What is an API?
Your guide to the Internet Business (R)evolution.
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Executive Summary

The introduction of the Internet and then the World Wide Web unveiled some of the most dramatic transformations that the world of communications has seen. We have now embarked on another transformation to reinforce and extend these trends – the rapid, and increasing adoption of Application Programming Interfaces (APIs). This whitepaper will explain to an audience of executives and managers what APIs are, and why they are so important. We illustrate the benefits by drawing on an analogy of the pattern of industrialization that has been repeated many times before. While APIs themselves are not new, we are now entering a “chapter two” inflection point, which opens a whole new spectrum of possibilities. Next the key trends for future evolution are described. Finally we summarize the immediate steps that can be taken to capitalize on APIs as the cornerstone of an online strategy.

APIs as a route to create Business Value on the Internet

The Internet continues its relentless transformation of every business. However past investments in Internet and web technology are not enough to ensure future success. New technology enablers are emerging to change the playing field. The companies that miss the window to capitalize on the key enablers will be left behind. It is time to do or die…

Among the most important trends shaping the Internet today are social networks, mobile, and location based services. In addition, critical in its own right, and underpinning the other major trends, are Application Programming Interfaces (APIs). Here we will explain what APIs are and why they are becoming so critical.

During the dotcom era of the late nineties it became mandatory for every business to communicate to its customers with a website. Any business that did not take advantage of this powerful communication medium quickly found itself at a disadvantage, with declining mind share, leading to a loss of market share. This was a time when it was simple to reach an online, connected audience. All you needed was a website and your customers would find you from their desktop with a browser.

Although the core challenges of attracting and retaining users persist, today’s world is far more complicated. It is a fragmented world. Devices are proliferating, and people now access the Internet from countless smartphones, tablets and other gadgets, not to mention the hidden network of connected intelligent devices. The web browser is no longer the exclusive gateway to view content on the web. Nowadays ever more content is accessed through new media for example widgets or mobile
apps. Finally, you cannot count on your audience to come to find your website. Instead it has become imperative to ensure that digital data and services are available in the context that users choose. Since the web is such an effective platform for serving information to the long-tail, it means that users are more discriminating in deciding how, when and where they view information on the web. Bringing these fragmentation trends together means that companies must be aggressive to indirectly reach the huge untapped, potential audience that does not come to their website.

The big change in mind set is to recognize that data and services – the company’s digital assets – must be unlocked from the confines of a web site. Once they are free, and can be accessed from anywhere, then the potential to grow the business can be realized.

*Building blocks for powerful solution capabilities*

Before tackling the details of exactly what constitutes an API, it is useful to take a step back to understand parallels with other industries. When you consider how typical industries evolve, you notice a pattern that is repeated over and over. Every industry has evolved to create more sophisticated solutions over time through a process of modularization and standardization.

It is impossible to imagine how anyone would design a car today without taking advantage of existing modules or vehicle subsystems. In the early days of the automotive industry, pioneering engineers would craft the majority of components as a custom design. Over time, subsystems began to be identified and elements such as the powertrain (engine/transmission), brakes, steering, suspension, cockpit and body each became areas of specialisation. Engineering teams would work on the different subsystems and often entire companies would specialize on one or more subsystems. As big automotive manufacturers outsource more work in their drive for efficiency, their role becomes one of a systems integrator. Thanks to well-designed interfaces between all the subsystems, when they are brought together at assembly time, the result is a vehicle with great performance relative to cost.

*Source: Pen & Ink Drawings, Eric Chapman*
This pattern is repeated over and over again. Companies carefully choose the area of their core competence whether at the architecture or solution level, or among the subsystems. Then they cooperate to bring the modules together into a complete product or solution. In this way the industry gains better economies of scale, maintains high levels of R&D, and delivers more innovation in their products.

Beyond the automotive industry you see the same pattern in most engineering-driven sectors for example railways, buildings, aeroplanes, robots etc.

This same pattern is also seen in the software industry and is enabled with APIs. In fact compared to other industries, for software the returns are exponentially greater, because the modularization potential is virtually unlimited and because the integration cost is an order of magnitude lower.

**Definition of API**

APIs have been an important part of the computer industry since the early days. They are fundamental to the way that computer, software, and network architecture has evolved.

The [definition from Wikipedia of an API](https://en.wikipedia.org/wiki/Application_Programming_Interface) is: “An Application Programming Interface (API) is a particular set of rules and specifications that a software program can follow to access and make use of the services and resources provided by another particular software program that implements that API. It serves as an interface between different software programs and facilitates their interaction, similar to the way the user interface facilitates interaction between humans and computers.”

“Cloud computing will hasten the use of tools and automation in IT services as the new paradigm brings with it self-service, automated provisioning and metering, etc., to deliver industrialized services with the potential to transform the industry”

Source: Gartner, Top Predictions for IT Organizations and Users for 2011 and Beyond

A briefer and more conceptual definition is: “an abstraction that is defined by the description of an interface and the behaviour of the interface”. For example a book distributor may provide the book shops that it supplies with an application which allows a cashier to walk through a sequence of menus to check on the availability of books in the warehouse. However it could also provide an API to directly check on stock availability. One benefit is that the query could be made from within the book shop’s standard application, rather than switching to a different application for each supplier. Another benefit
is that the distributor has the flexibility to switch its internal systems however it likes, as long as the behaviour of the API interface remains the same.

APIs can be classified in several categories depending what abstraction is being described. These descriptions may seem very different, but they generally follow the guidelines of the definition. In the table are typical API categories, together with examples.

<table>
<thead>
<tr>
<th>API Category</th>
<th>Example</th>
<th>Timeline</th>
</tr>
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<tbody>
<tr>
<td>Operating System</td>
<td>API for MS Windows</td>
<td>1985-2001</td>
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<tr>
<td></td>
<td>API for Apple Mac OS X (Cocoa)</td>
<td></td>
</tr>
<tr>
<td>Programming Languages</td>
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**APIs Chapter One**

During the growth of the computer industry in the last decades - even before the World Wide Web - APIs were at the heart of market dynamics. Frequent competitive battles were won or lost on the basis of API wars. The stakes were high, and it was usually a select few, big and powerful companies or organizations that dominated the directions for APIs. For the winners, to control an open or proprietary standard API, would usually add rocket fuel to a company’s growth path.

The reason that APIs were so important to growth is because of the network effect that occurs when more applications created for a platform, lead to an increase in the value of the platform itself. As soon as a developer ecosystem takes root it becomes more costly to switch to alternatives (because some applications may not be available on the new platform) and it is a prerequisite for a company to become the dominant provider in its market.

Microsoft was one of the most successful companies to exploit their APIs for business advantage. They made massive investments to attract the largest base of application developers to write apps for MS Windows and the Windows API. Once they achieved critical mass, it became a self-reinforcing cycle of customers choosing Windows because of the large selection of apps, which led to more developers to write apps on this platform in order to reach the largest possible customer base.

During this period before the Web was available as a distribution platform, it was extremely hard to grow a developer ecosystem around APIs. In order to be successful, lots of distribution, competition and complexity challenges had to be overcome. It was only at large scale that it was feasible to solve these challenges. Therefore it was inevitable that big companies dominated.
APIs Chapter Two

The Internet, and in particular the rise of Web APIs, has had a democratizing effect compared to the dynamics of Chapter One. Now anyone can create an API to share data or services. Anyone can define their module or subsystem (to use the automotive analogy) as a web service and it will be available to be integrated in other modules or applications on the connected web.

The commercial potential for APIs is no longer limited to a handful of big companies, like Microsoft during the Chapter One period. Anyone can spot an opportunity for a new service and with APIs slot it into a bigger framework. Thus it makes the solution more accessible, more useful, and more powerful. For developers who build upon web services it is also easier than ever to take advantage of external services and data to enhance their offering. The result is more value for end customers/users and an explosion in the number of APIs:

![Open API Timeline](Source: John Musser, Programmable Web)

APIs provide a scalable way to do business development and create partnerships. “BizDev 2.0. I call it”.
Caterina Fake, Flickr

The API explosion means that it is feasible to create products which meet customers’ expectations and desires more accurately. It may be to meet their use case in a small market niche, or to have access to data in a unique context, or to meet their preference to interact from a smartphone device. Ultimately it provides companies with the flexibility to design completely new business models.

This is nothing less than a revolution in the way in which solutions will evolve. It is an evolution in the role of APIs, but it is a revolution in how business can benefit from APIs – the API (R)evolution.
The Next Chapter for APIs

Where to next for APIs? The journey has just begun, and the potential will continue to grow. Some of the key trends to watch out for:

- **Standardization** – the effort and friction necessary to integrate web services will continue to be reduced to approaching zero. Once an accounting web service has been integrated via its API, it should not be necessary to rewrite the integration if another accounting service will be integrated as a replacement.

- **Service Level Agreements** – were often treated as “best effort” during the first wave of cloud-based APIs. Increasingly services are being meshed together in more mission critical solutions. This is driving a requirement for service providers to commit to service level guarantees for their APIs and the need to monitor performance and keep track of the usage.

- **Automated service brokering** – in parallel with progress to improve standardization, brokering will help to make it seamless to dynamically switch service providers, for example from one accounting web service to another.

- **Programmer-less stitching of web services** – most of the benefit of APIs are limited to companies and individuals with the programming skills necessary to write the required code. Yet for as long as programming languages have existed, people have envisioned solutions to instruct computers without the need for programming skills. APIs provide higher levels of abstraction and will help get us closer to this vision.

- **Exploitation of rich APIs from services or devices that will create entirely new categories.** For example devices beyond PC’s and cell phones, such as augmented reality glasses, 3D projectors, sensor networks, grids of information produced by nanotechnology based devices, environment aware technology.
APIs are opening up a new chapter for the Internet. Content and services are the digital assets that are the core of any business. This report has shown how an API can open up new distribution and solution options and therefore capture more value from these assets. An API unlocks the value of the firm’s digital assets and explodes reach well beyond the website to mobile apps, partners, developers and more. This greater reach allows partnerships to be leveraged, and creates a multiplier effect for key assets - thus bringing the opportunity to innovate with completely new business models. Competitors are left standing still, while customers can access content and services exactly the way they want.

Get started on your action plan to boost your business with APIs today:

- Identify your core digital assets
- Brainstorm what solutions could be invented with the help of your digital assets
- Define a few scenarios for an API-based business strategy and business model
- Scope out requirements to implement your API initiative
- Start with one strategy and business model, and be ready to adapt and change

At 3scale we welcome the opportunity to help you at each step. The earlier you engage 3scale, the more you maximize the potential.

The API (R)evolution is here.......now!

About 3scale

3scale provides a SaaS Management infrastructure for your API enabling you to open, control, manage and monetize the distribution and usage of your data, content or services to multiple devices or mobile/web applications. 3scale services companies as Skype, Wine.com, and HES to name a few. We can help you to manage your API in a manner that it will increase the visibility of the latter and that you grow your revenues.

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