Understanding DevOps

Foster a culture for building better apps faster

rackspace®

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1. Introduction: The Brave New World of DevOps

DevOps is here to stay.

DevOps isn't just another IT buzzword. According to our 2014 DevOps Adoption report (conducted by Vanson Bourne, a technology research firm, and commissioned by Rackspace), the vast majority of surveyed businesses have either already implemented DevOps practices (51 percent of respondents) or were planning to implement them (35 percent of respondents).

At Rackspace, we help many different companies succeed in their DevOps journey. In this paper, we'll review what DevOps is and how it challenges prevailing IT processes, organizational structures and cultural expectations. Then we'll dive deeper into the primary aspects of DevOps, and how to get them right.

What does DevOps really mean?

DevOps is an emerging trend that continues to evolve, so definitions vary. But here's what it means to us at Rackspace: "DevOps is a combination of culture, processes and technologies that empower software development and IT operations teams to work closely together in order to enable the fastest time-to-market and maximum business agility."

If you're a developer, that might sound like business jargon. But most practitioners and analysts agree with us on a few key points. In short, DevOps is about:

1. Breaking down silos, especially between developers and ops engineers.
2. Automating infrastructure wherever it makes sense.
3. Shipping high-quality code fast through processes like continuous integration (CI) and continuous delivery (CD), usually facilitated by the cloud.

Why should I care about DevOps?

Our DevOps Adoption report reveals that most surveyed businesses using DevOps are already realizing a wide range of real, measurable benefits as a direct result of implementing DevOps practices.

Technical benefits include faster delivery of new features (for 57 percent of respondents), more stable operating environments (46 percent) and reduced application downtime (for 44 percent of respondents). In turn, these have led directly to successful business outcomes such as improved customer satisfaction (for 52 percent of respondents) and reduced IT infrastructure spend (for 49 percent of respondents).

2. The Old IT: Siloed and Slow

To successfully implement DevOps practices and technologies, you first need to understand how the DevOps trend currently challenges the way most IT departments have functioned for many decades.

Despite the large percentage of surveyed organizations that have already begun or are planning to start their DevOps journey, the IT function in most enterprises looks like this:

DEVELOPMENT (Dev)		OPERATIONS (Ops)
Silo 1: Develop	**Silo 2**: Test	**Silo 3**: Deploy
Who: Developers	**Who**: Testers/QA Analysts	**Who**: Sys admins, DBAs and network admins.
What: Writing code for new applications, customizations to licensed applications or new versions of existing applications.	**What**: Making sure applications are fit for purpose before being released to production, and reporting bugs back to developers for fixing.	**What**: Provisioning and managing servers to run applications, monitoring performance, fixing problems and system bottlenecks.

This means four things for the application development and deployment process:

It's siloed: The functions often don't sit in the same building — sometimes they're even in different time zones. Day-to-day collaboration is minimal.

It's linear: One job starts when another finishes. QA starts when the dev team hands over a release for testing. Operations start when a completed app is released for production.

It's manual: Lots of human effort is required at every stage, from writing and testing the code to installing and provisioning servers.

It's slow: It can take months to get a new application or new functionality in front of users. Inflexible deployment cycles and sluggish time-to-market make it hard to create a competitive advantage.

The prevalence of the cloud has transformed this traditional approach to developing, testing and deploying software.

3. The New IT: DevOps + Cloud

To take advantage of the cloud's improved speed and flexibility, development and operations teams need to work together more closely and productively. That's where DevOps comes in. But change is always hard. Building a DevOps culture means being able to do four things really well:

Collaborate: creating an environment where dev and ops teams can work towards common business objectives that are set at the top levels of the business. This can involve everything from physically moving teams to be near each other to finding good collaboration tools, agreeing on a common language and even organizing social events.

Automate: removing any manual processes that can slow down the continuous delivery model.

Measure: identifying metrics and continuously measuring success (and failure) to learn what works and what to avoid.

Share: feeding results back to everyone who can use them productively.

When we work with our enterprise customers to help them improve DevOps processes, we apply the above "CAMS" principles to four areas of their business:

1. People
2. Applications
3. Services
4. Technology

The following pages will look at each of these areas and provide tips for creating a DevOps culture in your organization.

4. People: Create a DevOps Culture

For organizations that run the siloed model, moving to DevOps requires quite a radical change in thinking, culture and approach. While dev and ops engineers are probably already breaking down walls and collaborating informally, for DevOps to become part of organizational culture, the change needs to be driven from the top.

What do we mean by “the top”?

Usually it’s the person who has ultimate accountability for both software development and IT operations. That role may be different in different organizations: It could be the CIO, the CTO, or the COO. In technology-driven businesses, like ecommerce companies it could even be the CEO.

To enable DevOps, it’s critical that key stakeholders:

- Understand that a DevOps approach can transform agility and competitiveness
- Convince non-IT senior management of the need for DevOps
- Know what has to be done to make the change happen
- Implement and lead a plan for transition (or identify someone to do it)
- Motivate everyone to get on board with the plan
- Measure and report on the success of the DevOps transition on an ongoing basis

5. Applications: Build for the Cloud

To reap the full benefit of the cloud, applications need to be architected from the ground up of the cloud environment. While some legacy applications can be ported to the cloud, it's cloud-native applications that will be able to best exploit the cloud's speed and agility.

In a DevOps environment, that means ensuring dev and ops teams can work together to:

Build for scale: ensuring that everyone has a good understanding of the underlying cloud platform, so devs can build apps and components that are capable of scaling instantly and effortlessly.

Build for fail: One of the fundamental aspects of the cloud is that it's built on hundreds or thousands of low-cost commodity servers, and it's not uncommon for an individual node to fail. The key is to architect cloud applications to glide effortlessly over localized failure — without the user noticing anything.

Automate everything: The more the development and deployment process can be automated, the faster and smoother it will be. DevOps teams should look to automate as much as possible, so that traditional bottlenecks (like the days it used to take to provision a new server) disappear.

Reduce costs: When dev and ops teams work together more efficiently and automate time-consuming processes, a natural outcome is lower transactional costs. Additionally, once scale is achieved, costs remain the same, while users increase dramatically.

6. Agility: Componentize Everything

When you’re working in the cloud and something goes wrong, you need to be able to fix it as quickly and as easily as possible. That means approaching everything in a modular fashion, so you only need to fix or replace the faulty component rather than the whole system.

This enables you to keep moving at cloud speed — improving time-to-market — with nothing acting as a drag on the rate of innovation. We call this principle “componentize everything,” and it applies at all levels of the cloud. For example:

Application development: Build and release applications in small, discrete chunks for rapid iteration, testing and deployment. If one part of an app fails, you only need to rewrite that part. CI and CD allow teams to quickly verify builds, identify bugs and deploy production-ready software at the push of a button.

Cloud infrastructure: Build clouds from many, low-cost hardware components — if one fails, the system works around it and the faulty node can be replaced.

Cloud services: From infrastructure providers to cloud tool vendors, make sure you can easily swap vendor services in and out, so you aren’t held back by contracts that no longer meet your needs.

7. Technology: The Right Tools for the Job

As mentioned previously, automating time-consuming software deployment and infrastructure management tasks is an important step toward achieving DevOps goals like improved time-to-market. That means you need to choose the right tools and gain access to the skills you need to maintain and use them effectively.

So, which tools should you use?

It depends on your stack, your current in-house skills and your teams' preferences. For instance, one of the most important choices you make might be whether to use Chef or Windows PowerShell DSC for configuration management. If you're running a Windows stack and using .NET, Windows DSC might be a better fit. If you're running a Linux stack, you may want to go with Chef. But it always depends.

To get these critical technology decisions right from the beginning, it's important to lean on engineers experienced with DevOps processes and infrastructure automation. That means you have a few different options:

- Allocate current dev and ops resources to learn these tools
- Hire new talent (ideally with real-world experience)
- Leverage a managed services provider with deep DevOps experience

Most businesses choose a combination of the three.

To reiterate: Every organization is different, and choosing the right tools depends on a wide range of factors. But to get you started, here's a basic introduction to some of the DevOps tools we commonly help our customers with at Rackspace.

Action	Explanation	Example Tools	User Benefits
Infrastructure automation	Automate your existing infrastructure using Chef and Windows PowerShell DSC. Write, test and maintain cookbooks. Automate dev, staging and production environments.	• Chef • Powershell DSC	• Keep dev and production environments in sync, enabling faster deployment and quicker time-to-market of new features. • Scale horizontally without manual setup.
Monitoring	Monitor performance metrics and provide a Graphite dashboard of counters, timers and gauges.	• New Relic • Rackspace Cloud Monitoring	• Understand how your performance improves or worsens in response to code changes and other events. • Track critical business metrics such as credit card processing times and signups.
Log aggregation	Aggregate logs from all of your devices and present through the Kibana web front end.	• logstash	• Spot anomalies and patterns in product usage by simplifying analytics of millions of lines of logs. • Understand the user experience and drill down to explain performance trends.
Source control	Provide cookbooks, workflows and all code that powers your infrastructure. Code is made available in private repos.	• GitHub	• Have full visibility into the code that powers your infrastructure. Collaborate with Rackspace on changes to your environment. Every change is tracked and documented.

8. Managed Services: Boosting Capacity & Expertise

Here’s another key question when you’re planning your DevOps initiative: To what extent will your business leverage managed DevOps service providers to bolster your operations team and deliver guidance around new processes, tools and culture challenges?

According to the Rackspace-commissioned DevOps Adoption report, a significant majority of surveyed organizations currently using DevOps practices (70 percent) choose to work with managed DevOps service providers like Rackspace. So, why do so many turn to external expertise?

It’s more economical. Improved cost efficiency was the most commonly cited reason for using managed DevOps services (59 percent of respondents). By leveraging a trusted service provider, businesses gain access to expert DevOps engineers and developers as a support function to their team — without the expense of hiring, training, developing and retaining highly sought-after talent.

It frees devs to write code. Half of businesses relying on managed DevOps services (50 percent of respondents) say that relying on an external partner “allows them to focus on innovation.” With a managed hosting provider like Rackspace, our specialists can handle the management of customers’ DevOps tools like PowerShell DSC as well as their infrastructure (maintenance, patching, monitoring, etc.).

While it’s still important for developers in a DevOps organization to communicate closely with their provider and think carefully about how their code will be deployed, these managed services address one of the most common criticisms of DevOps — that it can distract developers from doing what they do best, which is writing high-quality code.

9. Quick Quiz: Is Your Organization Ready for DevOps?

Answer the following questions to assess how ready your organization is for DevOps:

- Where in the hierarchy does accountability for dev and ops meet?
- Are there release frequency-based goals and objectives in performance criteria?
- How frequently are you able to release code to production?
- How often do dev and ops teams speak?
- Are customers starting to demand faster and better service from you?

Additional Resources:

- **Video: What Is DevOps**
- **Blog: Businesses Are Finding Real Value, Cost Savings With DevOps**

10. Conclusion: Realizing the Promise of DevOps

The cloud is all about being able to move (and learn, adapt and evolve) faster than your competitors. DevOps isn't a prerequisite for taking advantage of cloud. You can still gain immense cost, efficiency and agility benefits from the cloud without reorganizing along DevOps lines.

But when you create a culture in which every layer of your organization — from people to technology infrastructure — can work at cloud speed, with no barriers, miscommunication or bottlenecks, there's nothing that can slow you down.

About DevOps at Rackspace

- Real-world experience helping rapidly scaling customers succeed on their DevOps journey
- Fully managed infrastructure (OS patches, upgrades, monitoring, etc.)
- Managed tools like Chef and Windows PowerShell DSC for infrastructure automation and New Relic and logstash for performance monitoring
- Full visibility into the code that powers your infrastructure
- Close collaboration on changes to your environment
- DevOps engineers available 24x7x365

Learn more:

- DevOps Automation Services
- DevOps Advisory Services

Call anytime: **1-844-299-4263**

About Rackspace

Rackspace® (NYSE: RAX) is the #1 managed cloud company. Its technical expertise and **Fanatical Support®** allow companies to tap the power of the cloud without the pain of hiring experts in dozens of complex technologies. Rackspace is also the leader in hybrid cloud, giving each customer the best fit for its unique needs — whether on single- or multi-tenant servers, or a combination of those platforms. Rackspace is the founder of OpenStack®, the open-source operating system for the cloud. Based in San Antonio, Rackspace serves more than 300,000 business customers from data centers on four continents.

GLOBAL OFFICES

Headquarters Rackspace, Inc.
1 Fanatical Place | Windcrest, Texas 78218 | 1-800-961-2888 | Intl: +1 210 312 4700
www.**rackspace**.com

UK Office

Rackspace Ltd.
5 Millington Road
Hyde Park Hayes
Middlesex, UB3 4AZ
Phone: 0800-988-0100
Intl: +44 (0)20 8734 2600
www.rackspace.co.uk

Benelux Office

Rackspace Benelux B.V.
Teleportboulevard 110
1043 EJ Amsterdam
Phone: 00800 8899 00 33
Intl: +31 (0)20 753 32 01
www.rackspace.nl

Hong Kong Office

9/F, Cambridge House, Taikoo Place
979 King's Road,
Quarry Bay, Hong Kong
Sales: +852 3752 6488
Support +852 3752 6464
www.rackspace.com.hk

Australia Office

Rackspace Hosting Australia PTY LTD
Level 1
37 Pitt Street
Sydney, NSW 2000
Australia

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