PROGRAMMABLE WORLD,
PROGRAMMABLE ENTERPRISE

An Apigee Institute Note

May 2013
INTRODUCTION

Something new is changing work, play, and life.

Computing, data storage, and networking technologies have continually improved for over thirty years. While any one advance taken in isolation may have seemed novel in its time, a pattern has proven to be predictable and relentless. As connectivity and computing power increase, form factors expand: larger and smaller, minimally featured and full-featured, locked down and expandable. And the critical mass of computing power moves further from the center to the edge: from glass rooms to office desks to coat pockets.

The cumulative effect has brought us to the tipping point of a programmable world. Within the next few years, fifty billion connected, sensing devices and a trillion instrumented objects will wrap people, organizations, and things with digital representations as fundamental to their identities as their physical selves. Participants in the programmable world will interact and transact through software—in the process generating an unprecedented pool of data that will itself make new forms of value creation possible.

Today, our experiences with Amazon, Google, EBay, Facebook, Evernote, and Dropbox illustrate how the programmable world changes the game for business.

More devices, ubiquitous connectivity, and super-abundant computing power make the digital dimension of our lives richer and more relevant—but also threaten to overwhelm our ability to manage technology and make everything work together. As a result, consumer behavior is disproportionately rewarding companies for understanding our context, using that insight to deliver experiences that are not only richer, but also simpler, and seamlessly weaving together both physical and digital value chains behind those experiences.

In order to create sustainable competitive advantage and win market leadership under the new rules of a programmable world, companies need to become programmable enterprises:

• Every major corporation has a physical value chain with the potential to be digitally augmented on the supply side, the demand side, or both;

• Every major corporation has the potential to use instrumentation and analytics to turn data about customer, partner, or employee experiences into a new source of competitive advantage; and

• Every major corporation has the potential to foster a digital ecosystem to help deliver experiences more precisely tailored to the context of customers, partners, or employees.

Those who master these capabilities for projecting their enterprise’s business model through software will have the power to drive value migration, reshape their industries, and seize a dominant market position.
CONTENTS

Introduction .................................................................................................................................................. 2

Welcome to a Programmable World ........................................................................................................ 4

As We Have Embraced Computing Beyond The PC ............................................................................... 4

We’ve Gone From The Web Internet To The App Internet ..................................................................... 4

The App Internet Started With The Programmable Web ....................................................................... 4

Now More Apps And Devices Are Creating A Programmable World .................................................... 4

In A Programmable World The Programmable Enterprise Wins .......................................................... 5

How To Become A Programmable Enterprise .......................................................................................... 6

Core Capabilities For Competitive Advantage And Market Leadership ............................................... 6

Measuring Success As A Programmable Enterprise .............................................................................. 7

The Programmability Imperative ............................................................................................................. 7

Next Steps Toward Winning In A Programmable World ......................................................................... 7

Key Terms .................................................................................................................................................. 8
WELCOME TO A PROGRAMMABLE WORLD

AS WE HAVE EMBRACED COMPUTING BEYOND THE PC

With the launch of the iPhone in 2007, we entered the post-PC era. The app as the atomic unit of user experience opened us to the idea of “small software” that is perfectly tailored to a specific device. By 2012 apps were on everything with a screen, from Sony TVs to Microsoft Surface tablets, connecting us to the services that we have come to depend on across all aspects of daily life.

WE’VE GONE FROM THE WEB INTERNET TO THE APP INTERNET

Web browsers were the software we needed when we accessed the Internet primarily from desktop and laptop computers. Companies and communities only had to build websites to reach all Internet users: “The Web” was synonymous with “The Internet.” But as we shifted to using phones, tablets, and more, the Web- and browser-centric model began to fail, delivering a poor experience across increasingly diverse devices.

Apps built for these devices delivered a great experience in each situation. The API as a way for apps to share information and access functionality exposed us further to the idea of “software experiences” that understood all our context, all the time, on a device and across all our devices. If a device had a small screen, an app used appropriate graphics. If a device had a camera, an app used it as appropriate. If a device had a GPS, an app used it for location context. We learned to use the Internet to connect apps to a user’s identity and stored data, leveraging the infrastructure built to support the Web Internet to create the App Internet.

THE APP INTERNET STARTED WITH THE PROGRAMMABLE WEB

As the static “Web 1.0” gave way to the user-generated content explosion of “Web 2.0”, we wanted to read the latest content without going to a dozen websites. Websites adapted by becoming programmable — for example, by giving direct access to software applications such as newsreaders to get or post data.

Websites became programmable through APIs. Any website that served information about location was more useful if it had maps, so because of its API, Google Maps became ubiquitous. Websites that connected people or ranked content were more useful if they had a social network, so because of its API, Facebook became pervasive. A single large market for goods is more powerful than many small markets, so EBay’s API opened their listings to access from anywhere, and EBay boomed. These relationships were mutually beneficial, creating digital ecosystems strengthening both the API provider and the websites using their APIs.

As digital ecosystems evolve to become app- rather than website-centric and expand to fill every niche in a growing market of devices, geographies, and industries, the leading API providers are being brought along.

NOW MORE APPS AND DEVICES ARE CREATING A PROGRAMMABLE WORLD

As computing, storage, and networking technologies have become both cheaper and more powerful, connected, sensing devices are proliferating. Cars, televisions, DVD players, refrigerators, and washers all retain distinctive core purposes but can now connect to APIs and run apps. By connecting to APIs they can deliver on the larger context of their users’ needs: cars can present traffic information, TVs and DVD players can stream movies, and washers can run when electricity is cheapest.
The cumulative effect of more devices and changed user expectations is creating a programmable world that we are just beginning to fully experience. Tractors include GPS receivers and controls that make them programmable through APIs in order to increase harvest yields. Healthcare providers are building monitors for people’s activity, weight, blood pressure, and medication intake that allow doctors, care teams, and the patients themselves to understand and improve their health through APIs. Consumer goods companies like Coca Cola are expanding their brand presence by adding cameras, CPUs, displays, and APIs to their vending machines to engage customers and exchange sodas for social interactions such as dancing in public. Startups such as Streetline have added simple binary sensors to physical parking spots in major cities, creating a business in data “bits” by describing the state of specific physical “atoms” and projecting it as an API.

The business implications inexorably follow the ubiquity of connected, sensing devices in work, play, and life. Today’s leaders in digital customer experience have higher margins and revenue growth than competitors. In a programmable world, the leaders in every industry will be those that become programmable enterprises.

IN A PROGRAMMABLE WORLD THE PROGRAMMABLE ENTERPRISE WINS

Programmability means APIs make enterprise assets reachable by apps written by any player in an ecosystem. A programmable enterprise strategically selects those assets in order to enable customers, partners, or employees to interact in ways that reinforce its business model. This pattern had its origins in the software industry but is now becoming transformative in industries such as transportation, telecommunications, construction, financial services, healthcare, entertainment, and retail. For example:

• Walgreens projects their in-store photo printers as an API. By partnering with third-party photography app providers, they are able to attract users into their physical retail stores to print photos—and buy anything else they may need at the same time, reinforcing their core business model.

• Bechtel can complete projects faster and with and greater profitability if its staff and an ecosystem of partners including suppliers and contractors have access to the exact same data at the exact time they need it. An API for materials, projects, and schedules makes this possible by enabling many different apps to be built and run independently on any computing device and over the public Internet. The resulting windfall of data equips Bechtel to use analytics to improved project performance.

• Large enterprises like AT&T are an ecosystem unto themselves, with competitive pressure driving them to get better information to and from employees. Their employees, like most large enterprises, have diverse devices and patterns of behavior. By projecting internal systems as APIs, AT&T empowers the large number of employees who have the skills to build apps that help them work more efficiently in ways perfectly tailored to their specific context (such working from home or on the road).

Every business currently operating a website is being impacted by apps and APIs. Web-based portals, marketplaces, entertainment and retail channels, and even search engines are losing share to apps on mobile devices and tablets. These shifts, like the impact of the Web Internet in the late 90s, will unfold unevenly across industries and geographies, but the shift in user behavior towards apps and devices has happened faster and at higher total user volume than the shift to the Web. Given the speed and scope of this shift, lack of an app initially damages an enterprise’s brand, then adoption, and then revenue. As a result, when one player in an industry establishes an API on the way to becoming programmable, it poses a strategic challenge to others in that industry: either beat them to it, or find a place as a participant in the leader’s ecosystem.
HOW TO BECOME A PROGRAMMABLE ENTERPRISE

CORE CAPABILITIES FOR COMPETITIVE ADVANTAGE AND MARKET LEADERSHIP

Emergence of a programmable world changes the basis of competition.

At a basic level, the rise of a new digital channel mirrors the emergence of the Web in the 90s. As customer and partner behavior shifts towards using apps, marketing, sales, and support functions need to add operating in the “App Internet” to their skills. Staying on the playing field with existing competitors and new entrants requires mastering APIs and apps.

At an advanced level, the source of competitive advantage shifts to digital ecosystem creation. This has two core components: a platform business model strategy to reward multiple sides of a market, and a technology platform to support a digital ecosystem through programmability and analytics.

A platform business model is defined as follows: build value for multiple sides in a given market by consolidating customers, simplifying market-wide processes, and rewarding each player in the value network between the platform and the customers.

A technology platform supports a platform business model by adding a digital layer to the value chain. This makes it possible to interact with the business from any app or device, and for the enterprise to analyze these interactions. Through the technology platform, each player in the value network becomes part of a digital ecosystem.

Analytics organize the vast scope of activity across the digital ecosystem into a meaningful whole. Insights from analytics that capture the “facts” about the digital ecosystem (ranging from simple metrics like total transaction value to larger-scale patterns and trends that can be used to predict future results) can be shared back to that ecosystem or withheld for additional competitive advantage.

In a fully realized digitally driven multi-sided market, each new customer of a product becomes a customer for the whole ecosystem. Each new product or partner attracts more customers to the ecosystem. More customers attract new products or partners to the ecosystem. Well-executed, the platform business model is a virtuous cycle which results in greater market share. As interactions grow, generating more data and enabling more sophisticated analytics, the ecosystem behaves more intelligently and becomes more valuable for all members: platform provider, partners, and customers. These members collectively form a community that benefit from supporting and promoting the ecosystem.

Technology companies pioneered digital ecosystems: Microsoft, Intel, and Cisco are 20th century examples; Apple, Amazon, and Google are early 21st century examples. Today, however, a majority of the Fortune 100 generate over 50% of their revenue from platform-mediated networks. These corporations include American Express, Citigroup, Time Warner, UPS, and Vodafone.

Digital Ecosystem

Digital ecosystems are enabled by programmability and represent sustainable competitive advantage.

They are the new basis of competition and value delivery.

The participants in a digital ecosystem include developers and users. These participants work across a broad range of organizations, including the enterprise, its partners, and its customers.

The digital ecosystem begins deep within the enterprise where existing and new services are projected as APIs.

It continues within the enterprise to developers and employees building new experiences and business processes.

It extends far beyond the enterprise to partners who build experiences and business processes fitted to their market segments and audiences, and who project their own complementary APIs.

The digital ecosystem’s outer edge is the customer using apps that draw on the capabilities of the enterprise and its partners.
MEASURING SUCCESS AS A PROGRAMMABLE ENTERPRISE

Charting the way forward and measuring success as a programmable enterprise entails both new metrics and new priorities for old metrics.

In contrast to the limitations of page views or sessions associated with the browser-centric web, companies can now measure experiences. Each contextually situated interaction between a customer or partner and a company’s app or API is an experience. Nike is using this model to focus on remaining a visible and engaged part of athletes’ and customers’ lives.

On the threshold of the full emergence of a programmable world, behavior is changing quickly and industries are in flux. History shows that during transitions of the speed and scale we are experiencing, companies that focused primarily on revenue and margin lost ground, but those who focused on market share were dominant once the period of intense transition was over. Netflix used this model to put Blockbuster out of business in the transition to streaming movies from rented DVDs.

THE PROGRAMMABILITY IMPERATIVE

All large corporations are embracing apps and APIs at some level because proliferating devices and ubiquitous connectivity are inexorably changing work, play, commerce, and life. This is a pattern that is predictable, and will persist; this pattern will define the new basis for competition.

Companies that master projecting their enterprise’s business model through software by augmenting their physical value chains, leveraging instrumentation and analytics, and fostering a digital ecosystem will have the power to drive value migration, reshape their industries, and seize a dominant market position.

In a programmable world, the programmable enterprise wins.

NEXT STEPS TOWARD WINNING IN A PROGRAMMABLE WORLD

To build enterprise capability for leadership through the global shift from today’s app economy to tomorrow’s programmable world, we recommend that executives take the following actions:

1) Establish a Programmable Enterprise workgroup within your leadership team with an initial assignment to prepare draft recommendations in the next 45 days;
2) Assess top competitors’ progress towards a platform business model and digital ecosystem; and
3) Assert a strategic planning assumption that more than 50% of customer and partner interactions with your enterprise must be digital by 2015 in order to establish market share leadership.
KEY TERMS

Analytics: technology designed to analyze structured, unstructured, and semi-structured data, find patterns in that data, and algorithmically project future states based those patterns

App: a user-interactive program for a computing device

API: an “application programming interface” that projects data and functionality for use by Apps

Digital Ecosystem: a digitally instrumented and coordinated system of interactions and transactions among suppliers, partners, and customers

Device: an object with computing, storage, networking, sensor, and display technology

Experience: a set of interactions between a user and an API or digital ecosystem through a range of apps

Projection: presenting enterprise business processes and data and via through an API

Programmable: modifiable by external software

Platform Business Model: a way to create and monetize multi-sided markets that exhibits virtuous cycles based on customer and partner adoption

Technology Platform: a technology suite that is integrated and supports a platform business model

---

i Peter Weill, senior research scientist and chair, MIT Sloan School of Management Center for Information Systems Research and Stephanie Woerner, search scientist at MIT Sloan School of Management’s Center for Information Systems Research (http://sloanreview.mit.edu/article/optimizing-your-digital-business-model/)

ii Kishore S. Swaminathan, Chief Scientist, Accenture (http://www.accenture.com/SiteCollectionDocuments/PDF/EightTrendsthatareRedefiningIT.pdf)


iv Annabelle Gawer, Assistant Professor, Business School, Imperial College London (http://www.europeanbusinessreview.com/?p=4079)

---

About the Apigee Institute
The Apigee Institute delivers strategic insights and practical recommendations based on real-world benchmarks and original research, with a focus on guiding organizations as they build strong digital ecosystems through apps, APIs and data. Learn more at http://pages.apigee.com/institute.html.

About Apigee
Apigee is the leading provider of API technology and services for enterprises and developers. Hundreds of companies including AT&T, Walgreens, Bechtel, eBay, Pearson, and Gilt Groupe as well as tens of thousands of developers use Apigee to simplify the delivery, management and analysis of APIs and apps. Apigee’s global headquarters are in Palo Alto, California, and it has offices in Bangalore, London, Austin and Detroit. To learn more, go to www.apigee.com.

This work is licensed under a Creative Commons Attribution-ShareAlike 3.0 Unported License.