DevOps: A View From the Enterprise

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By Valerie O’Connell
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DevOps is the real-life art and science of bringing together all the resources and requirements of development and IT operations to work for the business they serve. There is no one, universally accepted definition, partly because there are so many ways to look at the different aspects, attributes, and interested stakeholders involved in any DevOps initiative. Take, for example, the concept of change.

Change is the root of all __________________________________________

a.) evil b.) innovation

☐ From a software development point of view, innovation is all about new ways of doing things—both new and old. By definition, innovation means change.

☐ From an operations point of view, change introduces risk and instability, and is the single most common source of problems in performance and availability. By experience, change is trouble.

At its core, DevOps is about change.

DevOps asks and answers the question, “How can an enterprise balance the business demand for software-enabled innovation with the business requirement for IT performance, risk control, and governance?”
From Dev-vs.-Ops to DevOps

Without strategic intention, organizations default to a de facto state of Dev + Ops that is usually characterized by friction and delay—more Dev *versus* Ops than DevOps.

Done right, DevOps is a way to come alongside what is already being done well in both development and operations, using existing toolchains that are well-loved, and make it all work better for everyone.

It welcomes autonomous teams and lone rangers who are producing well, facilitating their movement in and through the organization for the benefit of the business.

The result is innovation at scale and speed with the control and governance that large, well-regulated enterprises require.
DevOps maturity, automation, and AI/ML

EMA research shows that 85% of midsized companies and almost 100% of all large organizations self-describe as being active in DevOps at varying levels of maturity. In doing so, they frequently reference agile techniques used much more often in development than in deployment.

Understanding that DevOps is a dynamic mix of people, technology, culture, and processes, EMA often uses the level of automation as a reliable, informal gauge of DevOps maturity for a few reasons:

- Automation presupposes the existence of solid processes and the cross-domain collaboration required to put them in place. It suggests that an organization has moved from small, agile teams to an enterprise-spanning teams-of-teams approach.
- Automation delivers DevOps benefits at enterprise scale when built on a unified platform that enables end-to-end views, workflows, processes, and actions.
- Automation is more likely to be combined with AI/ML in mature environments, which has a multiplier effect on all of the benefits that DevOps offers.

Using degree-of-automation for measurement of DevOps maturity, rather than time-in-place, EMA research categorizes 32% of large enterprises as advanced (most DevOps activities are automated), 48% as average (many automated activities), and 18% (some/few) as early in their DevOps progression, typically centered around testing.

![DevOps Maturity in large enterprises](image-url)
What’s driving DevOps today?

The turbo-pivot felt round the world

Digital transformation, a universal strategic initiative across industries in early 2020, shot to emergency status with the paradigm-busting pandemic. As IT turbo-pivoted to support its work-from-anywhere workforce, the C-suite trained its collective eye on the path from survival to renewed growth.

Existing cloud migration and digital transformation initiatives were immediately accelerated. EMA research conducted early in 2021 examined the short and long-range impact on organizations globally. As expected, the pandemic significantly impacted nearly every aspect of business. Initial responses to the lockdown were black and white: get employees back to some level of productivity, no matter the cost. Today, the no-longer-new work-from-anywhere proposition, with all of its complexity, is expected to be a permanent fixture of global business life.

Flexibility, always desirable, became a critical success factor overnight.

In response to the agility crisis, 71% of organizations surveyed accelerated their timelines to migrate business workflows to cloud computing resources in a mix of public, private, and hybrid. The resultant challenges drive the need for DevOps adoption of governance that can keep pace with cloud speed.

90% of organizations were adversely impacted by the pandemic shutdown

86% discovered new ways to deliver goods and services

40% of organizations saw growth despite the pandemic

65% are forecasting growth next year

Where are/will your organization’s assets be hosted?

Public Cloud

Private Cloud

Hybrid Cloud

Hosted Data Center

Outsourced

On-Premises

Past

Present

Future

Public, private, and hybrid cloud usage are all projected to grow
DevOps objectives

Cost savings is especially interesting in times of uncertainty—and DevOps delivers. EMA research substantiates that DevOps routinely delivers significant and ongoing OpEx efficiencies/savings. However, although cost savings is a top benefit of DevOps, it is not usually cited as a top driver. The top drivers are:

- Speed of software delivery
- Reliability of applications
- Business agility
- Customer and employee experience

In a solid symmetry of objective and outcome, EMA research finds that DevOps initiatives almost always match or exceed initial goals. As success breeds success, DevOps tends to expand across organizations in time. Certainly, there are challenges—more often cultural than technical. But those hurdles, once cleared, tend to stay fixed, paving the way for further expansion and improvements.
C-level investment in DevOps

Most enterprises start their DevOps journey on the Dev side. After all, developers have always been interested in agility—speed and flexibility of innovation on a continuous basis. Agility in IT operations is a somewhat more novel proposition. It is now a focal point of DevOps expansion with pandemic-inspired, long-term C-level interest:

- Operational resilience is recognized as a business-critical requirement
- Digital transformation, automation, and AI/ML are competitive essentials
- Outstanding service quality to both customers and employees is a top priority
- Cost transparency and efficiency of operations are fundamental to business health

In addition to the natural C-level interest in business effectiveness, the C-suite frequently drives DevOps initiatives because successful implementation requires erasing boundaries that act as barriers to progress. The need for barrier breaking becomes more pronounced when there is a mix of decentralized and centralized functions.

Although there is a clear trend toward decentralization, most enterprise organizations operate in a purposeful mix of centralized and decentralized DevOps teams. Pan-organizational functions, such as IT service management (ITSM) and IT operations management, are projected to integrate with these efforts through automation and to experience growth in budget and business impact.

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**DevOps and decentralization**

- We are now fully decentralized, with multiple DevOps teams aligned with specific application and business needs: 10%
- We are in the process of becoming fully decentralized with multiple DevOps teams: 35%
- Development is decentralized for business alignment, while IT operations and ITSM are part of a core IT team: 31%
- Some development is decentralized, but most resides within our core IT team: 19%
- We are fully centralized for both operations and development: 5%
- Don’t know or not sure: 0%

The move to decentralization is well underway, but retains a balance of centralized/decentralized teams.
DevOps: A View From the Enterprise

Change management

From idea to production

DevOps is not new. Its trajectory roughly trails the rise of agile development practices that specialize in rapid movement of software from ideation to production.

The key phrase here is “to production.”

While agile development represents a radical improvement over traditional waterfall development practices in the speed of software development, it grinds to a halt when confronted with longstanding gates to production. DevOps recognizes that agility in software development must be met and matched by agility in software deployment.

The pivot point is control.

This control is not letter-of-the-law adherence to time-honored processes first developed in the days of waterfall and mainframes. Rather, the control of DevOps is the necessary control of governance, risk, and compliance (GRC) that strikes to the heart of today’s business realities—especially in large or highly regulated industries, such as healthcare and finance.

DevOps pipeline deployment: Where have you deployed your DevOps pipeline?

- A hybrid combination of public cloud and our own data center: 44%
- Public cloud using dedicated resources: 22%
- Public cloud using multitenant resources: 14%
- As a hosted service through a managed service provider service: 11%
- In our own data center: 8%
- Don’t know or not sure: 0%
Ferrari at rush hour

On level ground, a Ferrari will leave nothing but dust for a big city transit bus to see, but in bumper-to-bumper traffic, the advantage is lost. In the same way, a Ferrari-caliber development team’s speed is rendered useless if it faces complex procedures, processes, and hurdles to get software into production.

From a DevOps point of view, the traditional change advisory board (CAB) process is an icon of unreasonable delay. Even with improved change processes, the developer experience is most often one of doing rewarding work at fast coding in an agile environment only to be followed by time-consuming administrative hoops to jump through. From filling out a change request form through iterations of approval cycles that are interspersed by wait times, days or weeks can go by before code goes live.

Traditional change process

1. Create change
2. Get approval
3. Wait for CAB
4. Get approval
5. Wait for change window
6. Signal deploy
Release overhead hits both development and operations

Delay isn’t the only problem that manual change control processes cause. EMA research shows that this release overhead can consume as much as 20-50% of a developer’s time with the following results:

• Expensive and valuable talent is wasted doing things that machines could largely do better.
• That expensive and valuable talent gets frustrated and dissatisfied with their jobs, further decreasing productivity, and increasing the likelihood of turnover.
• A disrespect for the change/release process grows fueling motivation to bypass procedures and turn to more convenient rogue/shadow initiatives. This is not good news for operations.

Operations also takes a less obvious hit as a result of this systemic delay. There is a strong correlation between overly burdensome change processes and high change failure rates. Whereas mature DevOps teams can realistically run at a change failure rate between zero and 20%, process-heavy teams typically straddle both sides of 50%.

Who wins? No one wins. This state of change management actually undermines the control for which the processes were originally put in place. Too often, the goal of heavyweight processes becomes checking the boxes that serve the process rather than using the process to serve the business.
Common sense lights up automated change control

The cure for excessive release overhead is simple in concept. A mix of common sense, cultural change, and automation, it begins with the recognition that risk is never zero—but not all risks are equal. Recognition and acceptance of these facts open the door to change process automation.

Automated change policy and connecting DevOps processes to that policy through change APIs can drive rapid change delivery. Just as with test and security automation, change approval policies can be configured and automatically applied, taking into consideration current operating conditions (incidents and outages) and any risk factors, such as the scope of a change, change test pass/fail percentage, and a developer’s track record of success/experience level to determine the overall risk of a change.

A CI/CD tool can initiate a change request on behalf of the developer so that teams never have to leave their own development environment. Cutting change approval friction while ensuring accountability and accurate tracking achieves the balance between speed, control, and effectiveness. It returns productive hours to developers, delivers superior quality software to production, and eases the release overhead on operations as well.

In addition to increased speed and frequency of deployment, the returns on this win-win advance can be outstanding, including:

- 20-50% of admin time returned to developers
- 30+% reduction in the change failure rate
- 30+% cut in mean time to restore

The more broken the starting point, the larger the possible returns can be on all aspects of the software development lifecycle.
Value stream management (VSM)

From agile to enterprise

Lean manufacturing revolutionized production speed and quality starting with a simple observation:

“\textit{You can’t inspect quality into a product.}”

In an analogous, more recent revolution, Value Stream Management (VSM) takes an end-to-end approach to software speed, quality, and value, finding and eliminating sources of waste understanding that:

“\textit{You can’t tool your way out of a bad process.}”

VSM, like DevOps, is first of all an idea—a business practice, not a technology. It provides a business value view of a product’s complete lifecycle. Treating software as products instead of projects, VSM gives all teams and functions across the enterprise a unified context within which to understand, deliver, and improve value. It also provides a way for teams to document, analyze, and manage the measurable value of their DevOps projects and processes.

In an infinite loop of continual improvement, the VSM point of view is rooted in business outcomes. The goal is to automate the right things in the right way to cut or eliminate waste and to maximize value.

Asked why VSM is being used, the top answers of the many given were, “VSM helps us to...”

- Eliminate delays
- Improve product quality
- Standardize how we design, develop, deploy, and operate products
- Standardize the governance of our pipeline(s)
- Focus on how best to support our customers
- Improve product performance
- Understand where steps in our value chain can be improved
VSM impact

In its DevOps 2021 research, EMA asked global VSM practitioners, “What impact is value stream management having on your company?” With “some impact” as the neutral response, fully 90% of the respondents see the impact of VSM as very positive—well above average. The fact that 16% chose the superlative “transformative” when they had other positive choices is an early indicator of VSM’s revolutionary potential.

What impact is value stream management having on your company?

- Transformative impact: 16%
- Significant impact: 35%
- Moderate impact: 39%
- Some impact: 7%
- Minimal impact: 0%
- No impact: 2%
VSM early days show impressive early gains

The outstanding rating of VSM’s business impact is even more compelling in light of its newness. EMA’s DevOps 2021 research showed clearly that VSM is of almost universal interest to large enterprises (96% expressed some level of adoption and interest). However, 85% of those enterprises polled were very early in their VSM experience (54% were just beginning and 31% were at an early stage of use). Only 13% characterized their VSM implementation as advanced.

Asked to rate the benefits of VSM, either planned or achieved, respondents gave a surprising result: Practitioners who were actively using VSM reported actual benefits realized at a much higher level than that sought by those who were only anticipating benefits. The indication here is that VSM consistently over-delivers on the promises of its potential—an atypical state in technology markets today.

Providing direct benefit to every IT function and many business stakeholders, VSM offers a unified way to address DevOps governance, establish product lifecycle frameworks, streamline processes, and both deliver and demonstrate business value, all while focusing enterprise priorities on customer interests and strategic outcomes. In VSM, business and IT are not only aligned, they’re united.
You say “silo” like it’s a bad thing

If it’s true that all modern companies are software companies (and it is if they rely on digital services), not all are successful software companies. EMA research consistently finds that advanced DevOps in large enterprises share two seemingly conflicting hallmarks:

- The enforcement of homogenous tools does not work
- High-performing “software companies” require an enterprise-wide platform

In fact, there is no conflict. Game-changing enterprise-wide DevOps is a combination of individual excellence of teams of teams and end-to-end visibility of integrated activities, processes, information, success metrics, and business objectives.

DevOps excellence requires that individuals and teams be free to work in the ways and with the tools that are most effective for their tasks at hand. The needs of a team developing an on-premises application are going to be much different than the Wild West of a cloud-native team. Specialization is a reality that demands respect and serves the cause of excellence as long as any resultant siloes do not stand as a barrier to cross-domain processes, visibility, and automation.

A platform is the no-compromise way to bridge organizational specialization and enterprise unification. As an abstraction layer that enables a view of all the activities associated with the lifecycle of software from a product, customer, and business perspective, a good platform welcomes optimal toolchains and processes across a sometimes stunning array of enterprise teams. Featuring a common data model, understanding of relationships and processes, and analytics/AI/ML, platforms facilitate complex automation, especially when integrated with established systems, such as ITSM and AIOps.

### Developer control over tool use

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<th>Description</th>
<th>Percentage</th>
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<td>Developer tool choice is driven by the preexisting application portfolio</td>
<td>16%</td>
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<tr>
<td>IT determines what tools developers use</td>
<td>28%</td>
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<tr>
<td>IT has a pool of required and optional tools for developers to use</td>
<td>35%</td>
</tr>
<tr>
<td>IT is giving development teams more choice to choose the tools they use</td>
<td>14%</td>
</tr>
<tr>
<td>IT determines what tools developers use, but developers can petition IT to introduce new tools</td>
<td>28%</td>
</tr>
<tr>
<td>IT determines what tools developers use, and developers bring/use additional tools as needed</td>
<td>6%</td>
</tr>
<tr>
<td>Developer teams can select the tools they use with approval from IT</td>
<td>28%</td>
</tr>
<tr>
<td>Developer teams are free to follow their instincts and use whatever tools work best for them and let the best tools win (software Darwinism)</td>
<td>20%</td>
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(Note: multiple selections allowed)
Ironically, the technology-dependent story of DevOps is primarily one of human willingness to change, ability to collaborate, innovation, and improved work experience for everyone involved.

The result is innovation at scale and speed with the control and governance that large, well-regulated enterprises require.

- Developers deliver software quickly, getting valuable productive time returned to their days.
- Operation teams get visibility into the pipeline and more reliable software, along with fewer change-related issues and the traceability to quickly pinpoint any problems that do occur.
- The business gains when continual integration/continual delivery is matched by continual governance/risk reduction and the continual improvement that fuels growth.

The end-to-end visibility and traceability of VSM gives insight into the causes of delays and areas where there are more defects and reworks than usual. That insight makes it possible to drive waste out of the system.

It also encourages developers to own the reliability of the code they deliver as being release-ready. The spotlight of traceability changes the human equation from releasing code to fend for itself in the wilds of production to much more of a “you built it, you own it” mindset.

The wide-ranging benefits of DevOps, both quantifiable and qualitative, don’t happen overnight or easily. They take the practical combination of people, processes, and technologies, especially automation and AI/ML. Although DevOps success can’t be bought, it must be well-funded with first-rate technology and support at all levels across the complete cross-functional management spectrum.

DevOps success begins with starting where you are and knowing where you want to go. The rest is an ongoing process of working hard to get there, collaborating as you go, and continually improving along the way. At the end of the day, human nature is the crucial link between PowerPoint and how DevOps works in real life.
A word from the ServiceNow DevOps team

ServiceNow’s long track record of helping our clients with their governance initiatives gives us a front-row view of the challenges they face when it’s time to scale DevOps. EMA’s research brings those challenges into sharp focus, including:

- Governance requirements have an obvious impact on highly regulated industries. Yet almost all organizations, regardless of industry, need those same types of protection. Regulated or not, all organizations look for ways to avoid burdensome processes that impact the agility of their teams.

- Automation testing is improving the reliability of code, but does nothing to address the next major source of outages: infrastructure configuration changes. This common problem is not alleviated in any way by Infrastructure as code. Here, the same principles of centralized governance are also now being applied to great effect.

- We—our clients and ServiceNow—have the opportunity to significantly improve the developer experience. An end-to-end integrated approach means that developers can remain in the tools where they do their best work and they can be relieved of administrative overhead.

- A value stream perspective is the next evolution from agile, to DevOps, to value stream management where bottlenecks are more easily identified and eliminated, and the true value of DevOps best practices can flourish, even on an enterprise scale.

ServiceNow—one of the most successful software companies today—is no stranger to the challenges of DevOps at enterprise scale. Because we live it, we can help.
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