use and development of APIs are rapidly growing and will not slow down anytime soon. API usage was already on track to continue increasing before the widespread understanding and adoption of AI technologies accelerated — and now their use will grow at an unprecedented scale. AI adoption, including generative AI (GenAI), will be another consumption point for APIs but at a potentially larger scale, as APIs are invoked to enable AI components such as AI agents and retrieval-augmented generation (RAG). However, most organizations have not adequately solved the complexity in their API landscape.

AT A GLANCE

KEY STATS

- Organizations estimate that nearly one-third of the APIs they use are unmanaged, meaning that those APIs are more likely to leave the organization vulnerable to attacks.
- Embedded AI capabilities are already a key decision criterion for organizations when they evaluate their API management solutions.

There are several sources of complexity, but one of the biggest is having a full inventory of the APIs used within an organization. Companies must manage a mix of internally developed APIs and static and dynamic third-party–developed APIs, each with varying formats, data access, and developer approaches. According to IDC's June 2024 *AI-Enhanced Connectivity Automation Survey*, nearly a quarter of organizations admit they do not know how many APIs of any type they use. However, they do know that many APIs running critical operations in the business are unmanaged, meaning APIs are not controlled and monitored by a system that catalogs them, maintains documentation about use, and ensures they meet organizational development and security policy standards. Organizations estimate that approximately 29% of the APIs they use for day-to-day operations are unmanaged, leading to challenges in effectively governing and protecting them from unintentional and intentional data and resource misuse. In truth, the number of unmanaged APIs might actually be higher. In IDC's survey, nearly half of the respondents admitted that they do not have software to detect unmanaged APIs.

Organizations were developing APIs long before API management software was commonly deployed. A steady stream of APIs were developed before the creation of a central catalog that would document existing capabilities to avoid the creation of duplicate APIs. Many single-use APIs had also been developed and replaced during this time, leading to a growing API graveyard. This sprawl is at risk of creating more AI enablement challenges.

How AI Is Changing the Role of APIs and API Management

A comprehensive, enterprise-grade API management tool is critical to discovering, managing, and securing APIs. API management solutions are not new, but their urgent adoption for a holistic view of an organization's APIs has become essential. APIs play a crucial role in broader organizational AI enablement, including access, management, and many other important capabilities to make adoption easier and more beneficial. APIs are the communication vehicle that provides AI with contextual data for processing, regardless of the AI modality used (generative, predictive, or interpretive). For example, in GenAI, companies can use APIs to perform retrieval-augmented generation to supply LLMs with organizational data for prompt context, which is critical to obtaining personalized and more relevant responses from AI. However, protecting the organizational data that feeds into AI requires complete visibility into API usage and robust monitoring.

Organizations are also infusing AI capabilities into API management and gateway tools to enhance product capabilities. These features will make API management tools easier to use, facilitate API discovery and documentation, and help development teams deliver new capabilities to the organization faster.

Definitions

- **Application programming interface (API) catalog:** This is a repository feature in most API management software that centrally tracks and manages all the APIs available on a platform or in an organization. Most API management systems have their own catalog and do not necessarily connect to other API management solutions within the same company.
- **API discovery:** This software detects APIs, including unmanaged APIs, by scanning and indexing network traffic, analyzing patterns to create documentation on an API function, and cataloging to add it to a central catalog, where it can be validated for security and compliance. Historically, API management software did not include API discovery, but an increasing number of suppliers are offering it as part of a more comprehensive API management suite of services.
- **API gateway:** This software enables and monitors APIs at runtime, routing authorized access to back-end services while providing load-balancing and rate-limiting capabilities and effective monitoring and logging for all attempted transactions.
- **AI gateway:** These are components that typically sit on top of existing API gateways and have capabilities to guard against malicious prompts and protect the data that feeds into a model for context. Typically, an AI gateway is not licensed for an additional cost and is considered an add-on to an existing API gateway.
- **Retrieval-augmented generation (RAG):** This technique improves the quality and accuracy of generative AI (GenAI) responses by injecting context into a GenAI prompt.
- **Universal API management:** This software can manage APIs across multiple gateways and catalog tools, regardless of supplier, to provide a more complete inventory of the available APIs in an organization. Universal API management is sometimes licensed as part of an API management solution.

- **Unmanaged APIs:** These are APIs that are not registered through an API management system, meaning developers are responsible for their own documentation, validation, security and compliance, API functional testing and promotion, version control, and API usage data.
- **Zombie APIs:** These are APIs that an organization no longer uses and have deprecated from being invoked but are still active in the catalog and registered to a gateway, meaning they are available to call on — creating potential security and compliance issues.

Benefits

API management solutions offer various benefits to enable AI while addressing API proliferation. Their deployment provides the mechanisms necessary to tame API sprawl and make use of existing API assets. Key benefits of a modern API management system include:

- **Enabling better AI results:** APIs power AI capabilities. From providing context to AI at runtime to accessing AI services, APIs are a prerequisite for anything an organization wants to do with AI. But the API must be fit for purpose and managed appropriately. In addition, AI gateway capabilities help customers control what data is shared with each LLM the organization uses, which often varies by prompt and purpose.
- **Boosting productivity:** One key pain point in managing APIs is avoiding multiple developers independently creating similar APIs with similar functionality. API management systems provide a catalog of APIs already developed in the system, making it easier to avoid costly development cycles to recreate existing capabilities that may not be as robust or secure. This saves time for developers as well as for compliance and operations teams. Most API management systems provide analytics and runtime data to assess API performance in the moment and over time.
- **Increasing architectural flexibility:** Although REST-based APIs are the most commonly used, 32% of organizations' active APIs are not REST based but a mix of both newer and older formats. GraphQL and asynchronous APIs enable new architectural design capabilities that can reduce message volume and latency. Managing these APIs and the documentation to use them effectively and safely is critical to determining the optimal API type for the right use case.
- **Increasing standardization and security of APIs:** An API management solution makes it easier for developers to follow standard development practices and to reuse APIs. Standardization helps secure APIs by limiting the likelihood of less secure versions of the API being used. It also simplifies the process of applying security and compliance policies.

The right API management solution will provide tools to increase developer velocity and block or limit threats in real time where APIs are the attack surface, acting as the first line of defense in a broader API security strategy.

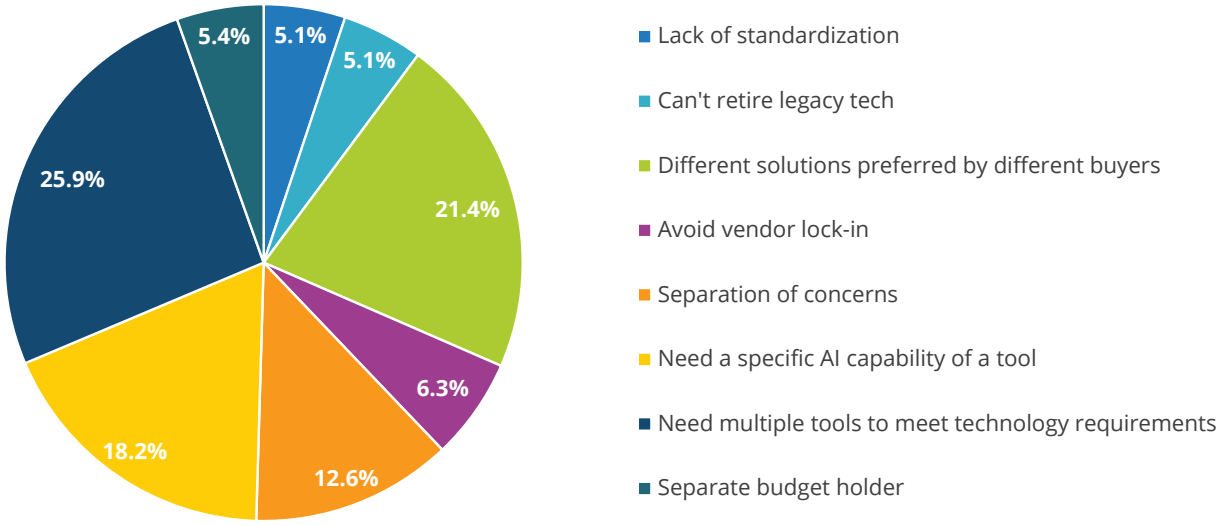
Trends

Although API management is not new, it is receiving renewed focus. Many organizations use multiple API management tools and sometimes even multiple separate gateway solutions across the enterprise to manage their APIs. IDC's June 2024 *AI-Enhanced Connectivity Automation Survey* found that 40% of organizations have at least two API management tools and 33% use multiple API gateway providers.

Several factors contribute to the use of multiple tools, including differences in preferred solutions, failure to decommission technology that an organization plans to replace, and a separation of concerns. As shown in Figure 1, the top 2 reasons are related to specific technology requirements for a given use case or solution preference. The third-biggest reason was the need for a specific AI capability in the API solution.

FIGURE 1: ***Primary Reason for Having Multiple API Management Solutions***

Q ***What is the primary reason you use more than one solution for the following API management?***



n = 619

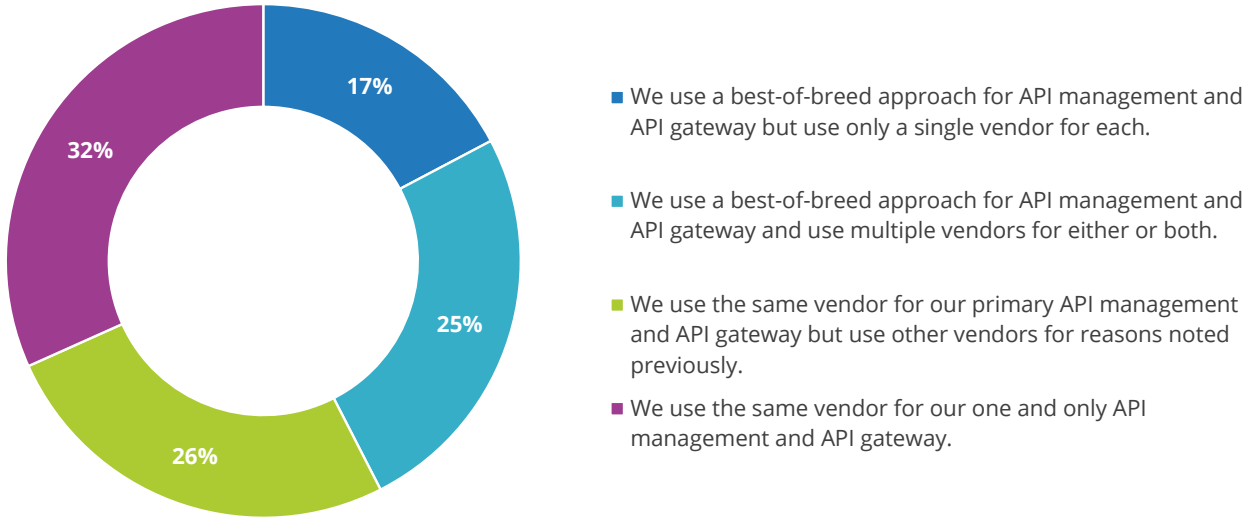
Source: IDC's Worldwide AI-Enhanced Connectivity Automation Survey, June 2024

Although specific technical capabilities can be a legitimate need, it's important to constantly evaluate the validity of having multiple solutions. Tools are constantly evolving, and actively using multiple solutions can hamper API reusability and standardization, particularly if an organization does not deploy a universal API management solution above disparate solutions. Solution preference and comfort without a legitimate technical limitation means the organization could be incurring unnecessary risks and costs. In some cases, the technical limitation might be that companies have API management needs beyond REST, which is approximately 32% of all the APIs deployed today — with little change in the API mix expected in the next two years. While SOAP-based APIs comprise the bulk of that 32%, asynchronous-, GraphQL-, and gRPC-based APIs each account for 5% of an organization's APIs, meaning solutions that do not support multiple API formats may be contributing to additional tool sprawl.

In addition to multiple API management tools adding to complexity, some organizations prefer to take a best-of-breed approach to gateways and management solutions, as shown in Figure 2.

FIGURE 2: ***Preference for API Gateway and API Management Solutions***

Q ***Which of the following statements best describes your API management and API gateway vendor approach?***



n = 619

Source: IDC's AI-Enhanced Connectivity Automation Survey, June 2024

With all of these tools, it's little wonder that it is challenging to get a single control and management plane of the organization's API estate. This must change if organizations want to gain control of their APIs and use them for AI capabilities. Otherwise, AI capabilities will be the next point of sprawl, further compounding the challenge.

Considering IBM

IBM has provided API management solutions for over 10 years. In 2024, the company completed the acquisition of webMethods and StreamSets, bolstering its integration capabilities for both cloud and on-premises customers. Available as both standalone and as part of iPaaS, IBM offers edge and comprehensive API management capabilities with its webMethods and API Connect offerings. Organizations can manage all types of API styles and protocols, including REST, GraphQL, and AsyncAPI. IBM offers support to API producers and users and has a customizable developer portal intended to facilitate the discovery, sharing, and subscription to APIs with proper access control and authentication.

Strategic Acquisitions, Partnerships, and Adjacent Products

IBM continues to build out both its API management and broader connectivity portfolio with innovative capabilities.

The company developed and released an AI gateway capability that provides visibility into and control over third-party AI services that organizations use. It is intended to provide better insights and cost management while enhancing AI services governance and compliance. IBM also uses AI and automation to enhance API testing capabilities and speed, improving overall developer productivity. This includes capabilities such as automatically generating test cases. Most recently, IBM

launched an API Assistant feature that uses GenAI, powered by watsonx.ai, intended to help users enhance API documentation and remediate errors faster.

Since IBM closed the StepZen acquisition in February 2023, it has been incorporating GraphQL capabilities to better utilize these APIs. GraphQL support includes the ability to build and manage GraphQL APIs, including rate limiting to secure back ends.

In April 2023, IBM partnered with API security provider Noname Security, acquired by Akamai Technologies in June 2024. The partnership is aimed at providing customers with a simpler way to add API discovery capabilities to bring more awareness and insight to unmanaged APIs. API discovery capabilities use data source collectors to retrieve traffic logs and traces, making it easier to find unmanaged APIs running across the enterprise. While already providing the first layer of security capabilities, including authentication, authorization, and policy implementation, with the Noname/Akamai partnership, IBM can now also offer advanced API security capabilities, such as identifying API misconfigurations and vulnerabilities and detecting and blocking API attacks in real time using machine learning.

In addition to API management portfolio enhancements, IBM has increased its investment in connectivity technology research and development. One example is IBM Event Automation, which the company introduced in 2022 for event-driven connectivity use cases and offers for separate licensing or as part of the Cloud Pak for Integration. These investments suggest that IBM is committed to creating a robust portfolio of capabilities in the broader connectivity space, as well as in API management.

IBM continues to innovate and invest in API management across discovery, API development, security, analytics, and governance to help organizations solve their API challenges and become AI ready.

Challenges

IBM's webMethods and StreamSets acquisition in 2024 brought together leading capabilities in API management and integration from both companies. However, some customers are concerned about overlapping products and potential portfolio complexity. That said, IBM has committed to ensuring no loss in functionality or disruption to either set of customers, and it has developed a road map to bring the best features of both API Connect and webMethods into each product as it works to implement its longer-term vision for its integration portfolio.

Conclusion

Modern API management tools provide organizations with the resources they need to build, deploy, govern, and monitor APIs at the scale needed for a real-time, AI-first world. Selecting the right solution is key to not just taming sprawl but also ensuring that API assets deliver strong capabilities and better business outcomes.

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About the Analyst

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Shari Lava is senior director, AI and Automation. Ms. Lava's core research coverage includes the fast-changing integration and API management software space, including an emphasis on the market understanding and adoption of these key technologies and how they are powering AI to drive better business outcomes. Because connectivity-automation sits at the nexus of AI and data, Ms. Lava also frequently contributes to other AI and data research.

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