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Data-Driven DevOps

If you're an IT manager, you know the power of good data. It's the lifeblood of complex systems. The question is, how deeply does your data influence your decisions? Here, we argue that the way to establish the most efficient, agile, and innovative IT teams is to build a DevOps infrastructure on the foundation of a data-driven culture.

WHAT IS A DATA-DRIVEN CULTURE?

At its root, the concept is simple: in a data-driven culture, every employee bases every decision on data. Data-driven cultures quantify as many of their goals and expectations as possible, and they build toward working with their data in real time. Because everyone is expected to drive their actions with metrics, everyone must have access to the data they need and the tools to interpret it.

This move toward democratizing data goes hand in hand with DevOps, which favors a flatter network of collaboration within cross-functional teams rather than traditional hierarchical models. In DevOps, development and operations teams are de-siloed and share knowledge constantly. The flexible and collaborative nature of DevOps empowers team members to analyze and act on data in every decision they make. A data-driven culture can be essential to a DevOps team: as long as everyone is clear on how the data relates to your business initiatives, they can collaborate across areas of expertise.

WHAT ARE THE BENEFITS?

Guesswork and gut feeling don't have a place in a data-driven culture. In the long term, the move to a data-driven culture lets you leverage vital business metrics to minimize risks in deploying new initiatives because you can respond to that information in near-real time. Having that level of insight and agility in the realm of customer experience is the gateway to the next disruptive innovation in your industry.

No matter where your company is or where it is going, you can start laying the foundation for future success by establishing a data-driven DevOps culture around incident response. As customers conduct more and more transactions online, the demands we place on IT departments have scaled exponentially. So has the cost of an outage. In 2015, Apple experienced an outage that cost an estimated $25 million and contributed to a 1.8% drop in its stock price. The more valuable uptime becomes, the more important it is to foster the fastest, most flexible incident response infrastructure possible.

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The core challenge of improving incident response is separating the signal from the noise. Many companies use several monitoring systems simultaneously. If those systems routinely throw out dozens of alerts with each incident, it's easy for your team to become desensitized. This is called alert fatigue, and it can wreak havoc on responsiveness and team morale. Constantly dismissing inconsequential alerts is a frustrating distraction from the real work of building new features, and it blinds your team to the signals that a critical incident is underway.

A data-driven DevOps team, however, has the tools and the agility to put an end to alert fatigue. When you democratize your data, everyone can refer to a centralized platform to get the big picture. Because everyone is on the same page and comfortable with collaborating to solve problems, you can easily work together to eliminate non-actionable alerts, adjust alerting thresholds, triage non-severe alerts, and consolidate related alerts. And because you've established a clear relationship between the data and the goal of improving incident response, everyone can see the results and come to a consensus about what's working and what isn't.

Transparency also makes it easier to ensure that alerts are going to the right people, another crucial factor in preventing alert fatigue. When your team members get alerts that are within their power to resolve, not only do they give them their full attention, but they can take ownership of their response and how creates value for the organization as a whole. Each person on your team should be able to meet one-on-one with you on a weekly or monthly basis and say, "My goal was to improve metrics a and b by x%. Here are the actions I took, and here's the data that shows I met this goal." This empowerment is great for team morale, and it also clarifies your role as a coach. Not only does a data-driven DevOps model show you when a team or an individual needs help, it sets up your team members to seek the help they need. A data-driven DevOps culture is a high-trust environment in which your coaching becomes less about intervention and more about ongoing collaboration.

IMPORTANT METRICS

It takes time to build a data-driven culture, so where do you stare? Incident response is an essential part of keeping your business active, and is a good place to lay that foundation for your team. Here are four incident response metrics to get you started.

Raw Incident Count

When you know the number of incidents a team normally encounters, a spike or continuous upward trend in the incident count tells you either that team's infrastructure has a weakness or their monitoring tools need to be recalibrated.

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As you add features and monitoring tools, incident count may rise. But you can lower real incidents per responder by filtering out low-quality alerts, building runbooks, and automating common fixes, the team prevents alert fatigue and maximizes the time it can spend tackling critical incidents and building new features.

As with any metric, knowing the number is less important than knowing the context that gave you that number. It's important to break your incident count down by team or service and drill into specific incidents to understand what is causing problems. Was that spike on Wednesday due to a failed deploy that caused issues across teams or just a flapping service on a low-severity service? Comparing incident counts across services and teams also helps you understand whether a particular incident load is better or worse than the organization average.

Time to Acknowledgment

Time to Acknowledgment (TTA) is a good way to measure individual performance. Team members may not always have control over the root cause of a particular incident, but they are always in control of how quickly they acknowledge and respond. Fast response time is a marker of operational readiness, and teams with the attitude and tools to respond faster tend to have the attitude and tools to recover faster. Operationally mature teams have high expectations for their team members' TTA and hold themselves accountable with internal targets on response time.

You can enforce a response time target with IT operations management software using an escalation timeout. If, for example, you decide that all incidents should be responded to within five minutes, you simply set your timeout to five minutes to make sure the next person in line is alerted if the timeout is triggered. Tracking your escalations will also give you valuable data about how your team is working together.

Escalations

For most organizations using IT operations management software, escalations are rare. They are a sign that either a responder wasn't able to get to an incident in time or that he or she didn't have the tools or skills to work on it. While escalation policies are a necessary and valuable part of incident management, teams should generally be trying to drive the number of escalations down. If you're seeing a rising trend in escalations over time, you can make adjustments to your workflow and alerting protocols to ensure that alerts are being funneled to the people with the time and skills to address them.

It should be noted that there are some situations in which an escalation will be part of standard operating practice. For example, you might have a NOC, first-tier support team or even an auto-remediation tool that triages or escalates incoming incidents based on their content. In this case, you'll want to track what types of alerts should be escalated and what normal numbers should look like for those alerts.

Mean Time to Resolution

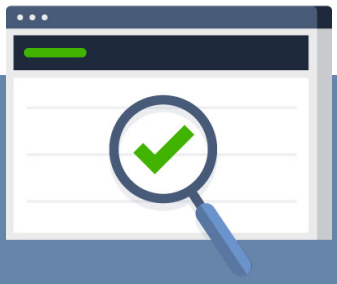
Mean Time to Resolution (MTTR) is the highest standard you can use to measure your team. How long does it take your team to resolve an incident?

Every organization has a different baseline for MTTR. Complexity of infrastructure, organization of responsibility, even the industry in which the organization operates can all contribute to different norms. But downtime is expensive, both in loss of revenue and customer trust, and it's important to track MTTR to make sure that your team is up to the challenges of a major incident.

HOW TO BUILD A DATA-DRIVEN CULTURE

Now that you have some basic metrics to drive your team's performance, the question is how to build a culture around them. There aren't simple answers to this question, and you will know best how to guide your team through this change. There are, however, a few principles of data-driven DevOps culture to keep in mind.

Relate the metrics to both your specific business goals and the team's role in achieving them. The goal is to get your engineers to see themselves as generating value for your customers, not just "keeping the lights on" for the company. Mean Time to Resolution is the ultimate customer-facing metric, but it can be difficult for teams to take sole responsibility for the results you see there. But combining MTTR with MTTA should give you a clearer picture of how your team is contributing to customer satisfaction. Once everyone is working with the same customer-oriented goals in mind, you'll have established a common reference for success as you tackle new challenges.



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Democratize the information. In a data-driven culture, everyone is a data analyst. This is how a data-driven DevOps team becomes flexible enough to respond to challenges quickly and continue improving its infrastructure. But to build a team of analysts, the data has to be available to everyone, and the team needs the tools to understand it. Make sure everyone has some kind of dashboard or other window into the data and that they understand (through training, if necessary) how to extract insights from it. Better yet, consider analytics that plug directly into the tools your team uses so that the data they need is there at every stage of the project.

Encourage action. Now that your teams have the data, you need to empower them to share their own conclusions and take action. Everyone has access to the same information, which means that everyone should have the ability to think critically about your business and propose their own ideas. Encouraging action is how your teams' efficiency increases exponentially. Instead of having your team members report problems and wait for you to provide a fix, imagine having a meeting where people can say, "I noticed x problem, and here's the solution I've come up with. I've tested it, and here's the data that came back." Now everyone has an evidence-based solution to a problem they may not have even known they had. When your teams are given ownership of their work, the improvements they share with each other build up unparalleled networks of communication and innovation.

Back decisions with data. Of course, plenty of problems don't have simple solutions. A DevOps team is just as likely to run into roadblocks and differences of opinion as any other. But the beauty of data-driven culture is that you can all turn back to the metrics for a common way to measure success. In a data-driven culture, no one should be afraid to ask, "Do you have the data to back that up?" Because in a data-driven culture, everyone, management included, should be prepared to show their work. From there, a data-driven DevOps team has agility to painlessly roll back unsuccessful initiatives and refocus on the next solution.

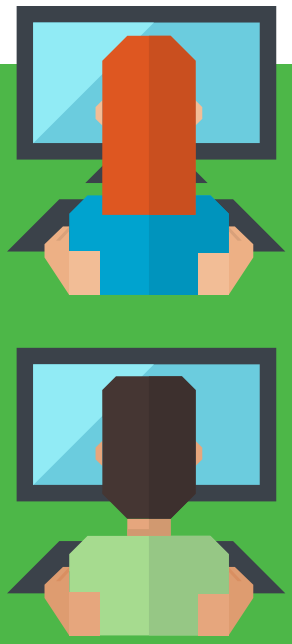
Act on the data. You've put the time into building a data-driven DevOps culture, your team is on the same page about metrics and goals, the data is transparent, and you have the IT ops management software in place for proper data analysis. You've announced with great fanfare, "We are data driven!" Now you have to follow through. There's nothing more frustrating to your team than seeing data-supported ideas languish or be overridden by conventional thinking about what's always worked before. Data-driven DevOps teams work on a continuous feedback loop. Top-performing DevOps teams typically discuss what their data shows on a weekly basis, and they need you to close the loop by reporting back on the actions taken based on that data. Not acting means not learning from results, which means your team is stagnant.

There are also several obstacles to becoming a true data-driven culture.

Don't get stuck in the past. Metrics, by their nature, reflect things that have already happened, and it's easy to get sucked into spending a lot of time dissecting reports, discussing each person's actions and reasoning, or assigning blame. What happened, happened. The better question is: What does it tell you about what to do next time?

Don't just focus on the numbers. It's easier to manage numbers than goals, and metrics may incentivize people to try to "work to the test." Remember, the metrics are a means to an end. They tell you what has been happening, but it's your job to drill in and figure out why you're seeing those trends. If you keep the relation between your metrics and your business goals front and center, your team will stay focused, too.

Don't get paralyzed. What you want out of metrics are insights, not just information. With the wealth of data available to you, it's tempting to try to do too much too fast. That's the path back to alert fatigue and inertia. Avoid the "analysis paralysis" that can come with information overload by making sure everyone is making the best use of the metrics they have before introducing new ones..



The cultural shift proposed here should not be taken lightly, but neither should the benefits that come with it. Democratizing data, empowering your teams to take action, giving them ownership of the value they bring to your organization—these changes run counter to traditional hierarchies and decision-making processes. But the pace and complexity of e-commerce is growing rapidly, and it isn't leaving room for you to rely on gut feeling or outdated information. The organizations that will alter the future of customer experience online will be those that put fresh data at the heart of every decision and build an agile, empowering, and efficient culture around it.

EXECUTIVE SUMMARY

1. In a data-driven culture, everyone backs up every decision with data, meaning they have access to the data and the tools to analyze it.
2. A DevOps infrastructure gives your teams the collaborative workflow and the power to take action based on the data, increasing your efficiency and agility.
3. Data-driven DevOps teams eliminate alert fatigue using business-oriented metrics to cut through the noise.
4. When teams and individuals back up their work with data, they take ownership of the work, even when they need help, and your role as a coach becomes clearer.
5. Teams lay the foundation for a data-driven DevOps culture by improving incident response using Raw Incident Count, Mean Time to Acknowledge, Escalations, and Mean Time to Resolve as metrics.
6. As you build data-driven culture around incident response, be sure to relate the metrics to specific business goals, democratize the data, encourage teams to take action, back decisions with data, and act on those decisions.
7. As you work with these metrics, don't get stuck in the past or caught up in the numbers themselves. The metrics are a means of understanding how your processes can be improved, not assigning blame or setting quotas.
8. Avoid analysis paralysis, which comes from trying to work with too much data too soon. Once your teams are seeing results around incident response, you know they're ready to let data drive the next innovation.

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