

Why DevOps Matters:
Practical Insights on Managing Complex & Continuous Change

A research report prepared by:



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The research and analysis presented in this report includes research from a dedicated survey and interview program with ongoing Saugatuck Technology research programs, including our global survey and interview work with user enterprise business and IT leaders, briefings with providers, and analysis of publicly-available market information from multiple sources.

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INTRODUCTION: DEVOPS AND MANAGING CLOUD COMPLEXITIES

Continuous deployment of Cloud business solutions is a challenging and sometimes daunting task which DevOps can make manageable. Saugatuck Technology research has recently uncovered these critical learnings for organizations considering DevOps in order to manage complex and continuous systems change:

- To succeed, DevOps must grow beyond pockets of IT automation to span organizational groups and their project activities
- Windows organizations may be especially well-suited to successful adoption of DevOps
- DevOps successes can be incubated, expanded and sustained through Centers of Excellence
- Integrated toolsets based on loosely-coupled platforms will best support DevOps and continuous deployment

This paper presents research and insights intended to support IT leaders and people working in operations to navigate the intricate challenges of deploying DevOps in your organizations.

Continuous deployment of Cloud business solutions in today's marketplace is a competitive necessity. It's a business imperative. Cloud business solutions providers from Plex Systems to GE Software, financial firms and on-line retailers alike, are all embracing continuous deployment because, in the ultra-competitive environments where companies are racing each other to release the next big thing, the last innovation you brought to market is never enough. Just to pick one area -- mobile commerce -- consider the many innovative, emerging technologies that demand continuously creating, deploying and maintaining new apps: for instance, SMS, MMS, bar codes and QR call queuing. With 6 billion plus mobile devices worldwide, the real opportunities for generating revenue through mobile technologies are vast, if not countless.

Delivering Cloud business solutions also means an obligation to increasing responsiveness and reliability for your customers. Time-to-market and software quality are essential for today's enterprises in achieving business goals and in creating and sustaining differentiation. Moreover, technical problems may cost you customers permanently. Should the Cloud business solution deliver poor response time or go down in the middle of a transaction, you are not only not serving your customer, you are creating frustration at best and at worst doing damage to your brand. If it is a mission-critical capability to respond more quickly to glitches, then it is far better to prevent them in the first place by the effective management of complex and continuous change.



DEVOPS: EMERGING STRATEGY FOR MANAGING CONTINUOUS CHANGE

Along with more rapid change in business requirements, emphasis has shifted dramatically in the develop-deploy equation from the mainframe and client/server eras of the now-distant past. No longer are developers immersed in an obsession with the requirements completeness of the Waterfall method, which long dominated programming. Today's development / deployment model, built largely on Agile and other similar methods, embraces iterative requirements gathering and continuous delivery of software, in a "nothing's perfect, so let's get something up there, and then get it right" approach. Thus, the shift to the Cloud over the past fifteen years has brought with it new demands for developers and operations teams alike, who must now manage not just a few maintenance changes once a system has been built, but a continuous stream of change. The challenge is felt keenly in the IT operations organization, where implementing this continuous change has become a time-to-market and software quality challenge. The need for continuous development and deployment, which continues to accelerate, drives the need for DevOps, which we define as *the collaboration and coordination of developers and IT operations in deploying new software releases to benefit the business*.

Developers are normally consumed by the latest business and technology innovation, while operations teams focus on using technology to keep Cloud business solutions running smoothly. Although, in one view, their approaches can seem almost in conflict, DevOps reframes their apparent conflict as a shared challenge, collaborating in the continuous delivery of business value.

Regardless of company size, whether the company has a pre-disposition to Open Source or Windows, and regardless of whom you ask, DevOps appears to be present in many organizations as "pockets of IT automation." In a recent Saugatuck Technology survey of over 300 development and IT operations professionals and managers, 71 percent of companies have pockets of IT automation and 54 percent are incubating DevOps in one or more small projects. Only 37 percent of these organizations have a formal DevOps strategy today. Yet, to succeed in managing complexity, DevOps should grow beyond these pockets of best practice to span all organizational groups and their project activities. What's preventing this? What are the barriers to organization-wide success with DevOps? Overcoming long-established cultural habits and other forms of organizational resistance is necessary if DevOps is to grow beyond pockets of IT automation and best practice. How to nurture the growth of DevOps will take somewhat different forms, depending upon the organization and the nature of its cultural resistance. In some organizations, it may be sufficient to raise awareness through training and positive incentives. In others, the strong hand of executive leadership may be required, especially when cross-organizational collaboration is suffering due to stovepipe mentalities.

As we have observed, for instance, developers are more concerned with innovation and productivity and IT operations with control, availability and production efficiency. Transcending these narrow, but important points of view is essential in order to collaborate on delivering manageable solutions to drive and benefit the organization, serve the customer and attract new business revenues. Organizations transitioning to today's new business environment may require strong leadership to ensure these priorities are not undermined by narrow self-interest and stovepipe mentalities.



THE DEVOPS CHALLENGE

First of all, DevOps is about people and process. It's a methodology that enables organizational groups to communicate with each other across silos and to coordinate their activities. Thus, it is not surprising that established cultural habits are the number one challenge to DevOps, especially barriers to cross-organizational collaboration, the critical element of successful DevOps practice.

Figure 1: Top Challenges in Implementing DevOps



Source: Saugatuck Technology Inc.

Most of the other barriers to success with DevOps are about less-than-direct resistance, such as lack of experience or understanding, lack of management support, productivity pressures and priorities, and challenges in aligning the right people with their most appropriate positions in a DevOps organization. Nevertheless, these obstacles can have as much negative influence as direct resistance. Passive forms of resistance can kill or delay the implementation of DevOps just as well as can overt opposition.

At the same time, the Saugatuck survey has turned up two additional interesting findings about organizational resistance to DevOps:

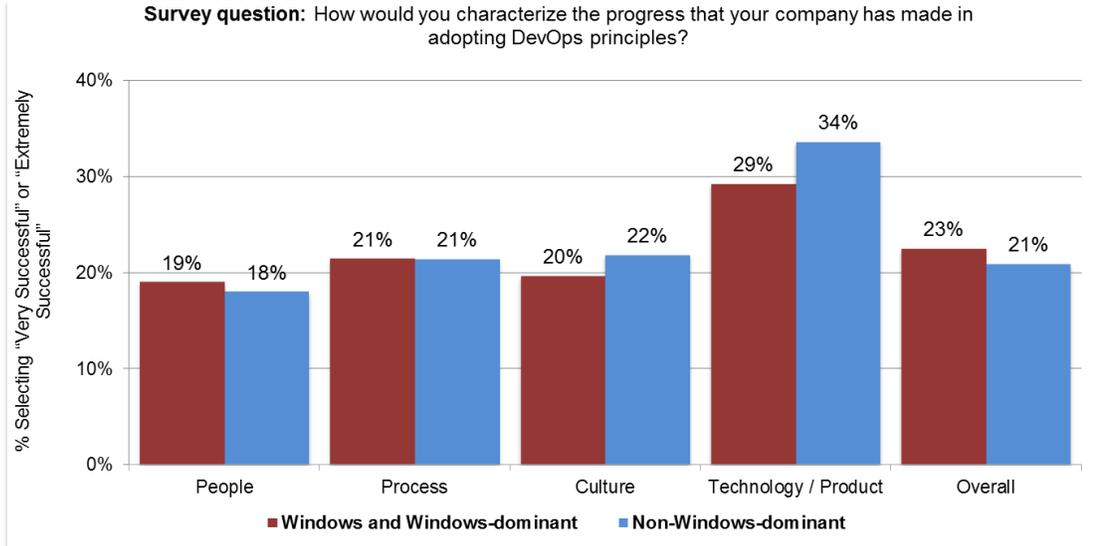
1. Larger firms feel cultural habits are slightly less an obstacle than smaller firms, possibly due to larger firms having more recognition of the importance of managing complexity and continuous deployment. Because they recognize the potential business value of DevOps, larger firms are willing to attempt to break old cultural habits.
2. Non-Windows shops report more DevOps challenges stemming from organizational culture, while Windows shops are less concerned about cultural resistance. Why are Windows shops less concerned? Most likely, they are more used to structure and formal organization than non-Windows shops. In Saugatuck's view, DevOps requires more structure and more organization than the non-Windows shops are used to. Having a defined structural model for people and process is critical to the ongoing success of DevOps. Overall, Windows shops are more predisposed toward achieving success in DevOps.



Many people would expect that non-Windows shops using open source DevOps tools would be on the leading edge of DevOps adoption. And some may be. However, in the recent Saugatuck survey, there was no significant difference in progress with DevOps reported by Windows and non-Windows organizations as shown in Figure 2.

Figure 2: DevOps Progress in Windows and Non-Windows Shops

Survey question: How would you characterize the progress that your company has made in adopting DevOps principles?



Source: Saugatuck Technology Inc.

Note especially the close alignment between Windows and Non-Windows shops (within a single percentage point or two) on all categories except for Technology / Product. That is not exactly a surprise, given we are differentiating by technology platform. However, the interesting thing is how this aligns with another survey finding.

Although all respondents, regardless of platform, indicated a strong likelihood to shift from standalone tools and single-vendor platforms to platform-based, loosely-coupled tools, Windows shops showed significantly higher expectation (52 percent) than Non-Windows shops (43 percent) by 2016. The difference for Non-Windows shops was in the continued increase in standalone single-vendor tools. Standalone tools for Windows shops declined from 34 percent to 20 percent by 2016, while Non-Windows shops showed an increase of from 20 to 25 percent.

Saugatuck sees this as clear evidence that *Windows shops are making the same kind of progress as Non-Windows shops in deploying DevOps as a methodology, if not slightly better, but are looking for a more holistic, platform-driven tools environment than currently exists.*



HOW BEST TO NURTURE DEVOPS IN YOUR ORGANIZATION?

The short answer is...it depends. Every organization is different, and to be successful you have to be responsive to the cultural dimensions of your organization. That said, company size matters, has a dramatic impact on many aspects of DevOps and can provide guidance for how to succeed building a DevOps organization. For instance, *smaller firms are looking to improve development process agility, while larger firms are more inclined to favor improved quality and faster response time to line of business needs.* The larger the enterprise, the more likely they are to see DevOps as the dominant approach by YE2016. However, all sizes of organizations do expect very dramatic growth in the use of DevOps by 2016.

In Figure 3, Saugatuck has summarized some specific findings with respect to size of organization that can help guide the growth of DevOps.

Figure 3: Organizational Size—Findings and Implications

Finding	Implication
Smaller firms indicate more activity focused in small, one-off-style projects.	Likely, smaller firms will require more effort to implement and follow project standards.
The larger the firm, the more likely it is to favor guidelines, policies, or a formal DevOps strategy in place	We attribute this to larger firms having more formalized IT organizations with more resources.
The largest firms also indicate more effective coordinated use of DevOps and report a greater degree of progress with people, process, culture, and technology.	These largest firms may have a greater breadth of DevOps activity across the organization, a greater awareness of DevOps activity or, most likely, both.

Source: Saugatuck Technology Inc.

Another important consideration in growing an organization-wide DevOps culture is dealing with the needs of the heretofore organizational silos. Here are some bulleted findings of interest:

- Developers report the fewest problems with leadership buy-in, selecting the right people, and aligning standards – and the highest level of problems dealing with organizational habits and complex environments.
- IT Strategists and Leaders value the collaboration angle of DevOps above all others, while Developers are more focused on technology.
- IT leaders also report more DevOps efforts across the board, while Developers seem to not know of strategy and guidelines that may exist. Developers also are less likely to see the use and benefits of DevOps.
- IT Leaders have greater expectations for DevOps, perhaps due to their wider scope of awareness of what DevOps is and can do, and what still needs to be done.



Figure 4 below presents some of these findings at a glance, showing general alignment, but also some differences among these three organizational groups – IT Leaders, IT Implementers and IT Developers – that are relevant to planning how best to nurture DevOps in your organization. The roles and responsibilities clearly shape attitudes in each of these organizational groups. What is most surprising about these findings is the high degree of alignment among the three groups, except in regard to the first issue: whether the organization is making progress with DevOps. IT Leaders take the most optimistic view, while IT Developers are the most pessimistic and IT Implementers are somewhere in between those two points of view.

Figure 4: IT Leaders v. IT implementers v. IT Developers

	IT Leaders	IT implementers	IT Developers
<i>Making Progress with DevOps</i>	HIGH	MED	LOW
<i>Have a DevOps Strategy</i>	LOW	LOW-MED	LOW
<i>DevOps Will Optimize Resources</i>	MED	LOW-MED	HIGH
<i>DevOps Will Improve Quality</i>	HIGH	HIGH	MED-HIGH
<i>DevOps Will Yield Faster Releases</i>	LOW-MED	MED	MED
<i>DevOps Will Yield Faster Response to Requirements</i>	MED	HIGH	HIGH

Source: Saugatuck Technology Inc.

Obviously there are no quick fixes for these attitudes and expectations. They arise out of the training and practices of the different professional groups. Some would say they have been developed, even nurtured, over many years, especially in larger and “older” organizations. However, it is extremely useful to keep these in mind when building a DevOps culture. Motivation and reinforcement of new practices can be far more effective that way.

FIVE BEST PRACTICES IN BUILDING A DEVOPS CULTURE

As Saugatuck has discovered, larger organizations may be able to teach us from their more successful experiences in building DevOps culture. What best practices are larger firms employing that others can learn from, which lessen the sting of breaking ingrained cultural habits and improve the ease of collaborating across different professional groups?

Let’s consider these five best practices for growing organization-wide DevOps:

1. **Start with smaller projects and engender a Center of Excellence approach.** In very large or very small organizations, a virtual Center of Excellence may create focus for gathering and disseminating information and guidance. Such a virtual group may be able to establish and maintain consistent practice across an organization that might otherwise permit too much local variance in implementing DevOps.



2. **Conduct DevOps awareness and training seminars.** These training seminars can build a spirit of collaboration across diverse professional groups such as Developers, IT Implementers and Operations Staff, and IT Leaders. Such seminars are an opportunity to bring in positive outside influences with proven track records for DevOps success.
3. **Identify, evaluate, standardize on a DevOps toolset.** While the foundations of DevOps are methodological, and should respect ITIL process management, a consistent toolset can further reinforce DevOps practices and evolve with the maturity of the DevOps organization.
4. **Include business analysts in the Center of Excellence, who can identify and maintain relevant business metrics to drive the creation of business value.** Where possible a business owner should be present as the overall lead. Agree on consistent set of key success metrics that the Center of Excellence will report regularly to business executives and other organizational sponsors. One very successful approach is to implement tools to gather and report on those metrics, e.g., information dashboards with drill-down detail.
5. **Evaluate progress regularly and repeat with improvements for each new project or set of initiatives.** Progress toward defined milestones should be communicated to senior leadership and other teams to reinforce successful practices, show key learnings, and inspire other teams to want to do the same. A successful DevOps organization is a living process of continuous improvement and not a static shell to retreat inside. Its purpose should be proven and its processes improved on a regular basis with no endpoint in mind. Rather, the DevOps organization should evolve in order to deliver business value for the organization -- and not the set of technology-driven methods, tools and practices that make that business value possible.

THE FUTURE STATE OF DEVOPS

As we have observed in the discussion above, Windows shops are making the same kind of progress as Non-Windows shops in deploying DevOps as a methodology. However, as is shown in Figure 5 on the following page, Windows organizations are looking for a more holistic, platform-driven tools environment than currently exists.

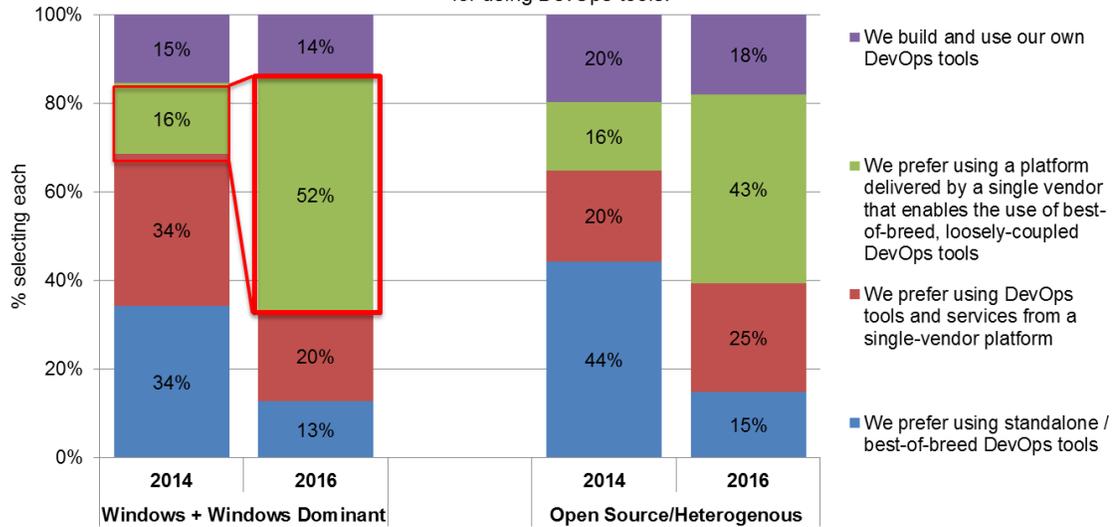
It is true that there are already excellent tools on the Windows platform that can effectively support DevOps practices. For example, the systems management platform in Windows PowerShell enables deploying and managing configuration data for software services and for managing the environment in which these services run. System Center, Azure Resource Manager, Visual Studio Online, TFS Online, PowerShell DSC all can play a role in managing continuous integration and delivery with DevOps. Even third-party best of breed tools from the non-Windows world such as Chef, Puppet and ScriptRock's Guardrail can either integrate with PowerShell or run as complementary tools.



Based on the Saugatuck survey responses seen in Figure 5, we can see there is a desire to mix and match tools DevOps professionals are comfortable with. Rather than have a single, monolithic offering from a platform provider, the survey data suggest organizations would strongly prefer to work with a platform-based solution composed of a mix of vendor-provided tools and best-of-breed, standalone tools, that all can integrate, share data and work together.

Figure 5: Growing Preference is Best-of-Breed, Loosely-Coupled Tools

Survey question: Please indicate your organization’s preference, now and 2 years from now, for using DevOps tools.



Source: Saugatuck Technology Inc.

Moreover, according to the survey data depicted above, Windows dominant environments will increase their use of DevOps tools from 16 percent in 2014 all the way up to 52 percent in 2016, an even more dramatic expected growth than may be seen in Non-Windows environments. This clear preference by 2016 is also found across all three professional groups: IT Leadership, IT Implementers and Developers. This will be especially true, as we have seen, in large and very large organizations, which also show at least threefold growth in preference for “a single vendor, loosely-coupled, best-of-breed platform.” But smaller organizations are not far behind, many of them driven by the need to coordinate effectively and maximize their scarce resources. Enterprises of all sizes are embracing DevOps and platform-based tool sets are their nearly universal preference.

The reason for this is becoming more obvious with every passing day, whether in the Cloud or in a hybrid environment. Businesses are innovating in faster and faster cycles and driving more and more change, not once or twice a year, but almost continuously. Managing complexity in today’s business and systems architectures, in which APIs abound and interfaces multiply almost exponentially, demands a new approach to management.

**CONCLUSION**

Continuous deployment of these increasingly complex solutions is a challenging and sometimes daunting task which DevOps can make manageable. However, to succeed, DevOps must grow beyond pockets of IT automation to organizational groups and their project activities.

While overcoming cultural resistance is never simple, Windows organizations may be especially well-suited to successful adoption of DevOps, and especially in larger organizations, which are more accustomed to structured development processes and collaborative models. While Windows firms still feel a cultural shift like DevOps as a challenge, as the Saugatuck survey made clear, it is less of a challenge than for Non-Windows shops.

Naturally well-poised to adopt and nurture DevOps, Windows organizations are already making steady progress in extending DevOps culture beyond those initial pockets of IT automation and best practice.



SPONSOR PERSPECTIVE

DevOps done right with Microsoft

DevOps is for everyone, large and small, startup as well as well-established enterprises. CIOs and operations staff across companies of different sizes who empowered teams working the DevOps way see improvements, including the following:

- 50 percent or greater improvements in software quality
- Over 60 percent release more often
- 50 percent or more see improve collaboration

DevOps done right can help IT Operations and Developers become more agile and responsive.

There is not a one-size-fits-all solution. Here at Microsoft, we believe DevOps can only be effectively implemented through People, Process, and Tools.

To find out more information DevOps @ Microsoft, please visit us at <http://aka.ms/devopstl>.





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