The API Management Playbook

Understanding Solutions for API Management

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Introduction

In the digital economy, application programming interfaces (APIs) are essential for executing ideas quickly and seizing new business opportunities. They are the building blocks of digital transformation, enabling organizations to deliver exceptional customer experiences, create new revenue streams and connect employees, partners, apps and devices to data—anytime, anywhere.

APIs are not necessarily a new technology, but in today's digital world, they have risen in prominence and become important to every facet of the enterprise. This in turn has increased the demand for effective API management. But what does an effective solution look like?

The **API Management Playbook** will help you understand:

- Why digital transformation is crucial in the application economy
- How APIs are the building blocks of digital transformation
- Which key stakeholders in your organization are impacted by APIs
- What the API lifecycle is and how it relates to API management
- Thirteen key "plays" that API management should deliver
- The essential capabilities of an API management solution
- What CA API Management brings to the table

Winning at Digital Transformation

To compete successfully and thrive today, enterprises across every industry need to undergo a digital transformation. This process is not about incremental improvements or minor operational changes but about evolving core businesses to meet the demands of today's connected world.

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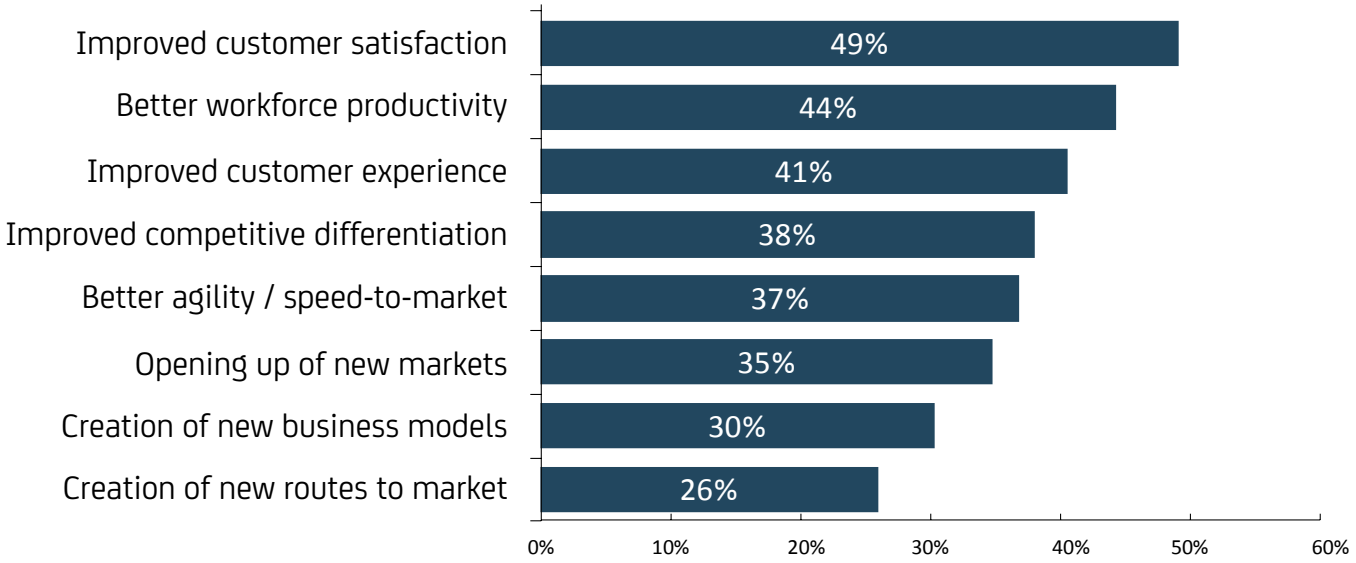
The “Why” of Digital Transformation

Digital transformation is a broad term, often applied to a range of initiatives that vary widely between companies. When 1,400 business and IT professionals were asked to name the top three drivers behind their digital transformation projects, the responses were diverse and spanned almost every aspect of the enterprise—from sales and marketing to product development, customer service, workforce optimization and logistics.

Top drivers of digital transformation[1]



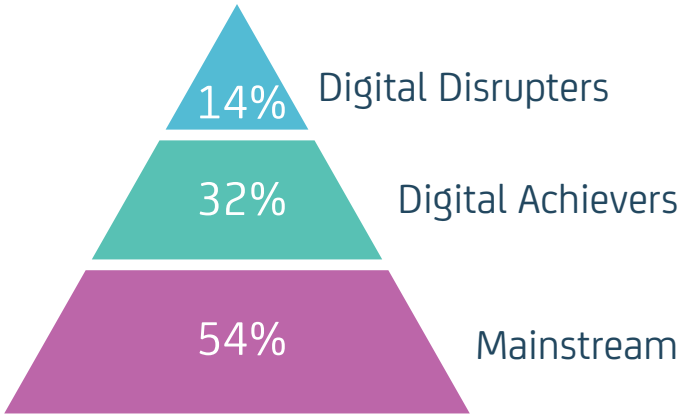
[1] Freeform Dynamics, Exploiting the Software Advantage: Lessons from Digital Disrupters, October 2015

The “Why” of Digital Transformation

Despite these differences in motivation, there is ample evidence that digital transformation of any kind is a key factor in business outperformance. In the same study, respondents were rated on various measures of digital effectiveness and then grouped into three segments: Digital Disrupters with the highest scores, Digital Achievers with above-average scores and Mainstream companies bringing up the rear.

The disparity in business performance between these groups was stark.

Business results of digital transformation[2]



“Digital Disrupters” enjoyed over twice the revenue growth of their mainstream counterparts, 2.5 times higher profit growth and 1.5 times more new-business based revenue. In today’s application economy, digital transformation works—and works well.

Digital Distruptors have:

2x higher revenue growth than the mainstream (26% vs 11%)

2.5x higher profit growth (32% vs 13%)

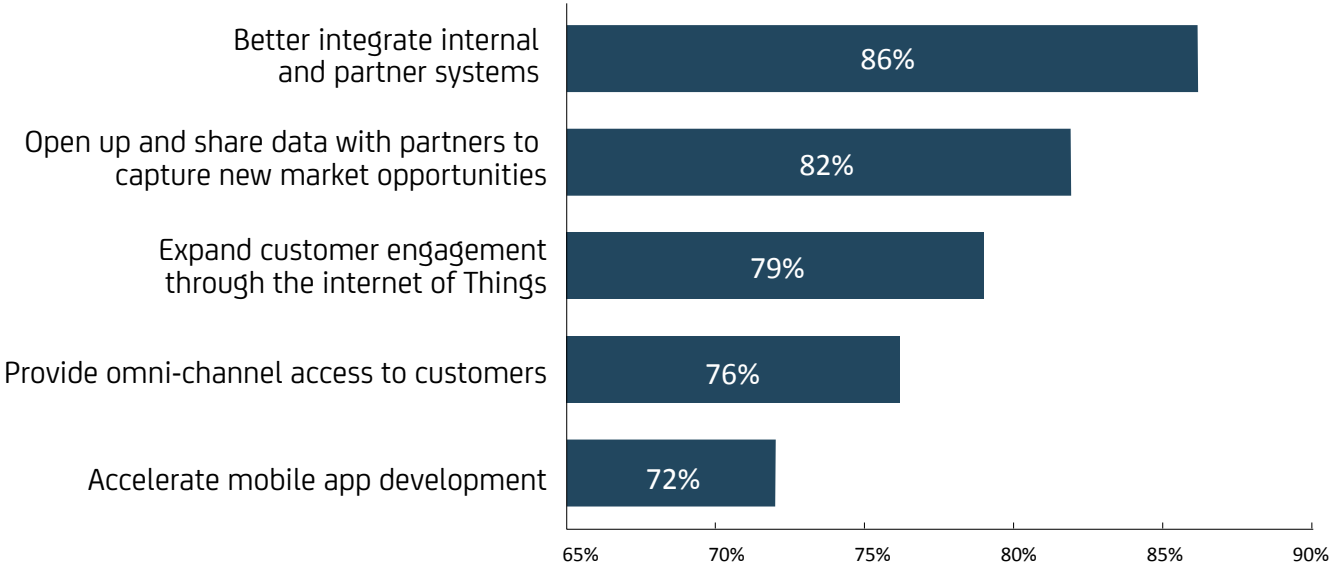
1.5x more new-business based revenue (37% vs 23%)

[2] Freeform Dynamics, Exploiting the Software Advantage: Lessons from Digital Disrupters, October 2015

The “How” of Digital Transformation

Compared to the spectrum of business imperatives, there is a more concise set of technology challenges that must be solved by architects, developers and product managers before their companies can deliver on the promise of digital transformation. These projects make up the “how” of digital transformation and are primarily focused on integration, supporting the customer experience and accelerating software development.

Most important digital initiatives[3]



There is a clear connection between the above initiatives and the broader imperatives that drive them. These technology projects create the building blocks upon which successful digital businesses can be built.

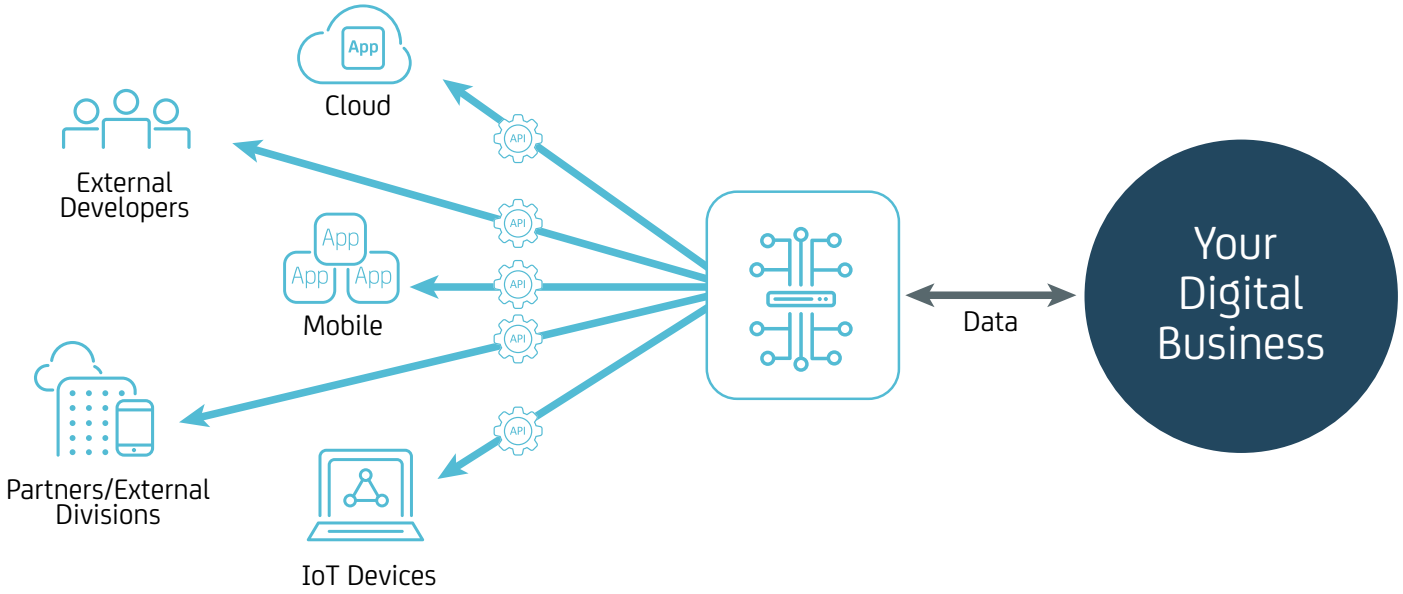
Successfully overcoming challenges like integrating apps, eliminating data silos and providing omni-channel access make an enterprise far more likely to reach transformative goals such as improving customer satisfaction, increasing differentiation and creating new routes to market.

[3] Gatepoint Research, Trends in Digital Transformation with APIs, September 2015

The Importance of APIs

With their focus on connecting data, people, systems and devices, the most important digital initiatives all rely heavily on APIs to deliver the robust and flexible integrations they need. As the rate of innovation and the number of connected devices have increased, so too has the importance of APIs and how they are created, consumed and managed at an enterprise scale.

A recent report from Forrester Research summarizes this nicely by stating that "APIs are perhaps the most critical technology in digital business design[4]."

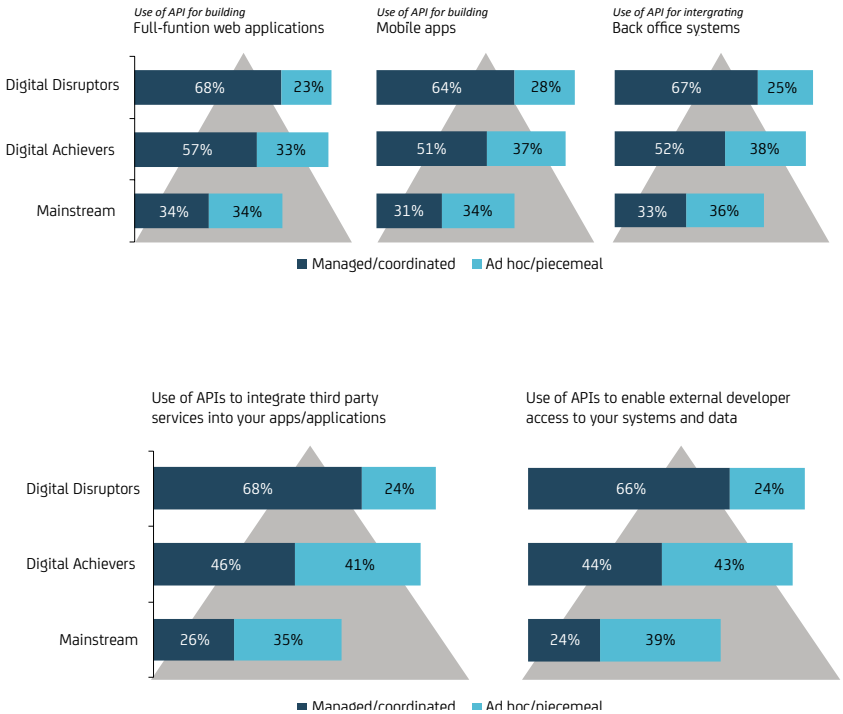


Implementing an effective API strategy empowers organizations to cope better with the rising volume, scale and volatility of customer-facing applications. It also allows them to meet constant demands for new or improved functionality and makes it easier to decouple existing or potential endpoints from backend systems for improved performance, security and manageability.

[4] Forrester Research, Inc., Brief: Four Ways APIs Are Changing Your Business, June 2015

The Importance of APIs

Use of APIs as the building blocks of digital transformation[5]



It should not be a surprise that in our survey of 1,400 business and IT professionals, companies in the highest-scoring digital disrupters category placed a significantly higher emphasis than others on the managed or coordinated use of modern API techniques to introduce speed and efficiency to their digital infrastructure.

Although the obvious result is a disparity in overall API usage between the top two tiers and their mainstream counterparts, the most important factor is that a clear majority of the digital disruptors depend on a managed or coordinated deployment of APIs, versus an ad-hoc or piecemeal strategy.

This is where an API management solution comes in—to provide a formal way of creating, securing, managing and optimizing APIs at enterprise scale, throughout the API lifecycle. With so much riding on their APIs, these solutions have become a preferred strategy for the world's most effective digital businesses.

[5] Freeform Dynamics, Exploiting the Software Advantage: Lessons from Digital Disrupters, October 2015

Your API Management Team

The next factor to consider when looking at API management is the diverse team of players involved. Because digital transformation reaches deep into the enterprise—affecting every facet of the business and involving every customer channel—there is a wide range of stakeholders to consider.

Line of Business
Lead Digital Transformation
Stakeholder

Enterprise Architect
Integrate and Create APIs
Stakeholder

Developer
Accelerate Development
Influencer User

Security
Secure the Open Enterprise
Influencer

API Owner / Product Manager
Build, Deploy, Operate, and Optimize API Infrastructure
Influencer User

Your API Management Team

APIs affect each part of the enterprise differently—and are seen in a unique light by each of the roles they touch. Business executives perceive them as a source of revenue or cost savings. Architects see indispensable tools for integration. Security professionals view them as potential vulnerabilities. And developers appreciate them as a gateway to enterprise data and functionality.

An API management platform offers each of these personas the capabilities they need to do their jobs effectively, so a nuanced understanding of their diverse requirements is essential for a world-class digital business.

Line of Business

Titles: Chief Digital Officer, Chief Experience Officer, VP Digital, Director of Omnichannel
Focus: Unlock the value of data

These executives are responsible for meeting business goals and driving the organization's competitive advantage and differentiators. They see APIs as a strategic enabler for launching innovative products or services, forging new partnerships and improving the customer experience—so API management must be a trusted, reliable platform on which to achieve this.

Enterprise Architect

Titles: CIO, Chief Architect, VP Integration, Director of Integration
Focus: Integrate and create APIs

Architects are responsible for translating the digital business challenges into an ideal technology infrastructure. They see APIs as connective tissue that will orchestrate the data and functionality they need to make it happen—and API management as a set of tools to help them model, design, shape and optimize these integrations for years to come.

Your API Management Team

Developer

Titles: VP App Development, VP Mobile; Director of Apps, Mobile/Web Development Lead
Focus: Accelerate mobile and IoT development

Developers build front-end applications while discovering, acquiring and consuming APIs as their gateway to enterprise data and capabilities. For this group, API management represents stable, secure and scalable access to the back-end, as well as a source of tools and utilities to help them obtain and leverage the APIs more efficiently.

Security

Titles: Chief Information Security Officer, VP Information Security, Director of IT Security
Focus: Secure the open enterprise

Because APIs are designed to "open the enterprise" by establishing new digital value chains, they pose a unique challenge when it comes to protecting the business against vulnerabilities. For security professionals, API management is about providing advanced threat protection and authentication capabilities—without compromising the overall mission of increasing connectivity and convenience.

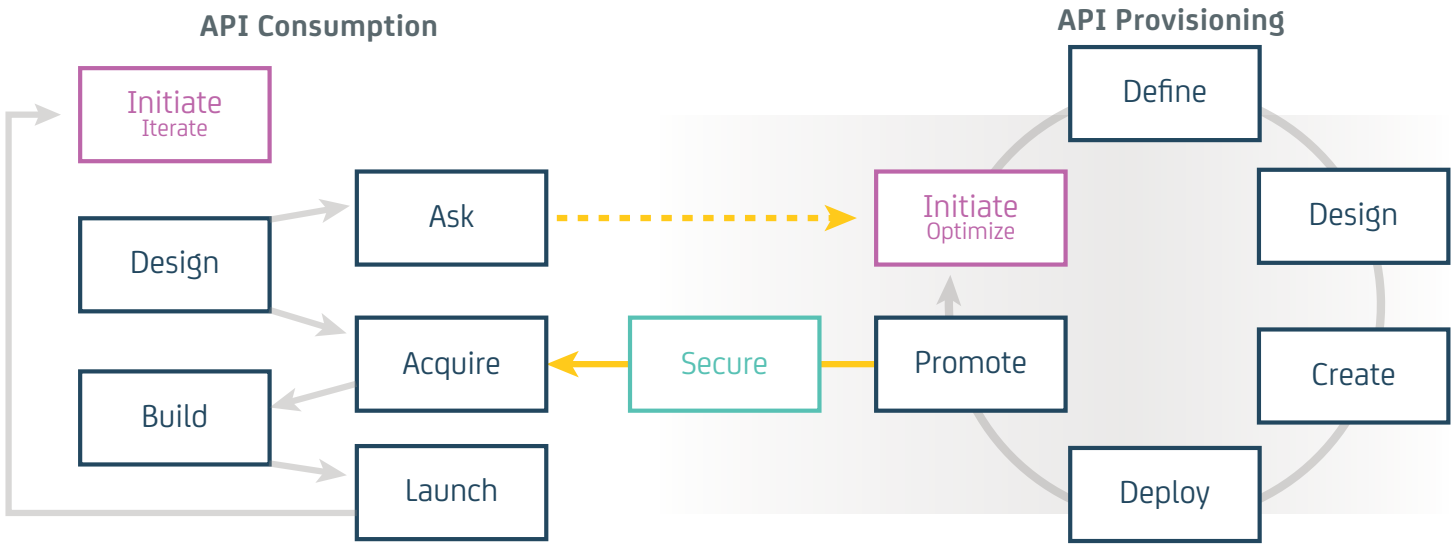
API Owner

Titles: VP Product Development, API Product Manager, API Specialist
Focus: Build, deploy, operate and optimize API infrastructure

Once an overall API strategy has been determined, this group ultimately becomes responsible for operating and maintaining its technology infrastructure. For product managers and DevOps professionals, API management is their lifeblood—allowing them to effectively control, measure, optimize and deploy a large number of APIs through every step of their lifecycle.

Understanding the API Lifecycle

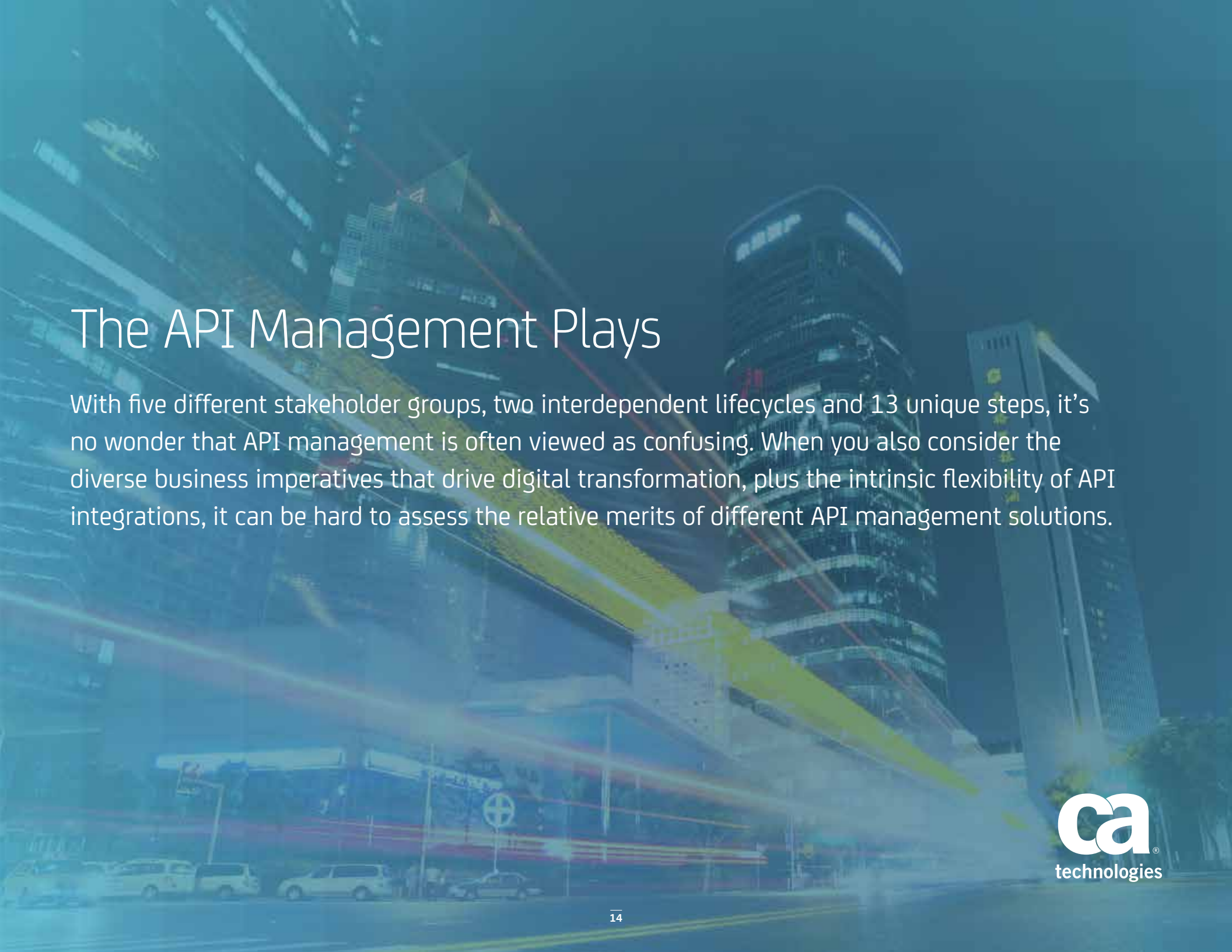
Before delving into the specifics of API management, one final area to consider is the API lifecycle. This is an approach that governs the creation, deployment, promotion and optimization of APIs on the provisioning side, as well as their acquisition and usage by API consumers.



On the API provisioning side, enterprises are responsible for a continuous sequence of **definition, design, creation, deployment, promotion, security** and **optimization**. This cycle meshes with a parallel one for developers—who **design, acquire APIs** for, **build, launch** and **iterate** their apps, while potentially providing feedback to improve the overall digital business program.

Although the exact responsibilities will overlap and vary, there are distinct areas of interest within the lifecycle for each of the five stakeholders. Functional coverage within each area is important when considering API management because a good solution offers effective tools with clear benefits for each role.

In a nutshell, good API management provides the foundation needed to execute the entire API lifecycle along with targeted tools to help stakeholders efficiently complete the work required to move APIs through each step.



The API Management Plays

With five different stakeholder groups, two interdependent lifecycles and 13 unique steps, it's no wonder that API management is often viewed as confusing. When you also consider the diverse business imperatives that drive digital transformation, plus the intrinsic flexibility of API integrations, it can be hard to assess the relative merits of different API management solutions.

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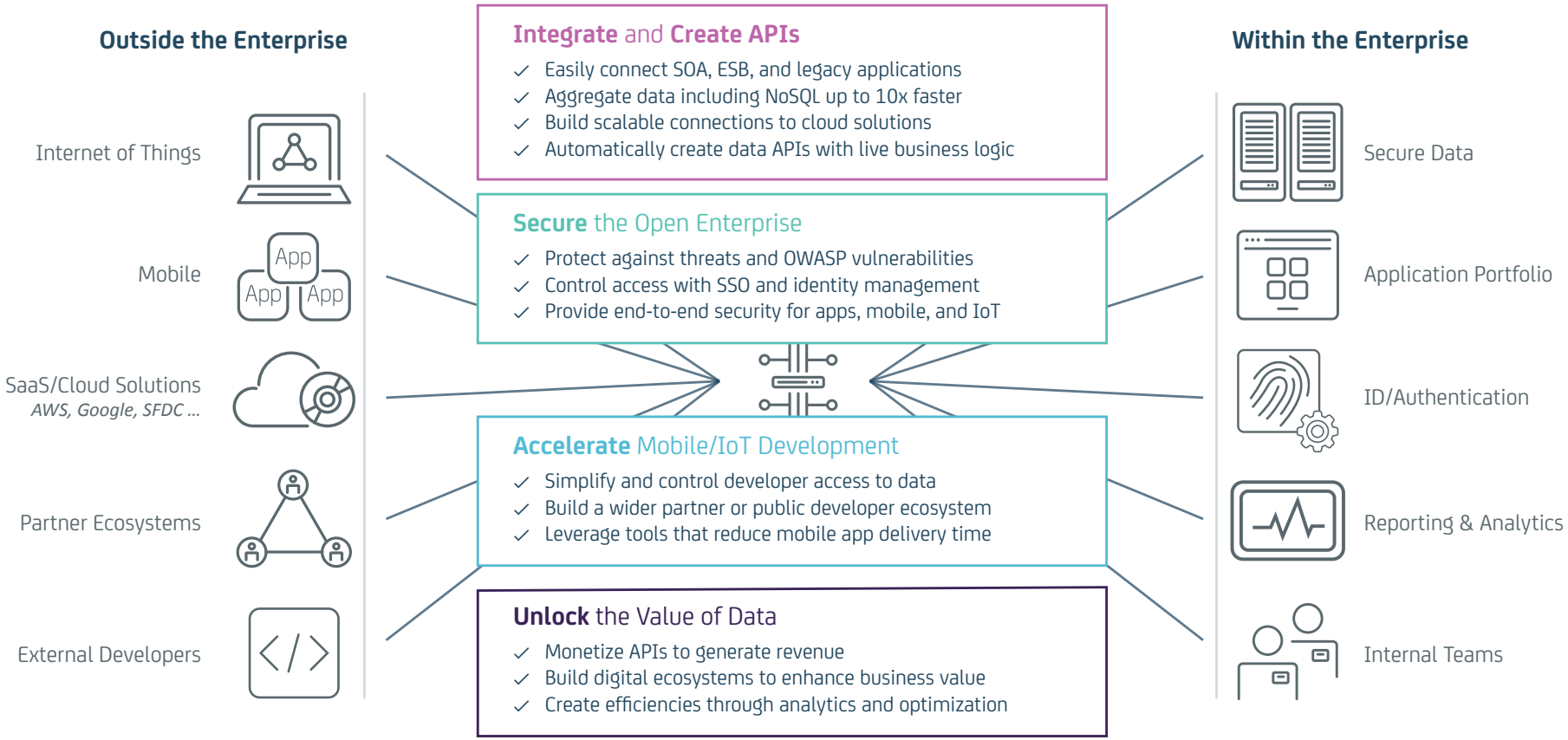
The API Management Plays

Instead, consider evaluating API management capabilities based on their ability to make these tactical "plays"—a collection of the most common and essential use cases, grouped into focus areas for each of the key stakeholders. The best part of this method is that almost any business scenario that calls for a managed approach to deploying APIs will be composed of some combination of these 13 plays.



Integrate and Create APIs

Key Players: Enterprise Architects, API Owners

Digital initiatives based on APIs are all about providing scalable, reliable connectivity between data, people, apps and devices. To support this mission, experienced architects look for API management to help them solve the challenge of integrating systems, adapting services, orchestrating data and rapidly creating modern, enterprise-scale REST APIs from different sources. The right solution will help them:

- **Easily connect SOA, ESB and legacy applications.** API management will streamline integrations across disparate systems such as CRM or databases by providing protocol adaptation, mediation and transformation.
- **Aggregate data including NoSQL up to 10 times faster.** API management will orchestrate both structured and unstructured data from multiple sources at the API layer to accelerate the development of better, more engaging web and mobile apps.
- **Build scalable connections to cloud solutions.** API management will enable the creation of performant, yet cost-effective digital platforms that integrate on-premise systems and cloud solutions, with robust traffic management.
- **Automatically create data APIs with live business logic.** API management will provide point-and-click functionality that can instantly generate enterprise-grade REST APIs from multiple data sources, with business logic processing to streamline the integrations.

Related eBook:
An Enterprise Architect's Guide to API Integration for ESB and SOA

Learn more

Key Players: Security, Developers

The open enterprise must be secured completely, from the app to the API—without preventing a streamlined user experience. Information security professionals look for API management to identify and neutralize critical threats, enable robust policies, offer consistent and repeatable security for mobile apps and provide the capabilities needed to deliver features such as single sign-on and risk-based access. The right solution will help them:

- **Protect against threats and OWASP vulnerabilities.** API management will provide threat detection and neutralization for key OWASP vulnerabilities such as SQL injections, cross-site scripting and denial-of-service attacks.
- **Control access with SSO and identity management.** API management will secure apps and their connections, while maintaining or enhancing user convenience.
- **Provide end-to-end security for apps, mobile and IoT.** API management will protect the digital value chain from frontend app to backend API and bring security to the Internet of Things (IoT). It should extend controlled access to all touchpoints—from web apps to vehicles—while supporting convenient features such as social login or risk-based authentication.

Related eBook:
Five Simple Strategies for Securing Your APIs

Learn more

Accelerate Mobile and IoT Development

Key Players: Developers, API Owners

Competitive pressure, rising customer expectations and the increasing pace of change mean that applications—especially for mobile and the IoT—must be delivered faster and more efficiently than ever. Developers look for API management to help them discover, acquire and consume APIs quickly, while also providing tools that speed up or eliminate the "dirty work" of repeatedly building core functionality to handle data and security. The right solution will help them:

- **Simplify and control developer access to data.** API management will provide a controlled way to access systems of record that shields developers from unnecessary complexity. It should aggregate and orchestrate data, while ensuring compliance through authorization, shaping and policy management.
- **Build a wider partner or public developer ecosystem.** API management will empower internal and external developers by streamlining API consumption lifecycle tasks such as discovery, acquisition, design and collaboration.
- **Leverage tools that reduce mobile app delivery time.** API management will accelerate and simplify mobile implementations by providing developers with reusable services in the form of SDKs and APIs that handle security, messaging and offline storage.

Related eBook:
APIs in Mobile: Striking the Right Balance Between App Security and Usability

Learn more

Key Players: Line of Business, API Owners

Digital transformation initiatives that leverage APIs create new business opportunities and routes to market. Line of business executives look to API management as a central launch point for their digital strategies, with a range of capabilities that will support their efforts to build a robust digital ecosystem by expanding partnerships, nurturing developer communities, monetizing data and leveraging digital connections to improve operations and efficiency. The right solution will help them:

- **Monetize APIs to generate revenue.** API management will provide the functionality needed to package, price and sell data products or services via any combination of free, freemium, purchase, subscription or consumption models. It should also simplify integration with analytics and billing services.
- **Build digital ecosystems to enhance business value.** API management will deliver the granular control, compliance, security and reporting mechanisms needed to support the expansion of digital value chains across a wide range of platforms, apps, devices, partners and third parties.
- **Create efficiencies through analytics and optimization.** API management will encourage companies to build more efficient, performant and scalable digital ecosystems by providing instrumentation and analytics that allow them to optimize technical and business performance.

By focusing on these 13 plays when considering an API management solution, you can ensure that the platform will offer the right mix of functionality for your situation, while providing a high degree of flexibility, scalability and security to meet current and future requirements.

Related eBook:
The Chief Digital Officer's Guide to Digital Transformation

Learn more

Unlock the Value of Data

API Management Capabilities

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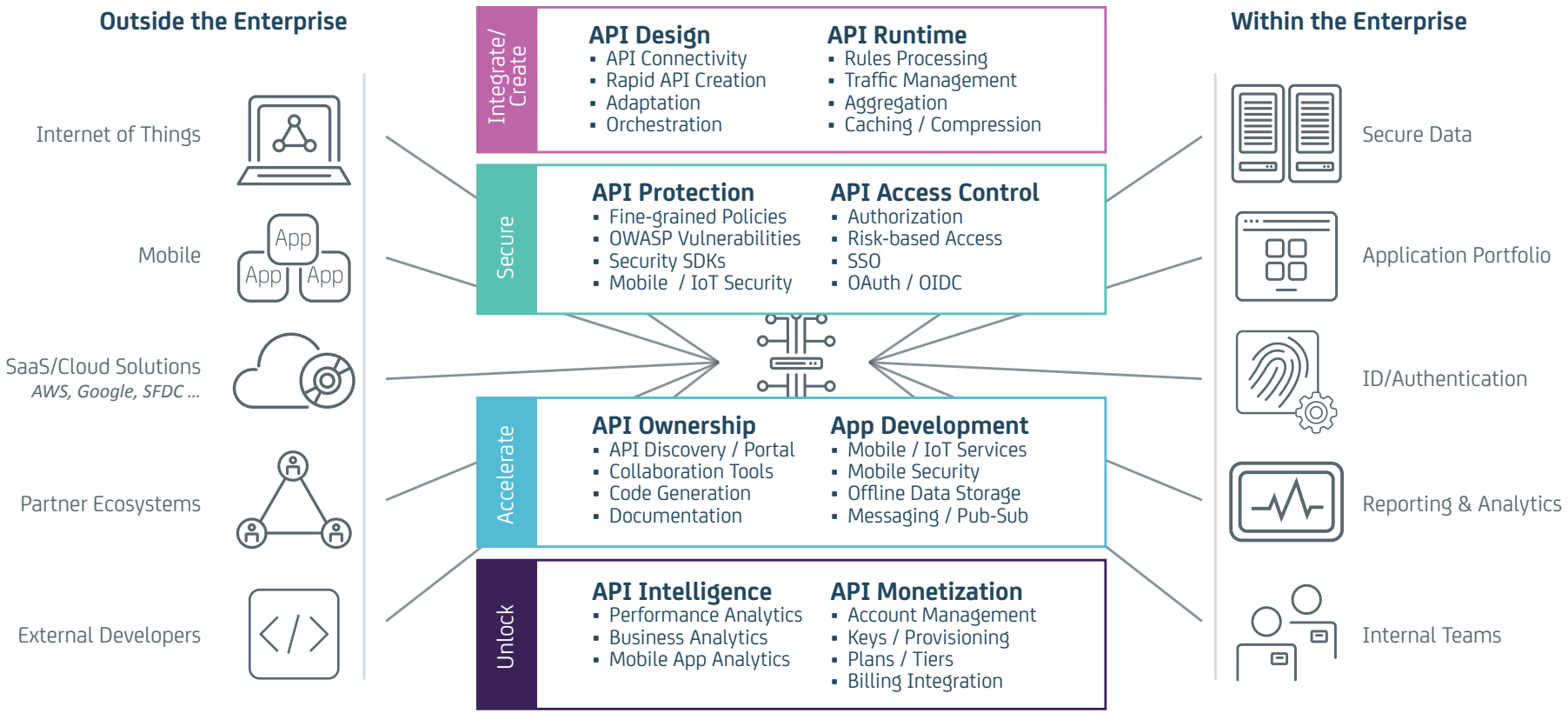
API Management Capabilities

Successfully covering all of the plays requires an API management solution to have features that address every step in the API lifecycle. CA API Management delivers this range of capabilities. It's designed to be a strategic foundation for the entire API lifecycle, while providing specific tools needed by each persona to move APIs through the process, from design to monetization.



API Management Capabilities

API Design

Area of Focus: Integrate and Create APIs
Key Players: Enterprise Architects, API Owners

- **API connectivity** centralizes connectivity and authentication between on-premise enterprise platforms, social networks, cloud apps and notification services.
- **Rapid API creation** generates enterprise-grade APIs from multiple data sources including RDBMS, NoSQL, existing APIs and JSON—with an efficient point-and-click interface that supports pagination, optimistic locking, filtering, sorting and more.
- **Adaptation** reliably externalizes services and data as modern, RESTful APIs for Web, mobile and IoT consumption.
- **Orchestration** composes and orchestrates modern REST and OData APIs from existing or legacy backend APIs.

API Runtime

Area of Focus: Integrate and Create APIs
Key Players: Enterprise Architects, API Owners

- **Rules processing** significantly reduces the complexity of composing data from multiple sources by applying reactive business logic at runtime.
- **Traffic management** improves performance and user satisfaction by prioritizing traffic to ensure that APIs remain available and responsive.
- **Aggregation** reduces on-device processing and latency by aggregating API responses for mobile apps and the IoT.
- **Caching/compression** improves performance and service availability by caching responses to common API requests, pre-fetching content, doing JSON conversion and performing message compression.

API Protection

Area of Focus: Secure the Open Enterprise
Key Players: Security, Developers

- **Fine-grained policies** centrally manages and secures data assets, with integrations to popular IAM systems and support for standards such as OAuth and OpenID Connect—in a platform that is FIPS 140-2 compliant with Common Criteria Certification.
- **OWASP Vulnerabilities** protects apps and APIs against critical threats such as SQL injections, cross-site scripting and denial-of-service attacks. Validates HTTP parameters, REST queries, JSON data structures, XML schemas and other payloads.
- **Security SDKs** improves mobile security with client-side libraries, code, documentation and mobile services to help developers simplify the implementation of SSO, encryption, certificates and secure offline data storage.
- **Mobile/IoT Security** extends enterprise security infrastructure to new endpoints by integrating popular IAM systems with mobile and IoT apps.

API Access Control

Area of Focus: Secure the Open Enterprise
Key Players: Security, Developers

- **Authorization** provides trusted, industry-standard access control for front-end apps, with support for a wide range of protocols and standards. Tracks policy violations and failed authentications to identify patterns and potential threats.
- **Risk-based Access** adds additional trust and convenience to authentication with access based on geolocation, social credentials and device proximity through QRC, NFC or BLE connections.
- **SSO** improves the user experience with SSO capabilities that integrate with popular IAM applications including CA Single Sign-On, LDAP and platforms from other vendors.
- **OAuth/OpenID Connect** offers support for common standards including OAuth 2.0, OpenID Connect, SAML, X.509 certificates, LDAP

API Ownership

Area of Focus: Accelerate Mobile and IoT Development

Key Players: API Owners, Developers

- **API Discovery/Portal** streamlines API publication with a full suite of portal features including developer enrollment and onboarding, key management, provisioning and reporting.
- **Collaboration Tools** delivers a better developer experience and ecosystem via a sophisticated content management system, support tools and discussion forums.
- **Code Generation** allows developers to automatically generate client-side code in popular programming languages including JavaScript, node.js, Python, Ruby, PHP, Objective C, Java™ and Curl.
- **Documentation** automatically produces interactive documentation from industry-standard WADL/RAML files to help developers accelerate implementation.

App Development

Area of Focus: Accelerate Mobile and IoT Development

Key Players: Developers, API Owners

- **Mobile/IoT Services** provides common backend services in the form of APIs and SDKs that can be used and shared across multiple mobile or IoT apps, improving implementation speed, consistency and security.
- **Mobile security** protects mobile and IoT apps with a wide range of methods, including OAuth 2.0 and OpenID Connect for authorization, mutual SSL for encryption, PKI support and secure offline data storage.
- **Offline data storage** allows for secure, easy-to-use local and cloud data stores in mobile apps, with standards-based APIs, native mobile SDKs and encryption.
- **Messaging/pub-sub** provides user and group management via SCIM 2.0, secure messaging and publish-subscribe services using MQTT and native mobile SDKs.

API Intelligence

Area of Focus: Unlock the Value of Data
Key Players: Line of Business, API Owners

- **Performance analytics** delivers up-to-the minute tracking of operational KPIs such as transactions, availability and latency for troubleshooting and adherence to SLAs.
- **Business Analytics** generates summary reports to track how developers are utilizing APIs against their quota. Provides custom, ad-hoc reporting into the health and performance of the API ecosystem for forecasting or analysis.
- **Mobile app analytics** tracks applications as they move from development through testing to production and reports on metrics such as revenue generation per app or developer over time.

API Monetization

Area of Focus: Unlock the Value of Data
Key Players: Line of Business, API Owners

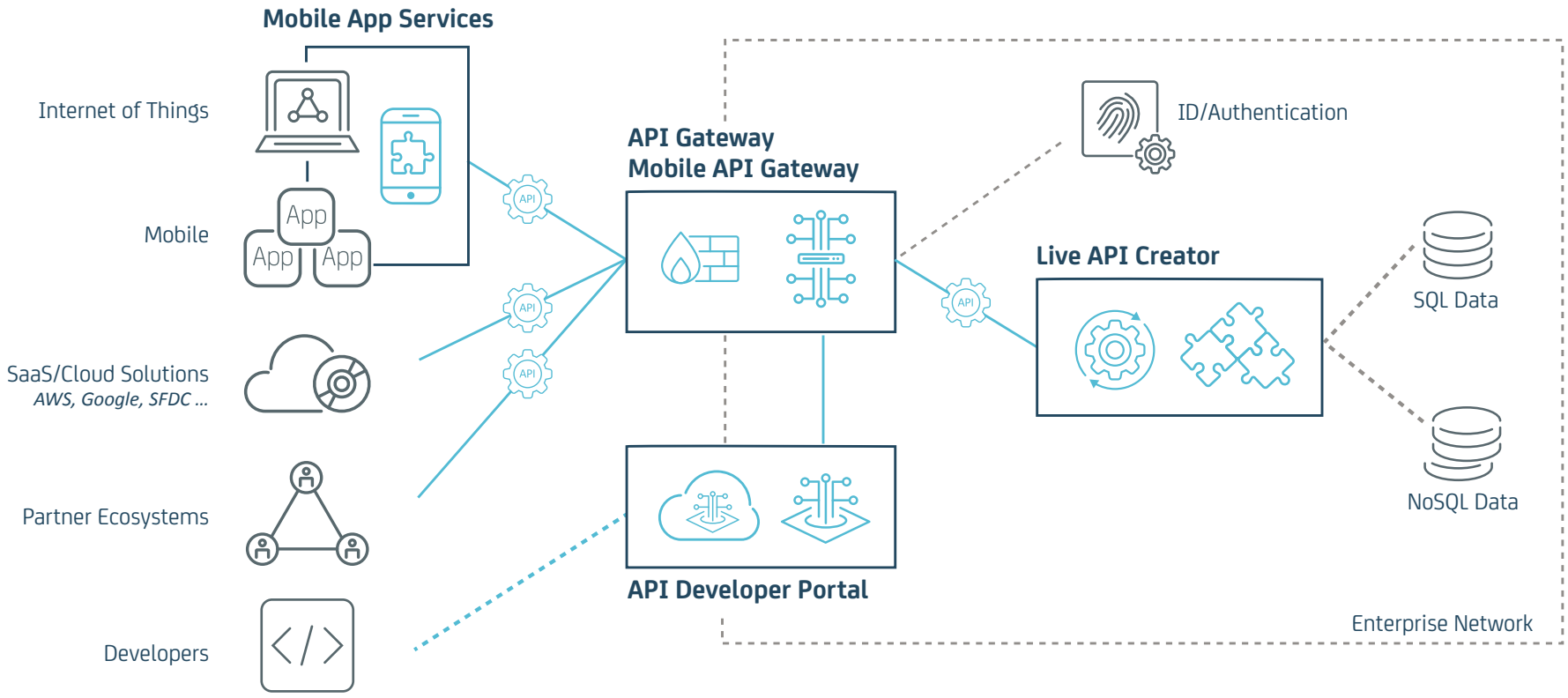
- **Account management** provides plans, accounts and tiers to organize filter and stratify developers. Monitors application usage to determine which developers are the most valuable and allows account managers to be assigned.
- **Keys/provisioning** allows managers to create, assign, suspend or revoke API keys and optionally gate the generation of keys for each application. Once authorized, provides throttling and shaping to customize access to APIs based on different SLAs.
- **Plans/tiers** allows for standard or unique plans and tiers for each API, with individual quotas, rate limits and other fine-grained controls.
- **Billing integration** provides a revenue planner to help map the monetization potential of charging developers for API usage and allows the model to be applied to a billing system with a single click.

The CA API Management Portfolio

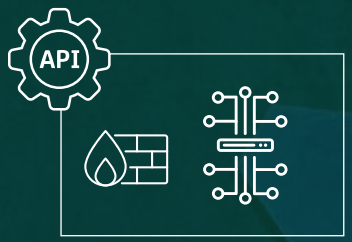
For maximum flexibility, CA API Management is comprised of several products, each focused on a specific area of the API lifecycle. In addition, many of the capabilities are offered in several deployment options—on-premises, SaaS or hybrid—to meet the infrastructure and investment preferences of any business.

The CA API Management Portfolio

Fully implemented, CA API Management is a flagship solution that addresses and streamlines the entire API lifecycle and digital value chain. The functionality it provides allows organizations to rapidly integrate and create APIs, secure the open enterprise, accelerate mobile development and unlock the value of data.



API Gateways

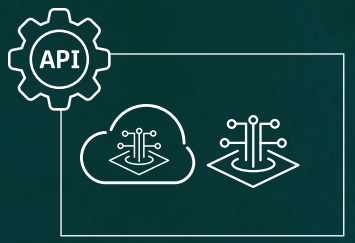


CA API Gateway, **CA Mobile API Gateway** and **CA API Management SaaS** are the heart of the API management portfolio and enable enterprises to securely open their data and applications to both internal and third-party developers. They combine policy management with runtime policy enforcement and can integrate with identity and access management products for a true plug-and-play solution to building a secure digital ecosystem.

CA API Gateway can be configured in a variety of form factors, scales easily and may be deployed in a failover environment for high availability.
CA Mobile API Gateway adds additional capabilities that simplify the process of adapting internal data, applications and security to meet the needs of mobile endpoints and the IoT.

Finally, **CA API Management SaaS** offers a turnkey API lifecycle and developer management option for enterprises where ease of use, fast time to value and reducing capital spending are paramount. Built from the ground up as a multi-tenanted cloud offering, it leverages Amazon Web Services infrastructure to scale efficiently and cost-effectively—while still providing the enterprise-grade functionality that businesses need to fully participate in the application economy.

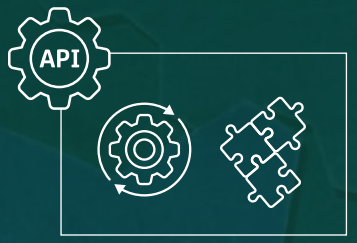
API Developer Portal



CA API Developer Portal gives businesses a central place to empower developers that are building Web, mobile and IoT applications based on enterprise APIs. It provides robust developer management capabilities that make it easier to plan, package, provision and monitor the usage of APIs by both internal and external resources—while supporting the developers themselves with tools such as documentation, automatic code generation and collaboration features that simplify and accelerate front-end development.

When integrated with the gateway products, the **CA API Developer Portal** eliminates the need to deploy solutions from multiple vendors, greatly reducing acquisition costs, infrastructure requirements and maintenance overhead.

Live API Creator



CA Live API Creator is an innovative API lifecycle product that allows businesses to almost instantly create responsive, enterprise-grade REST APIs from both legacy and modern data sources. It significantly reduces time and cost during the development process by adding automation and business logic enforcement to the definition, design, creation and runtime steps of the API lifecycle.

Enterprise architects, developers and API owners can build and extend REST endpoints that combine data from structured, unstructured and other API sources using a streamlined point-and-click interface. A reactive programming model forty times more concise than code provides an order of magnitude improvement in productivity over traditional approaches and a highly performant API server allows for the live execution of business rules at runtime.

For any organization that has embraced APIs and is ready to expand the scope of their lifecycle beyond management and enforcement, **CA Live API Creator** offers an incredible opportunity to shift left and move forward.

Mobile App Services

CA Mobile App Services accelerates mobile development and API consumption with SDKs and APIs that address crucial backend functionality such as user and group management, messaging, publish/subscribe functionality, offline data storage and authentication. These essential services are made simple and secure for developers, allowing them to focus on building great user experiences for mobile and the IoT.

Offloading common, repetitive, yet critical development challenges to **CA Mobile App Services** allows enterprises to reduce their time-to-market, while increasing security and manageability by replacing ad-hoc development of core functionality with a proven infrastructure that leverages best practices from the rest of the CA API Management portfolio.

Conclusion

As shown in this playbook, APIs are the building blocks of digital transformation—enabling organizations to deliver exceptional customer experiences, create new revenue streams and connect employees, partners, apps and devices to data—anytime, anywhere.

CA API Management is a central launch point for these digital initiatives. It provides the full range of capabilities needed to orchestrate legacy and modern systems, rapidly create APIs to safely expose data, protect these integrations with military-grade security, accelerate mobile development and unlock the value of these digital ecosystems through analytics and monetization. And because every business is unique, CA API Management offers the most flexible deployment options, including on-premises, SaaS or a hybrid combination—all with enterprise-grade scalability and performance.

In September 2014, CA Technologies was recognized as a Leader in the API Management space by top analyst firm Forrester Research, in The Forrester Wave™: API Management Solutions, Q3 2014 evaluation. In April 2015, Gartner, Inc. also recognized CA Technologies as a Leader in its Magic Quadrant for Application Services Governance report, which encompasses API Management[6]. And in July 2015, analyst firm KuppingerCole placed CA Technologies atop the "Overall Leadership" category in its KuppingerCole Leadership Compass: API Security Management report.

[6] Gartner, Inc., "Magic Quadrant for Applications Services Governance," Paolo Maliverno, April 9, 2015

Learn more at **ca.com/api**

CA Technologies (NASDAQ: CA) creates software that fuels transformation for companies and enables them to seize the opportunities of the application economy. Software is at the heart of every business, in every industry. From planning to development to management and security, CA is working with companies worldwide to change the way we live, transact and communicate – across mobile, private and public cloud, distributed and mainframe environments. Learn more at ca.com.

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