

How DevOps Drives Real-Time Business Growth

(Part One of a Two-Part Series)

Merging application development and operations to speed applications and services development and delivery need not be prohibitively expensive and disruptive if approached with rigor and delivered by a knowledgeable partner.

Executive Summary

DevOps – i.e., merging the application development and operations functions to bring applications and services to market more quickly – is gaining acceptance rapidly. DevOps slashes delivery cycles from months to days or even hours.

For example, while an organization using conventional development and deployment practices may take three weeks to fix a single bug and release the fix to production, those with DevOps can launch a new product in less than a day. A well-executed DevOps strategy also eliminates roadblocks caused by “the slowest process in the organization” – the ability to develop a new release in one week but then having to wait two weeks to deploy it. With DevOps, organizations can more quickly fix bugs, enhance features or tweak user interfaces based on application logs or customer feedback.

Almost two-thirds of IT developers and operations professionals surveyed by Puppet Labs and IT Revolution Press in December 2015 had implemented DevOps practices – a 26% increase over

the previous year. DevOps adopters reported improved software deployment quality and more frequent software releases along with increased business agility.

DevOps is very often misconstrued to be an end unto itself. The reality is that DevOps is only a means to an end. The true end is the ability to bring products to customers faster, and monetizing the product features with zero latency. Most important, DevOps also means combining structured transactional data with unstructured machine data and generating real-time insights that heretofore were unattainable.

Some organizations have steered clear of DevOps for fear it requires an expensive, grueling “forklift upgrade” of not only their development and deployment tools but their processes and culture. Some have also assumed they must create their entire DevOps infrastructure in-house.

Neither is true.

We recommend instead moving into DevOps incrementally, learning along the way. Rather than build a DevOps platform from scratch, orga-



nizations can ease the process by drawing on data they are already generating from their social, mobile, analytics and cloud (SMAC) platforms, as well as from legacy systems and application management tools.

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Based on our client experiences, we also suggest working with a seasoned partner that understands the tools and mindsets required to make DevOps work. Such a partner can help an organization realize the benefits without waiting for its

internal teams to get up to speed on DevOps skills and toolsets or for every DevOps-related challenge to be resolved.

Organizations should also consider turning to a service provider to host their DevOps infrastructure, and to help with training in the new DevOps ways of working. That gives enterprises more time to proactively and continuously improve their products and services.

Busting Information Silos

While much of the talk about DevOps focuses on the rapid and even continuous deployment of applications, the information it uncovers about the behavior of an organization's infrastructure and customers is just as important.

DevOps uncovers those insights by combining two, historically siloed, sources of information – structured data and unstructured data. DevOps can help correlate machine data – manifesting in the form of log files with structured data – with site tables, product tables and transaction tables, along with CRM, ERP and BI data.

For example, user behavior is monitored by tracking tags within Web pages. These identify, down to the level of the individual IP address, which pages, URLs, images or other navigation item an individual viewer clicked on. Click-stream analysis can be aggregated to generate business insights. This can be done at the level of individuals, to understand their preferences or provide them with customized offers. It can also be done at the level of groups – to understand peak sales periods, which Web pages perform best or the percent of customers who abandon shopping carts.

When this data is correlated with information tapped by DevOps, consisting of logs that record execution errors in the code or a complete request-response audit trail over a period of time, the insights are often fascinating. They can not only drive new product features but also empower proactive corrective actions on broken product flows.

Both types of data are essential to fine-tuning an organization's digital offerings. The most elegant Web site or most compelling product offer is worthless if administrators can't keep the site or an online service operating reliably. And a perfectly functioning site can't deliver the maximum business benefit if a product manager can't see which combinations of images or sequence of pages delivers the highest conversion rates and make the necessary adjustments.

DevOps draws on new sources for both types of data. In today's world, application logs may come from the SMAC Stack™ of social, mobile, analytics and cloud technologies. Application data, for example, may come from application and Web stacks within an internal data center or from cloud-based services, mobile applications or legacy back-end systems such as transaction processing applications. User behavior data may come not only from existing business analytics infrastructures, but from Web sites and social networks such as Facebook and LinkedIn. As the range of available business and technical information increases, the power of the resulting insights – and the need to act on those insights – only grows.

While organizations are already gathering much of this data, they find it difficult to aggregate it into a "single version of the truth," analyze it in a business context and quickly use that information to drive business value. The aggregation and analysis of this data are primary business values delivered by DevOps.

Build Expertise, Not Infrastructure

Organizations do not need or, much of the time, want to create their own DevOps infrastructure. The tools and processes that enable DevOps do not generate revenue or competitive differentiation in and of themselves. What does create business value is what an organization does with DevOps.

Think of the DevOps infrastructure like the platform (i.e., WordPress) that hosts a Web site and blog. What drives business is the quality of the text, images, videos and other content on the platform. That content is what business users should be focusing on. The same is true of DevOps. Organizations get the most business value by using DevOps to deliver the best products or services, not building the best DevOps infrastructure.

To free in-house staff for value-added work, organizations should consider DevOps partners that can leverage existing instrumentation and data warehousing/BI infrastructure wherever possible, as well as provide third-party tools and boutique services, such as value-added consulting.

DevOps Toolset

Implementing DevOps requires tools and processes to capture both machine and application data, to aggregate and analyze it and to quickly and continuously develop, test and deploy new code based on the requirements that such data uncovers.

Application log data is currently gathered by a host of systems and network management tools. This data has historically been used only by engineering teams for bug tracking and prioritization of remediation efforts. DevOps allows its use for real-time tuning of products and services, as well as of the infrastructure that supports them.

For example, newer cloud-based platforms such as Splunk, Loggly and Sumo Logic collect and analyze user data including interactions with Web sites and clicks on tags within sites. The Web analytics provided by click-stream analysis tools such as Omniture (now part of the Adobe Marketing Cloud), Tealeaf or customers' own frameworks produce detailed tracking of specific "page events." An experienced DevOps partner can also help organizations choose the right DevOps tools and provide proven processes and deployment frameworks.

Finally, organizations require Agile development tools and processes that facilitate the rollout of new code far more quickly than with traditional, "Waterfall" processes, which required sequential requirements analysis, development, integration, testing, deployment and maintenance. These tools include everything from online code reposi-

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Quick Take

How DevOps Optimizes Key Organizational Roles

Considering DevOps? Here's how this approach can help the following teams:

- **Data warehouses:** By extending the scope of their insight and analysis from historical data to real-time data, and combining the transaction-level data with which they now work to include system and Web performance data.
- **Functional engineering:** Teams now limited to loading log files in a text editor, to identify exceptions or errors, can move upstream. Through a DevOps process, they can build a more intelligent framework and reporting mechanism to provide dashboards with insights into the entire infrastructure.
- **Product managers and others responsible for revenue levels of specific products or categories:** Rather than waiting days or weeks for analysis to reveal the business impact of a new user interface or pricing mechanism, they can achieve near-real-time visibility into results, and make the changes necessary to reach their revenue goals.

tories to new development languages. The new processes may involve change management to help teams adapt to the self-organizing, self-managing, cross-functional Scrum teams that produce

code in rapid “Sprints.” In each case, the aim is to prevent the “slowest process in the organization” from becoming a roadblock.

The good news is that organizations can start their journey to DevOps leveraging many of the engineering process and governance tools and data they already have.

Using commonly available – or easily developed – drag-and-drop report builders, business users can then create their own summaries of this data rather than waiting for analysts to create them.

Build on What's There

The first step is collecting existing machine log data in a large-scale, extensible data platform such as Hadoop, Mongo DB or Cassandra that can accept and analyze unstructured data. This is one area where the tools and skills within existing data warehousing or business intelligence teams can help speed the process. Those organizations can also help implement an analytics framework.

Rather than build such platforms from scratch, an organization may be able to extend its existing engineering process management, product planning and governance, build and release engineering, data warehousing and business intelligence platforms to store and analyze this data. Based on the analysis of this data – ranging from the existence of broken links to conversion rates on landing pages – the organization can develop anything from tweaks to existing applications and services to entire new offerings.

Existing internal teams may be able to adjust existing workflows, standards, processes and metrics to guide the analysis of this data. They may also be able to help integrate the various tools required for this collection and analysis with the workflow automation that is necessary for the continuous identification and correction of problems.

Using commonly available – or easily developed – drag-and-drop report builders, business users can then create their own summaries of this data rather than waiting for analysts to create them. DevOps is all about creating tool chains, integrating them, enabling workflow automation and

driving self-service usage by business users by providing all reports and insights in real-time and on demand.

Using these visualization tools, users can “slice and dice” data by the day of week, time of day, geography or type of device to determine which customers are generating the most revenue, as well as the platforms, languages or regions where the business should focus its development or sales efforts. A well-implemented DevOps strategy also allows the organization to perform ongoing application monitoring and the measurement and quantification of an application's impact on the business.

This deep analysis also helps prioritize which bugs or systems issues to resolve first by linking application events to business impacts. For example, if the functionality enabled by a specific piece of code usually handles 100,000 requests per hour, and 30,000 of those requests result in an average \$10 purchase, the business can estimate a likely loss of \$300,000 every hour that the code is not working, and prioritize its bug fixes accordingly.

It is through such pragmatic, business-focused and bottom-up efforts that a business can build the DevOps momentum to move from small wins to larger, more complex problems.

The 360-Degree DevOps View

An effective DevOps strategy allows an organization to analyze, for the first time and in real-time, Web analytics data, machine data and existing structured data to achieve a 360-degree view of how customer-facing systems are and are not delivering business value. DevOps allows organizations to understand the behavior of individual customers, what actions they take and how their behavior compares to that of other customers. It allows an organization to perform what-if analyses of changes to their user interface or product offers.

Based on the results of these predictive analyses, and of actual field experience, the Agile “development” side of DevOps then allows organizations to respond to market needs more quickly than ever before.

If your organization is not moving toward a DevOps strategy it is leaving business insights unused within its infrastructure and user data it is already gathering. What's worse, it is losing the immediate and dramatic business value of

improving its infrastructure, customer experiences and product and service offerings to minimize operational costs and maximize revenue.

Achieving all these benefits does not require a disruptive “big bang.” Nor does it require the pur-

chase and deployment of an expensive toolset. The tools and skills required for DevOps can be purchased as a service, freeing existing staff to focus on analyzing and acting on the real-time business insights generated by DevOps.

About the Author

Kapil Apshankar leads Cognizant's Technology Product Services Group, focusing on DevOps, Hadoop product development and next-generation product engineering. He brings a rich and diverse Silicon Valley perspective from spending a decade-plus exploring various technologies. In 2005, Kapil developed a sophisticated methodology that empowers companies to harness the power of multi-fidelity rapid prototyping, which fundamentally changes the way they build software products. In 2007, he helped build the first-of-its-kind enterprise experimental learning platform. In 2010, Kapil incubated one of the largest distributed Scrum development teams in India. He is a regular speaker at technical events, including O'Reilly Conferences and The Innovation Enterprise Summits. He can be reached at Kapil.Apshankar@cognizant.com.

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