



# Learning from Web Companies to Drive Innovation:

## Embracing DevOps, Scale and Open Source Software

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Web companies — from dorm room start-ups to the Googles and Facebooks of the world — set the innovation agenda in the technology industry. Today's web innovation is tomorrow's enterprise architecture. As a result, the web segment acts as a leading indicator for enterprise technology with technology typically debuting in the web segment and migrating over time to the traditional enterprise market. By paying attention to what web companies are doing, enterprises can prepare themselves for the future.

### **Developers are king makers**

Software drives innovation and competitive advantage for web companies. Developers write the software, so it's no surprise they make the key architectural decisions regarding programming languages, platforms (OS), middleware and data storage. As a result, developers wield a great amount of influence and are ultimately at the heart of a web company's innovation.

Stephen O'Grady, an industry analyst with Redmonk, explains: "Consider, for a moment, the component pieces of the venerable LAMP stack. Linux is the de facto alternative to Windows on the server and Apple in mobile, Apache is powering nearly sixty percent of the world's websites, [and] MySQL is the most popular relational database on the planet. ... None of [the LAMP stack] Linux, Apache, MySQL, or PHP rose to prominence because of CIOs, IT managers or even analysts. The LAMP stack became popular because developers made it so."<sup>1</sup>

### **DevOps: Aligning development and operations**

While the developer's influence is on firm ground with web companies, their accountability and responsibilities are expanding. In the past, developers have kept their distance from operations; this is not surprising given the two groups' vastly different goals and objectives. In order for developers to drive innovation, they must continually improve the user

experience with new features to stay one step ahead of the competition. Operations, on the other hand, is focused on providing stability, reducing downtime and being able to scale at a moment's notice.

Between the two sides traditionally exists what is known as "the wall of confusion." Developers write applications in isolation from operations — while, on the other side of the wall — operations is using a completely different and sometimes incompatible set of tools to test and deploy applications. As a result, when an application goes down, each side blames the other. This disconnect introduces considerable friction and inefficiencies — hindering innovation and vastly reducing the speed with which new features are delivered to customers and users.

The DevOps (development and operations) model has emerged in response to this disconnect. DevOps links development and operations, using people, processes and tools to break down the wall that traditionally exists between the two departments. It blends the areas of responsibility. With developers often responding to support needs and operations gaining insight into coding innovation, they get a real-life appreciation for each other's role and task requirements. Ultimately, DevOps practices and technologies help companies accelerate the delivery of new features safely and at scale. Web companies that implement an integrated DevOps model, such as Amazon and Google — employing developers and operations specialists who understand and can work with each other — have found they improve their competitive stance in the market.

By expediting new-feature delivery, DevOps directly contributes to improved business results. As frequent functionality is put into practice, the removal of friction accelerates the business model, driving greater adoption, user retention and monetization.

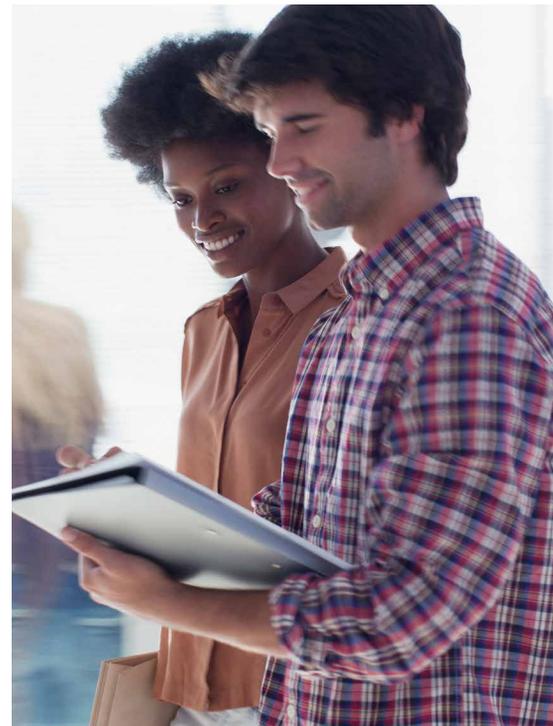
### **How do web companies support developers?**

Web companies must provide developers with an environment that is ripe for innovation. Open source software is key for this innovation as developers can easily access, utilize and modify software up and down the stack. Web companies accept and accommodate their developers' preference for open source software.<sup>2</sup> They also provide an infrastructure that efficiently scales, a data layer that is capable of collecting and analyzing vast amounts of data and an application environment that supports the adoption of various languages. Web companies that fail to provide such an environment can get left behind.

### **Challenges of the individual tiers: Infrastructure**

A web company's infrastructure must continuously balance innovation with maximum stability by enabling growth and supporting sudden directional changes.

This infrastructure is characterized by massive scale-out architecture that is either rented (using one or more public or dedicated cloud offerings), owned (in the case of a private cloud) or created by combining a variety of public and private cloud platforms. Scale-out architecture — as opposed to scale-up architecture, which adds memory, disks and other upgrades onto an individual resource — integrates hundreds of commodity servers that can be expanded linearly by adding more servers.



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True innovation can only occur if web companies learn to work with their developers and give them what they need to innovate — an IT infrastructure that is scalable, open and agile.

Key characteristics of a web company's infrastructure include:

- **System design:** With a scale-out infrastructure, the resiliency and availability that is normally included in the hardware is built into the software instead. This means that extra redundancy and availability are valued less in these systems than in traditional enterprise data centers — where a single server failure can spell disaster.
- **Systems in aggregate:** Utilizing hundreds, if not thousands, of servers — scale-out architecture decreases the chance of total system failure; if one server fails, the others will continue to run. However, significant management problems can potentially arise as a result of setting up, provisioning and managing the vast number of employed servers. DevOps management tools such as Puppet, Chef, Crowbar and JuJu can alleviate these problems by automating installation and provisioning resources.
- **Factory level:** While system efficiency requires thorough consideration, total cost of ownership (TCO) at the factory level merits even greater attention. It is critical that operations considers the amount of energy required to power and cool the entire data center.

By maximizing efficiencies and reducing costs, web companies can reinvest savings in support of developers and innovation.

**Data tier**

The next layer up the stack is the data tier. The volume and variety of data is increasing in every industry, especially in the web space. Ecommerce, social networks, internet search indexing, video archives, healthcare and many other sources are creating 2.5 quintillion

bytes of data per day, with 90 percent of the data created within just the past few years.<sup>3</sup>

The opportunity here lies in using this big data to deliver business intelligence and drive growth by improving customer insights and decision making. However, traditional database management tools weren't designed to deal with this volume or variety of data. Fortunately, open-source developers have created new non-relational data platforms such as Apache Hadoop to help unlock the value within large and complex datasets.

Hadoop excels at aggregating, organizing and querying large collections of structured and unstructured data. Using this platform, developers write applications that support complex analysis as well as other applications, allowing web companies to better understand, serve and monetize the opportunities within their customer base.

**Application tier**

A common trend among all three stack layers is open-source software that allows developers to write their own software infrastructure and applications — lowering overall costs and achieving greater flexibility. Unlike enterprise developers who code in Java and .NET, these developers work in web-scale languages like PHP, Perl, Python and Ruby on Rails. These applications are elastic — or cloud-native — as they are designed to scale and operate in a cloud or highly scaled-out environment.

The developer community is turning to a variety of alternative languages and tools to aid innovation. This undoubtedly creates compatibility and support issues for operations, but web companies that want to remain relevant will not fight the inevitable transition to open-source software. An environment that fosters developer-driven innovation must be embraced by web companies, and operations must proactively support and learn to simplify this evolution.



## Conclusion



Development is the engine behind web companies, as developers are responsible for creating more engaging customer experiences. They also provide solutions for extracting greater value from data and customer-centric services that foster growth and long-term value. Innovation occurs at web companies because they work with their developers and give them what they need to innovate — an IT infrastructure that is scalable, open and agile. At the same time, developers must learn to work more closely with operations. Innovative web companies are the bellwether for the IT industry, and, as a result, traditional enterprises can benefit greatly by following their lead and embracing the changing landscape of development and operations. Those that do will find themselves ahead of the competition.

### Key strategies:

- Enable developers to focus on innovation and unleash the power of frequent functionality by aligning their needs with operations through DevOps
- Deploy systems in a scaled-out, open environment, utilizing savings and efficiencies to create resources for innovation
- Utilize business intelligence and big data to continually deliver better solutions, customer experiences and monetization
- Accept and support changes in the developer community, such as wide adoption of various languages — looking to simplify where possible

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<sup>1</sup>Stephen O'Grady, "Meet the New Kingmakers: Same as the Old Kingmakers," Redmonk, accessed May 28, 2013. <http://redmonk.com/sogradey/2010/09/09/the-new-kingmakers/#ixzz2UctvK4tE>

<sup>2</sup>Stephen O'Grady, "Meet the New Kingmakers: Same as the Old Kingmakers," Redmonk, accessed May 28, 2013. <http://redmonk.com/sogradey/2010/09/09/the-new-kingmakers/#ixzz2UctvK4tE>

<sup>3</sup>Marcia Conner, "Data on Big Data," <http://marciaconner.com/blog/data-on-big-data/>



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