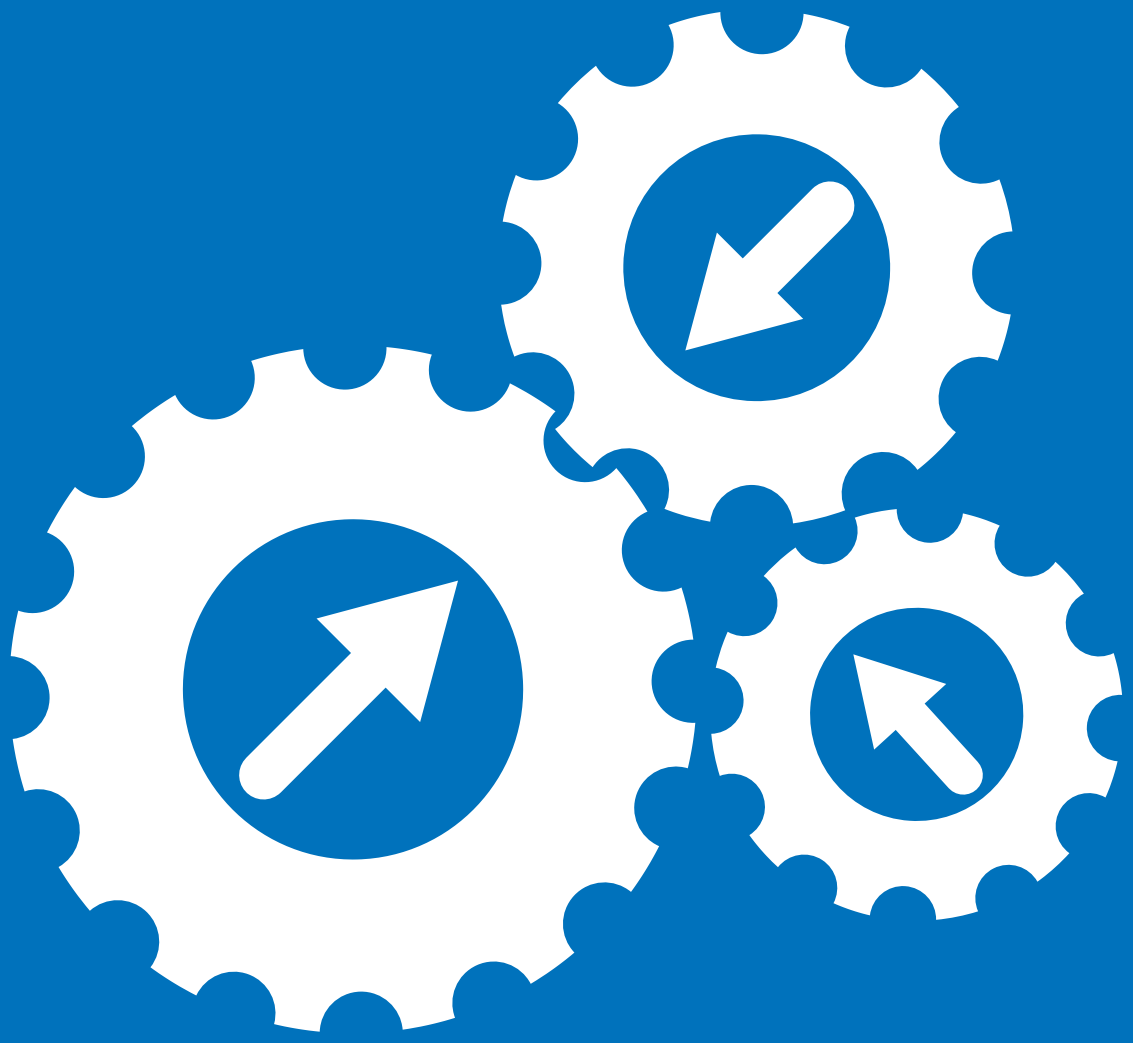
HOW ENTERPRISE ARCHITECTS ARE CONNECTING PEOPLE, APPS AND DATA AT SCALE THROUGH APIs AND MICROSERVICES

PeerPaper Report



BASED ON REAL USER REVIEWS OF CA API MANAGEMENT

IT Central Station
Unbiased reviews from the tech community

ABSTRACT

Being competitive requires investment in secure, scalable application architectures built on microservices and APIs. From this agile foundation, developers and architects can accelerate app development in support of DevOps practices. They can connect data with apps and devices across silos of systems to improve insights and experiences. New architectures open up paths to new market opportunities. This paper offers an inside, real-world view into what it takes to modernize application architectures with APIs and microservices. Based on user reviews of CA API Management on IT Central Station, it discusses how organizations can leverage APIs and microservices to deliver next-generation customer-facing and supply-chain experiences through web, mobile, and IoT.

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INTRODUCTION

Staying competitive in today's digital world requires that enterprises invest in secure, scalable application architectures built on microservices and APIs. This agile foundation provides developers and architects the tools to accelerate app development in support of DevOps practices. It lets them connect data with apps and devices across silos of systems to improve insights and drive innovation. It is then possible to deliver next-generation customer, supply-chain, and partner experiences through web, mobile, and IoT.

New architecture opens up new direct and indirect routes to market. For large, regulated organizations, modernizing application architectures with APIs and microservices means creating an agile organization built for speed, scale and security. This paper offers an inside, real-world view into what it takes to achieve these objectives. These best practice recommendations are based on the real experiences of IT Central Station members with CA API Management.

How APIs Drive Digital Transformation

There's a great deal of talk today about the digital transformation of businesses. In reality, the transformation is as much about the customer as it is about the corporation. New technologies create new customer expectations. Mobility and the demand for omnichannel experiences are two examples. What used to comprise good customer experience in a store, bank or healthcare facility is no longer sufficient. Customers demand digital experiences as well: accessible from anywhere, on any device, at any time. Businesses that cannot meet these expectations will lose traction in the market.

Competitive success, as realized by improved customer experiences, depends on modern, agile application architectures. When companies can quickly roll out new applications and features, and easily connect systems, devices, apps and partners, it becomes possible to extend their digital ecosystems and deliver value in new ways.

The modern Application Programming Interface (API) is the core enabler of digital transformation. Standards-based APIs, such as RESTful APIs using JSON, facilitate fast, flexible connections between users, data, applications and devices. With an API, developers and architects can take advantage of simple, universal commands to exchange data

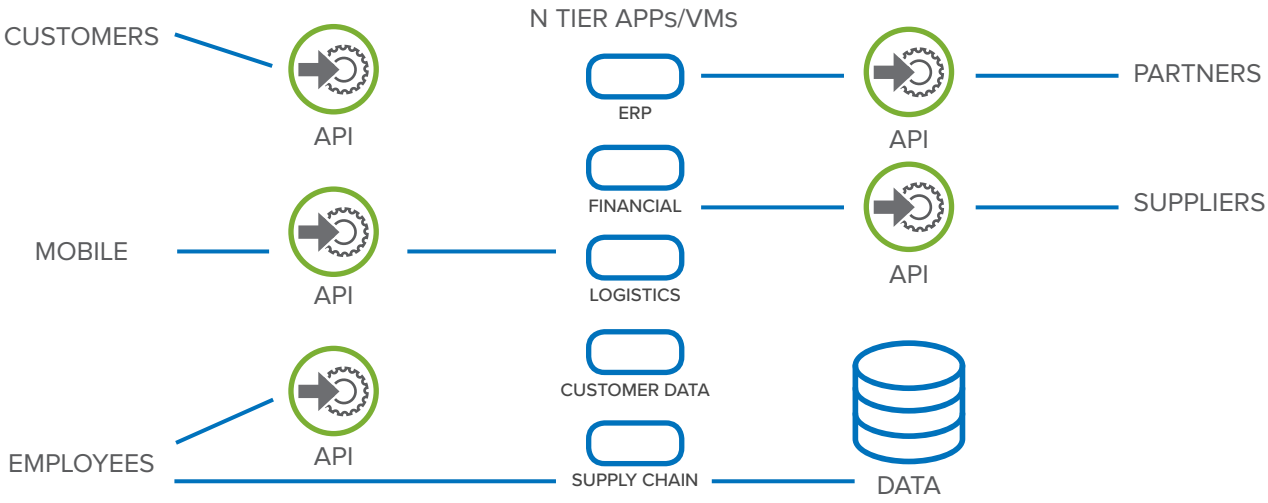

Figure 1 - APIs enable agility by speeding up and streamlining the process of connecting N-tier apps and VMs with customers, mobile devices, employees, partners and so forth.

between applications – either within the enterprise or with supported partners and customers.

This connectivity leads to agility, which in turn powers architectural transformation (see Figure 1). "We have been able to accelerate our clients' transition to digital organizations by using the CA API Gateway to rapidly expose legacy business services as RESTful APIs," explained a Vice President of API Management Division at a tech company with more than 50 employees in a review for IT Central Station[1].

API innovation is evolving, with new API-driven application architectures constantly emerging. Microservices and containers like Docker, for example, take the API agility concept further by splitting application functions into discrete units that are more easily integrated than traditional code. Thus, API management must support a broader range of technologies and demands than ever before.

Understanding the API Management Landscape: Yesterday, Today, and Tomorrow

APIs are disruptive. They speed development time, accelerate application integration and enable digital connectivity. But, they also pose security and stability risks without proper governance. The digital transformation promised by APIs will not succeed without effective (and cost-effective) API management to minimize these risks.

The IT field is at a transitional moment with API management. Starting around the year 2000, many enterprises embarked on Service-Oriented Architectures (SOAs) that used Simple Object Access Protocol (SOAP) web services for standards-based integration. In parallel, an early generation of SOA management tools proliferated, followed by solutions that offered basic management and security for APIs.

The next generation of API management solutions provide a way for API administrators to monitor and manage an API throughout its entire lifecycle. This lifecycle includes not only API creation and discovery, but also testing, monitoring and security (see Figure 2). Solutions that address the full lifecycle provide control to API consumers accessing the API. For the API publisher, control is achieved by managing usage and monitoring API performance response rates.

In this era of full lifecycle API management, it is necessary to consider the range of capabilities a vendor offers. Said a Director of Architecture at a healthcare company with more than 1,000 employees, "If I'm looking for an API management vendor then I would look at the API management

[1] *This reviewer works for a CA Technologies partner. His company is a CA API Management reseller and provides implementation services. Additional info can be found here: https://www.itcentralstation.com/product_reviews/ca-api-management-review-38825-by-jeff-nibler*

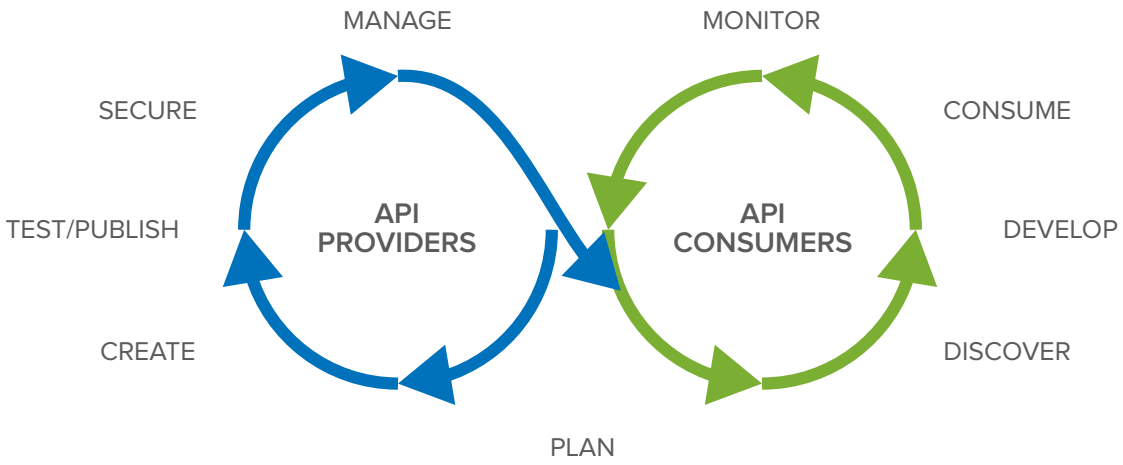

Figure 2 - The API lifecycle. API management tools must manage APIs from the moment of creation through testing, securing and deployment. This lifecycle affects both providers and consumers of APIs.

vendor's capability, their products capability to make their services available on the Cloud, monetization, security, availability, performance, resiliency, being flexible enough to provide different security integration mechanisms to different APIs, how flexible that software is and user intuitiveness." As the role of APIs in organizations expands, so too must our definition of API management.

Looking ahead at the "tomorrow" of API management, a new generation of solutions include tools to manage microservices and containers and to develop and scale for mobile and IoT. In covering the full API lifecycle, these solutions enable organizations to pursue the opportunities of tomorrow built on modern application architectures. A Head of Sportsbook Delivery at a hospitality company with over 1,000 employees described how CA API Management can be deployed "on desktop, on tablets," adding, "Mobile's coming as well now, and we use it for other partners." The most robust solutions provide scale and security across all channels to ensure that enterprises can safeguard investments while remaining forward-focused.

Best Practices for Modernizing App Architectures

What does it take to modernize application architectures with APIs? Connecting people, apps and data with APIs takes the right tools and a vision for how these tools can be used to bring enterprises into the digital age. Here, expert users from IT Central Station discuss how they approached the sometimes challenging task of managing, integrating, securing and scaling APIs for digital transformation success.

ACHIEVE AGILITY: LOW-CODE API & MICROSERVICES ARCHITECTURE DEVELOPMENT

IT departments can now use APIs and microservices to scale and quickly deploy modern infrastructures. These architectures can be easily modified, having been built upon APIs with the goal of achieving agility. Agility is accomplished by decoupling legacy and monolithic systems and transforming them into re-usable microservices. Then, architects can build applications and services from parts rather than from the ground up. With low-code or no-code tools, developers are enabled to create apps and APIs more quickly, within a modern enterprise architecture.

One IT Central Station member who embraced this low-code approach is an Enterprise Solutions Architect, who said that CA API Management "allows us to centralize the triple A functions: authentication, authorization, and audit. It gives us scalability." He found his team could focus on delivery in a hybrid cloud model without exposing priviledged back-end

services to the market. His team took on the task of modifying its architecture to focus on microservices. As he put it, "This allows us to have a front door where we can separate and abstract services from APIs. We can use the [CA] API Gateway as the entry point to our enterprise." He observed, "It's very secure, very powerful, and has a great deal of complex functions that are native in the solution so that we don't need to write code to do it."

A Solution Architect at a program development consultancy with over 1,000 employees also had the goal of achieving low-code or no-code development. He observed the value of CA API Gateway's "speed and versatility in the implementation of APIs without writing a line of code in any programming language." Developer enablement completes the picture, as a Head of Group Technology at a logistics company with over 1,000 employees explained. "The Mobile SSO [Single Sign-On] and developer functions are the most valuable features," he noted. "The Mobile SSO functionality is not available with most similar products in the market, which makes this a unique product. The developer function helped the developers to be self-sufficient meaning they did not need a lot of training and they could do things on their own." This developer enablement results in faster app delivery, without compromising the quality of apps.

> **"The Mobile SSO functionality is not available with most similar products in the market, which makes this a unique product."**

IT Central Station members are moving aggressively toward microservices. These architectures are built on a foundation of APIs which enable the decoupling and development of modern enterprise systems. The Enterprise Solutions Architect described this rearchitecting by stating, "We're the largest company in our market and the application we have been using is old. I came in and defined a forward-looking architecture. An API Gateway is the centerpiece of any microservices solution."

An Enterprise Architect expressed satisfaction that CA was "trying to make it [solutions that] work for different types of architectures." He added, "We are moving toward Microservice Architecture and having the Docker form and the micro API Gateway [CA Microgateway] to help with those kind of architectures is really helpful." To him, composability is the most valuable feature because his team prioritizes development and rearchitecting internal infrastructure, "that would allow us to flow nicely into our Microservice Architecture."

Others making the move to microservices include a IT Systems Professional at a communications service provider with over 1,000 employees. He is using CA API Gateway and is considering CA Microgateway to support business and e-commerce platforms as well as API traffic. This could enable his enterprise's vision of pursuing application containerization through Docker.

A Lead Software Engineer at a mid-sized health, wellness and fitness company has about 400 "monolithic" APIs that his team plans to convert into lightweight microservices. As he explained, "We want to deploy them in a container, use the gateway and then expose those microservices to the external world. That's our main goal and we are using CA API Gateway for this purpose."

INTEGRATE AND CONNECT A BROADER TECHNOLOGY AND PARTNER ECOSYSTEM

The potential to connect to new partners and technologies is one of the most appealing aspects of an API-driven architecture. Now, with APIs, it's possible to implement a wider range of device, app, and service integrations—both from internal investments and from partner and customer ecosystems. Integration also includes adoption of and support for mobile and the Internet of Things (IoT) – achieving connectivity through devices, applications, sensors and networks. For mobile and IoT, the ability to quickly and securely integrate and scale will be critical.

It can be complex to integrate legacy investments with new technologies like mobile and IoT. API management tools give infrastructure managers the ability to securely integrate systems to power new customer experiences while maintaining control of data.

The Head of Sportsbook Delivery at the hospitality company described how he approached connecting with partners. He said, "We have a number of REST APIs that we had to expose [to] a number of partners, internal users, as well as external partners who wanted to basically integrate cleanly and quickly." He was seeking a solution to avoid multiple manual integrations into each API. He achieved this with CA, describing, "[CA API Management] allows us to effectively wrap those APIs into a common interface, so you can make one call and then the gateway will go away and make the other calls for you. That is the primary goal."

A Technical Consultant at a software R&D company with over 500 employees commented on integration, "Whether your data is in legacy systems, disparate databases, or the cloud, you will be able to bring it all together [with CA API Management] to power new digital initiatives at scale in modern apps or SaaS applications." A Senior Java Developer/ Solution Architect at a financial services firm with over 500 employees uses CA API Gateway "as the top layer in physical infrastructure architecture [making] that available to mobile, iPad and desktop applications."

His approach exemplifies how API management can support integration that evolves traditional infrastructure into agile tools built to deliver next-gen capabilities such as mobile and IoT. He added, "Basically, it [CA API Gateway] worked as a single point of contact for all applications via HTTP protocol as a communication channel. Underneath, it is aggregating a plethora of REST and SOAP services and connections to LDAP, AuthMinder, RiskMinder and SiteMinder for authorization and authentication." Rather than operating in silos, a modern enterprise must integrate various data sources, systems, applications and communications protocols in a consistent, executable fashion to achieve value.

SCALE WITHOUT SACRIFICING PERFORMANCE

Modern, agile architectures must be built to scale. For technology-enabled enterprises, growth is inevitable. And with this growth comes the expectation to support unpredictable levels of demand, from customers, partners and internal stakeholders. Enterprises typically introduce APIs gradually, but scale API investments in volume and business impact as the organization becomes both a publisher and consumer of APIs. Similar to integration, scale poses a significant challenge in today's mobile-first world.

Legacy systems and the enterprise backend may not be optimized to support this scale without additional technology investment. API management solutions can help, but they must be adaptable enough to enable these unpredictable and complex scaling requirements. This is particularly relevant with the number of APIs needed to support IoT and mobile app experiences, which enterprises are increasingly seeking to deliver.

> **"From our perspective, the most important aspect is the ability to scale without compromising performance as well as security."**

The numbers can be stunning. Consider a VP Product Development at a financial services firm with over 1,000 employees, who revealed, "We are in a business which sees lots of volume, trillions of volumes of [API] calls. The [API management] system that we work with has to handle those trillion number of volumes of calls. All of that also happens in real time, so the system has to scale up to spikes. Sometimes during holiday season and all that [other peak instances], we see quite a lot of spikes going in. The system has to manage all those spikes and CA has been able to do that."

A Sr. Manager - Technology Governance and Architecture at a tech services company with over 1,000 employees addressed the importance of scaling, under the right conditions, by noting, "From our perspective, the most important aspect is the ability to scale without compromising performance as well as security." He also added that it's "one of the reasons why we chose the CA product, because it does scale for our needs to grow without compromising performance."

His group was using an in-house solution that he characterized as "quite complex." He shared, "We

wanted speed which is the key for success in the current marketplace, so CA did deliver that." In implementing and scaling the solution, he described "We were able to really get up and running fairly quickly because it is mostly configuration driven as opposed to doing things from scratch."

A Principal Architect at a tech services company with over 1,000 employees, described the scalability of the Gateway as "pretty straightforward and easy ... You can easily deploy and add, and it supports a cluster architecture so that you can add new nodes on the go." Comparing CA to the competition, he described "What I felt was when we reviewed it along with the multiple other vendors in the market was that the operational side of [CA] API Management is pretty simple, so that we can ramp it up very fast in our organization." The Principal Architect gave CA API Management a "9" on a scale of 1-10, demonstrating his confidence in the strength of CA's offering.

> **"It's 10 times, 40 times, 100 times faster than the way we used to do it, and that makes it very scalable."**

A best practice for scaling involves effective load balancing and clustering, a vital feature set for API management solutions. According to a Founding Partner at a tech services company with more than 50 employees, CA API Management is "enterprise class software. It gives you the ability to scale and load balance." Specifically, the CA solution is "based on how the technology is being managed today using a database as an underlying component that allows you to synchronize multiple gateways to the database." He also praised CA API Management's "ability to cluster the data technology." He remarked, "It can scale as much as you need to scale."

Scale can refer to more than just technology, however. As a business Owner commented, "There are other aspects of scalability. You might consider how well can I bring on new customers, how well can I scale my development team, how well can I handle additional API integration. Because of the efficiency of the product [CA API Gateway] actually doing that, pulling data from disparate sources, and integrating it into the response format that I want, that my customer demands, that's so easy. It's 10 times, 40 times, 100 times faster than the way we used to do it, and that makes it very scalable."

SECURE EVERY ENDPOINT

The open nature of APIs, while essential for agility, can also expose an enterprise to a variety of new risks. Malicious actors can exploit APIs if they are not well-defended, and as enterprises increasingly move high-risk and high-value transactions online, the outcome of such an attack can be disastrous. As such, the best approach to securing APIs is to build security throughout a modern app architecture, with countermeasures across backend systems, APIs, apps, frontend systems, devices and partners.

While robust security is critical, it cannot detract from user experience. Omnichannel experiences – where customers can interact with a brand online, in person and through mobile devices – are considered the norm by consumers despite creating significant security challenges for the enterprise. In this context, an Enterprise Architect at a retailer with over 1,000 employees praised CA API Gateway's strength in security. As he put it, "Most of the enterprises have exposed their back-end services as APIs and everything is okay if the APIs are accessed internally within the enterprise. However, now with all kinds of mobile channels and omnichannel customer experience, the APIs get exposed to the outer world; at such a time, you need something so that you can secure your data. You don't want to be in the news that something bad has happened. Thus, [CA] API Gateway acts like a security gateway."

The Sr. Manager - Technology Governance and Architecture at the tech services company echoed, "Security is very key. We are in a marketplace that companies are being hacked, so we didn't really want to compromise in any of the security aspects [when choosing an API management solution]." With an agile architecture built on APIs and microservices, enterprises are able to identify and resolve security issues more quickly as data and systems are decoupled.

Security is thus an essential component of modern, full lifecycle API management. As a Sr. Manager

of Delivery, Enterprise & Platform Architect at a tech services company with over 1,000 employees explained, "The most valuable feature [of CA API Management] is security.... [CA] gives us peace of mind. For example, there are so many penetration attacks happening. DDoS kind of attacks happen in our API infrastructure if you don't have the security. With the out of the box security features from CA API Management, I can focus on the business logic to deliver the real value to the consumers, without worrying about the security."

DELIVER NEXT-GENERATION MOBILE AND IoT EXPERIENCES

Real business value comes from delivering the cutting-edge, digital experiences that customers expect. Architects must consider how technology can support these customer experiences as they map out their API plans and modernize their architectures. The pace of change is only increasing, and there will surely be more innovations and evolving customer expectations around mobility, connectivity and edge computing in the coming years.

APIs are a key enabler of business growth, especially as organizations become both publishers and consumers of APIs. Today, enterprises are building secure yet powerful mobile experiences through technologies such as biometric authentication and Single Sign-On (SSO) enabled by APIs and mobile SDKs (software development kits). Such functionality delivers a frictionless omnichannel customer experience. Additionally, IT Central Station members are investing in mobile and connected technologies and scaling to deliver IoT experiences via partners and through integrations with devices and apps.

A VP Enterprise Solutions at a manufacturing company with over 1,000 employees remarked that CA has a compelling platform for the easy development and deployment of mobile applications that include customer-requested features such as biometric authentication. The Enterprise Architect at the retailer spoke of changing customer expectations, saying, "The mobile experience demands that you don't want users to authenticate every time they want to use the application. For example, the Facebook user experience is such that once you enter your username and password you are logged in and whenever you come next time, the token gets refreshed." Companies frequently seek to emulate the user experience delivered by market leaders such as Facebook. Said the Enterprise Architect, "A similar kind of experience is what we were looking for and that demands API management."

The Technical Consultant at the software R&D company commented on the strength of CA's solution in integrating and scaling to support demands for new kinds of user experiences. He noted that with CA API Management, "You can aggregate and orchestrate data from multiple data sources into modern REST APIs almost instantly."

> **"CA API Management powers the next generation of mobile and Internet of Things (IoT) applications by providing reliable connectivity between data, people, apps and devices."**

Summarizing the way in which CA is focusing on the future role of APIs, the Technical Consultant commented, "CA API Management powers the next generation of mobile and Internet of Things (IoT) applications by providing reliable connectivity between data, people, apps and devices."

MONETIZE AND WIN IN ALL CHANNELS

APIs make it possible to enter new markets, pursue partner opportunities and operate in new channels like mobile. To realize the full business potential of APIs, it's necessary to have consistent API strategy and execution. Monetizing APIs may involve acting as an API provider, consumer, or both.

On this front, the Principal Architect at the tech services company with over 1,000 employees advised architects and IT managers to look at the business benefit of an API rather than just its technical aspects. He explained, "We have to think from the business standpoint. 'Why do you need API Management? Do you want it to be more of an API company or you're selling your API, or you want to do an omni-channel approach? Or what is the reason,

are you simplify[ing] the integration?' That drives lots of real value and that gives you full feasibility [into] why you wanted to bring in an API Management solution. I would recommend to analyze that aspect before you try to purchase an API Management solution." In this way, his team can envision, and then support, API use cases that create business value.

The Head of Sportsbook Delivery at the hospitality company offered an example of API monetization. He shared, "The trigger [for CA API Management], effectively, was that we had a partner, we'd done a commercial deal. The partner wanted to integrate, we wanted to integrate with the partner, but the partner had a legacy sort of application." The company used APIs to make the connection and realize the benefits of the commercial deal. Another example came from a Sr. Systems Engineer at a hospitality company with over 10,000 employees, who revealed, "We were able to market our mobile app products with their [CA's] strong security features."

Similarly, the Enterprise Solutions Architect said about implementing CA API Management "We can actually monetize our services, our APIs, and build a generic integration architecture using RESTful APIs."

A Lead Infrastructure Architect at a small company added, "From 2012, our clients evolved a lot from API Management perspective after using CA. We are able to expose mission critical APIs to the external world, monetize them, and generate revenue from them in the most secure manner."

It takes a high-performing and scalable API management platform to monetize APIs, as the Sr. Manager - Technology Governance and Architecture at the tech services company found. He noted as critical, "Good performance and ability to scale not only for now but also in the near future as we organically grow the company." An OSS Enterprise Architect at a comms service provider commented, "The actual management of APIs is fundamental to us, as we're a heavy API user/provider. So, obviously, a centralised management platform is important." An API Champion at a tech services company with over 500 employees observed, "Our speed-to-market is based on ease-of-deployment and how fast we can iterate and change." This speed is enabled by modern application architectures that provide avenues for monetization and growth.

CONCLUSION

APIs and microservices are emerging as essential elements of application modernization and the broader goal of digital transformation. With this type of architecture in place, it becomes possible for developers and architects to accelerate app development, connect data with apps and devices across silos, and support innovation.

IT Central Station members have found that a set of best practices help them leverage APIs and microservices to deliver next-generation customer, partner, and supply-chain experiences through web, mobile and IoT. These include working toward agility through no- and low-code development, integrating with a broader technology and partner ecosystem, scaling to support next generation use cases, and building security from end-to-end. Reviewers have found success in balancing speed, security, and performance with help from CA API Management.

Ultimately, APIs are a matter of business. The best practice is to approach APIs as a source of monetization and channel expansion. Adopting a business-facing API strategy provides a path to positive, technology-driven business outcomes and the digital opportunities of tomorrow.

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