akana™

Powering the API Economy

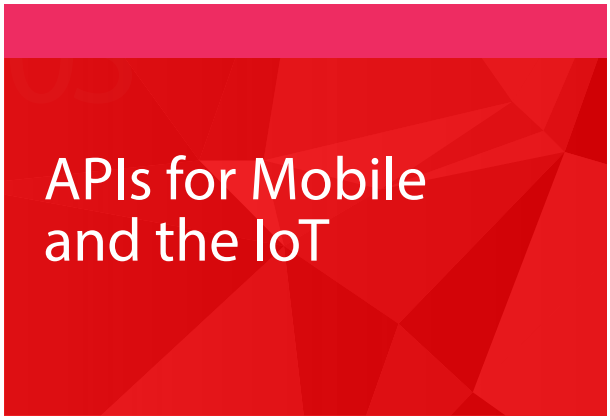
Enterprise API Adoption Patterns

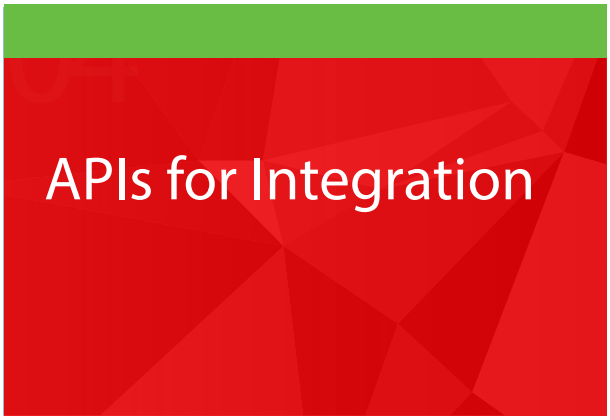
Introduction

Moments of technology-driven inflection in business are often hard to spot because they occur more slowly than the hype cycle might hope. This is the case with enterprise adoption of APIs. It has been tricky to identify enterprise API adoption patterns because API use is often at multiple levels of maturity within the same organization. The use cases are not always as simple as are found with consumer APIs such as those from Facebook, Google or Twitter. Yet, the transition is clearly happening and ushering digital transformation with enterprises.

Businesses seeking to leverage the latest forms of mobile and digital channels are utilizing RESTful APIs to deliver engaging experiences to their customers and partners, wherever they are. Enterprises are investing in APIs in order to forge ahead with digital transformation initiatives, in order to increase revenue, and improve productivity. APIs have become the technology of choice for enterprises that want to make their data and content more readily available for consumption, whether it be externally or internally. As we see more corporations tackle the pragmatic challenges of adopting APIs, distinct patterns are beginning to appear.

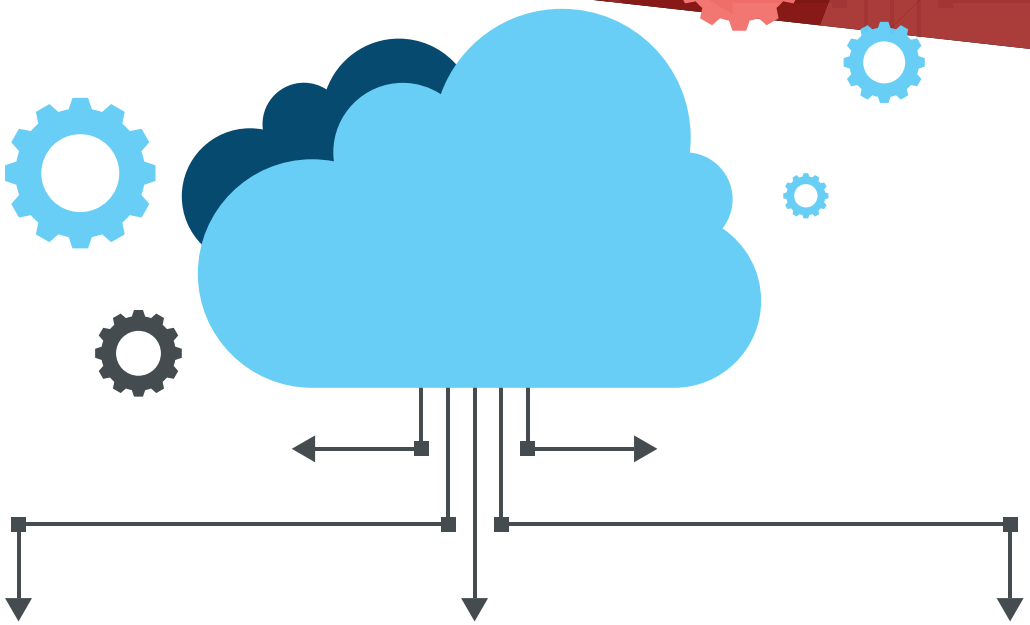
This paper looks at four APIs usage models that are emerging as businesses revise their internal enterprise architectures so that they can address business needs with agility and efficiency:





Each of the above patterns has unique business drivers and often has varying levels of architectural implications on how the APIs need to be implemented and shared.

APIs Used for External Innovation



Smartphones, mobility and the IoT are changing the way users consume digital information. They're changing the expectations and experience of customers interacting with enterprises. At the heart of these changes is the API. APIs have fast become the channel through which enterprises can share data and information with new digital eco-systems. To broaden the reach of its digital assets, an enterprise has to leverage an external eco-system of partners and developers who can consume data and services to create new products and services across an exponentially growing set of digital channels: various mobile platforms, connected devices, and the IoT. Most importantly, enterprises have to empower their developers and partners to discover and launch completely new and innovative business models that further expand revenue and profit potential. The low friction of changing API connections externally allows even large companies to iterate and change offerings based on rapid learning, as if they were "lean startups."

The demands and expectations of today's customers are nimbly met by digital enterprises. For example, Netflix's ability to stream it contents nearly ubiquitously across multiple channels and devices through APIs have helped it displace incumbents and cement itself as a leader in delivery of video content. Alternatively, Weight Watchers, in it 2013 Q4 earnings call, blamed disappointing results in part on consumers turning to apps like Lose It and MyFitnessPal. Even old industries are affected. For instance, John Deere revealed at Gartner Catalyst 2014 that the agriculture equipment provider is using APIs to collect contextual information (e.g. weather, soil conditions, GPS co-ordinates) gathered from its equipment to increase crop yields and provide up-to-date information to farmers, on their device of choice.

To accelerate their digital transformations, increase customer satisfaction, and discover new and improved revenue streams, enterprises are adopting externals APIs which can be adopted by external partners and developers in self-service mode. However, unlike large-scale consumer APIs that provide little to no support, enterprise APIs typically require a more interactive business relationship, proactive support, and a deeper engagement model. It can be challenging to have business relationships with entities that you don't completely know. An API management platform can provide a complete solution that allows an enterprise to attract developers and partners, provide documentation and seamless onboarding and testing tools, support and collaboration tools to foster communication and handle issue resolution, and an infrastructure that an enterprise needs to benefit from external developers without incurring undue risk.

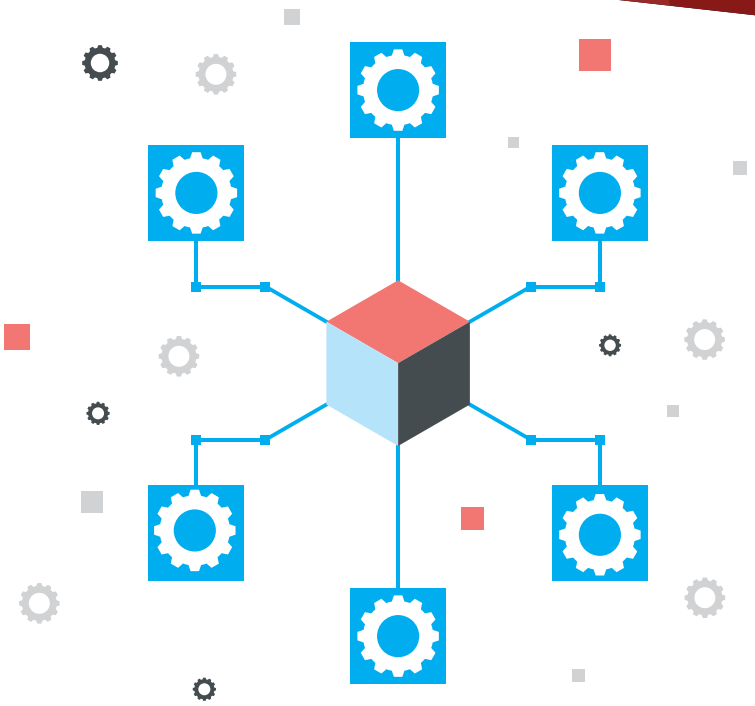
APIs enable faster connection to partners than is usually possible with traditional application integration methods

Partner or B2B APIs

In the context of external APIs for enterprises, partner or B2B APIs can be more effective than completely open APIs such as those found on Facebook and Twitter. Netflix recently transitioned from open APIs to a partner-centric API model. This type of B2B API implies that your APIs are available for consumption by a large set of business partners, rather than being open to anyone. While the technical aspects are similar to open APIs, partner APIs are more rigorous because they are essentially an aspect of a commercial relationship and usually imply that some meaningful commercial transactions are taking place. Both sets of parties are accountable to ensure the success of an API program. The API consumer is known with its activities dictated by a legal contract between the API provider and consumer. API provisioning and contract can still be automated and self-provisioned, allowing enterprises to achieve scale. Service levels and other aspects of API delivery are usually well established and may even be contractually guaranteed.

APIs enable faster connection to partners than is usually possible with traditional application integration methods. This, in turn feeds more growth in the partner ecosystem as well as an improved partner/customer experience. Indeed, in many cases we have seen, the partners actually demand to use REST interfaces for connectivity.

Internal APIs



Internal APIs improve utilization and enhance efficiency within and across an enterprise. Internal APIs build up on service-oriented architecture (SOA) but take it a step forward by addressing the consumption side of the equation, i.e. make it easy for internal developers to discover and consume internal services. The reality, however, is that most companies do not get to start using APIs from a clean slate. They have to contend with many (possibly hundreds) of not well-designed services, typically based on SOAP or other protocols, and move forward from there. When an organization wants to create APIs for internal use, it will likely add them on top of existing web services that expose various back-end systems.

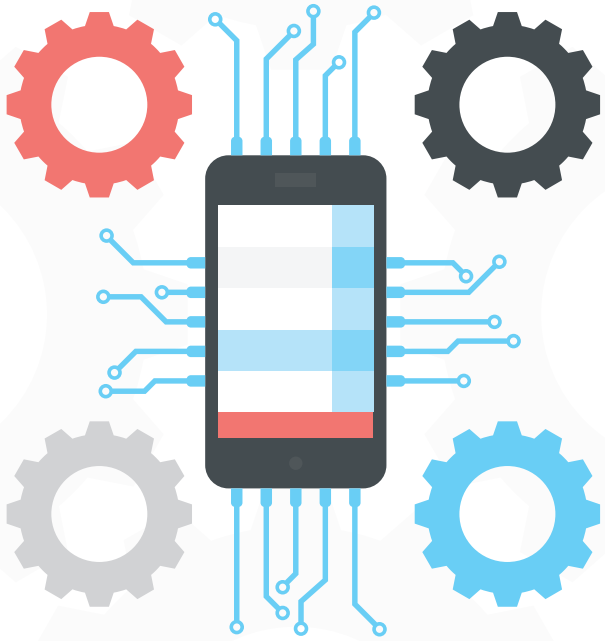
The challenge with SOA was that while enterprises embraced the protocol, the associated technologies to publish these services, such as UDDI and Service Registries, were quite complex and led to limited adoption within the enterprise. They provided the right kind of control, security and governance model for sensitive internal services, but made it difficult to discover and consume them. An Internal API Catalog combines the collaborative, open practices of external API Portals with search, controlled visibility, selective provisioning, and integration with enterprise security that are required for internal development. This public-private fusion offers enterprises a refreshing and productive way to harness the potential of APIs for software reuse and business value creation from within an enterprise.

Compared to open or public APIs, internal APIs have many distinct characteristics that require a different approach to management and security. While an enterprise might have only a few external APIs, it might deploy hundreds of internal services delivered in multiple protocols and transports including REST, SOAP, and POX, over HTTP/S, AMQP, MQ, JMS. To foster reuse, speed, efficiency, and agile application development, enterprises need to be able to publish their internal APIs in a searchable catalog. They need all the capabilities of an external API portal but combined with the kind of security controls and visibility restrictions often required for internal scenarios.

APIs for Mobile and the IoT

Your customers, partners and employees aren't who they used to be. Digital touch points permeate every aspect of their lives – how they get rides using Uber and Lyft, how they plan vacations using Airbnb, how they pay for their transactions using Paypal or Square, or how they collaborate with colleagues at work using apps like Dropbox or Yammer that might not be even approved by their corporate IT departments. Users can now expect to control their homes and cars remotely, whether it be controlling temperature through Nest sensors, or remotely securing and monitoring their houses, or even remotely starting and stopping their cars. Self parking or even self-driving cars are soon going to become a common sight.

The focal point of computing power is shifting from the server room to the smartphone, tablet, connected car, ubiquitous sensors and smart devices that are pervasive throughout our digital lives. This presents businesses with the opportunity to develop new experiences that are tailored and designed specifically for this new generation of devices. By 2017, 74% of the US adult online population will own smartphones, and 46% will own tablets. By comparison, by 2020, there estimated to be 50 billion connected devices, which are now all categorized as the Internet of Things (IoT).



All of this is pushing us towards a world where software is pervasive and influences everything, everyone, and every experience. In this world, APIs are the critical glue that connect these digital devices and experiences with each other or backend applications whether they reside in the cloud or private datacenter.

APIs in Mobile

The app economy was largely triggered with the introduction of the first Apple iPhone in June 2007. This ushered in a new generation of apps, which was first focused on consumers and but soon mushroomed into all aspects of lives including enterprises and how they interact with their customers, partners and employees. However, interfacing existing legacy applications and even enterprise data with mobile apps mandated the use of a simpler interface, one that could be easily consumed within mobile devices that had less computing power then the prevailing desktops. More importantly, the interface could be shared easily with developers who could then incorporate it in their apps. This perhaps was the catalyst that popularized the use of APIs.

While APIs are now a de-facto standard for externalizing data for consumption by mobile devices, enterprise API providers still have to take into considerations the design, security and operational aspects of APIs so that they are optimized for mobile consumption. Mobile devices primarily rely on cellular connectivity, which in most cases is still slower or more restricted in bandwidth. APIs should be optimized, cached, and designed so that they support transactions that are not too chatty, do not carry huge amounts of data that cannot be immediately displayed or consumed in the mobile device. The interactions should be secured, but at the same time offer an engaging user experience, providing support for standards like OAuth and OpenID Connect. Akana API Management platform provides the management tier that provides much of the security, orchestration and mediation capabilities required for optimizing APIs for enterprise mobility.

The Internet of Things (IoT)

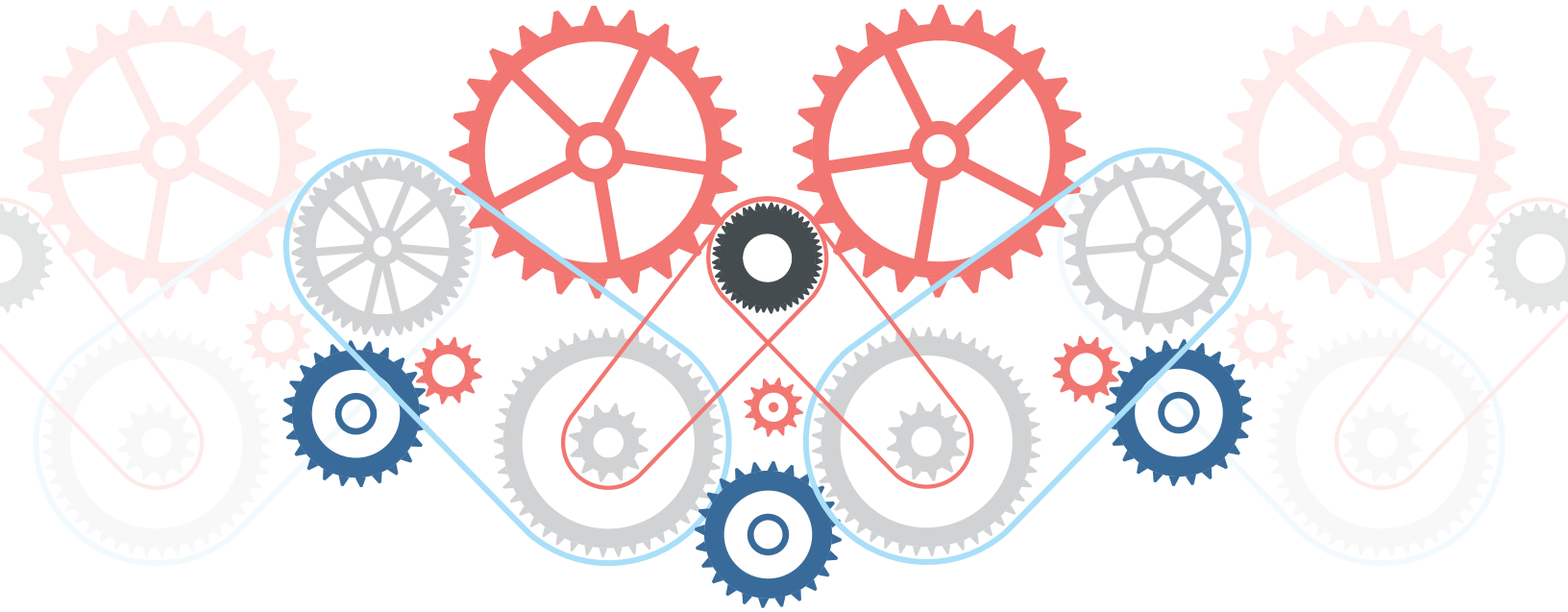
The Internet of Things (IoT) refers to the interconnection of uniquely identifiable embedded computing-like devices within the existing Internet infrastructure. These include the hotly discussed wearables (like iWatch), connected cars, connected sensors like Nest thermostats, e-meters, and a slew of other connected "things". Due to the ubiquitous nature of connected objects in the IoT, an unprecedented number of devices are expected to be connected to the Internet. APIs are again the critical glue that provides the interconnectivity for IoTs. APIs are the arteries through which data flows within this universe of billions of connected devices.

Digital enterprises that have initiatives encompassing IoTs should understand that while APIs are the soul of interconnectedness, IoTs are unique from mobile APIs in two very specific aspects. First, there are a variety of different protocols that IoT APIs would need to support. These protocols go beyond RESTful APIs and include AMQP, MQTT, CoAP and XMPP, to name a few. The second aspect is that the scale of IoT communication will be exponentially larger than the current "web scale" that companies like Google, Facebook, and Amazon have successfully been able to overcome. The amount of traffic, its chattiness and scale will be beyond what any organization and infrastructure provider has experienced so far.

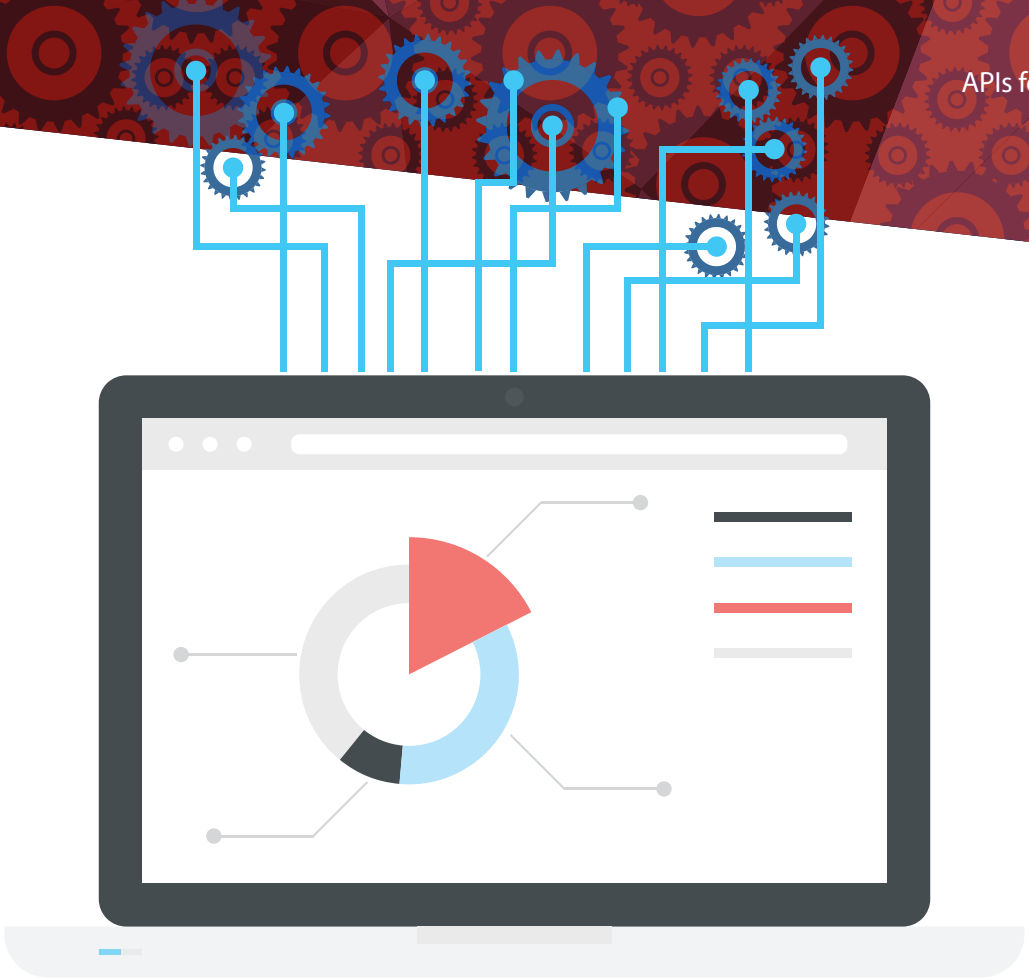
Enterprises dabbling with IoT need to put in place an infrastructure and API-tier that can both support the protocol demands of IoT as well as handle the expected scale of traffic that meets the demands of full blown IoT deployment.

APIs for Integration

APIs are beginning to play a role in application integration, picking up where the SOA concept left off. As most of us have experienced, the SOA paradigm advanced application integration greatly by removing proprietary protocols from the process of connecting multiple applications. Yet, the SOA technologies themselves were somewhat heavy weight, even as they worked well at linking SOAP requests with responses.



The Enterprise Service Bus (ESB), a preferred mode of SOA implementation in many enterprises, can be a cumbersome integration tool. And, most ESBs are not suited to work with RESTful APIs. In today's *I have a new idea. Show it to me next week...* corporate culture, the ESB is too slow for developers. Moreover the ESBs were not designed to address external connectivity, security, handle mobile or IoT specifics. Instead, the APIs themselves can provide an accelerator to extend the integration achieved by the ESB. The API is able to facilitate the quick turnarounds and iterations that line of business stakeholders demand.



APIs can serve as lightweight integration interfaces, enabling developers to invoke functionality and exchange data between applications that expose APIs. Also most modern day applications are being designed with API interfaces already in-place. This makes redundant proprietary adaptors that most ESBs rely on to connect with respective applications. An API-tier can take care of interfacing directly with the application APIs and providing the much-needed lightweight orchestration and mediation tier between the interacting applications and developers. The API can also work in tandem with existing ESBs. In this case, the developer of a mobile app can invoke and orchestrate APIs that in turn invoke and orchestrate underlying SOAP services through the ESB.

The advantage of this kind of hybrid application integration approach is that it makes it possible to leverage the investment already made in the ESB while augmenting its reach and business value. The hybrid approach avoids the time and cost involved in reworking all the integration work that was done on the ESB initially. The challenge, of course, is to ensure that the integration is secure and manageable.

Conclusion

It is still early for enterprises in the adoption of APIs. The patterns are clear, however. Enterprises are embracing APIs as a path to digital transformation and reinventing the customer experience. Each company approaches APIs in its own unique ways, ways that are quite different from the consumer approaches to API usage that have dominated industry discourse to date. The main difference between consumer and enterprise adoption patterns relates to the substantial role of internal-facing APIs, which do not exist in the public API space. Inside the enterprise, APIs are consumed within LoBs, between LoBs, between acquiring and acquired entities, and from external 3rd parties. Similarly, with mobile app development, APIs get connected to both internal and external apps and developer communities. The enterprise API requires a higher level of management and security than those found in the consumer sector. The best practice is to establish the enterprise API program on top of a proven API management platform. The right platform can ensure that APIs will be secure and efficiently managed across their complete life cycles.

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