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Enterprise SRE: ~~site~~ **service** reliability

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Prepared for ServiceNow
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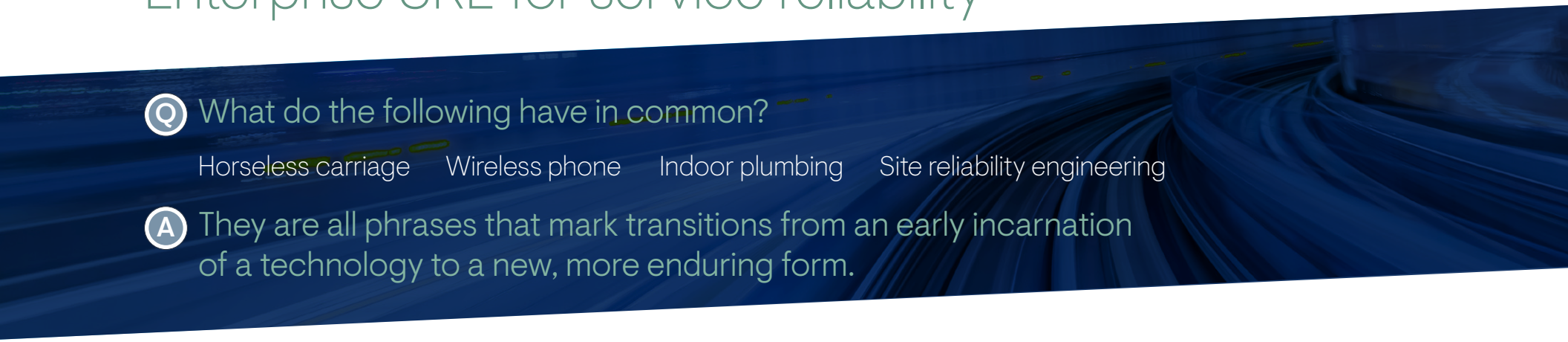
Table of Research Findings

Enterprise SRE for service reliability



Q What do the following have in common?

Horseless carriage Wireless phone Indoor plumbing Site reliability engineering

A They are all phrases that mark transitions from an early incarnation of a technology to a new, more enduring form.

Site reliability engineering (SRE) was first coined at Google in 2003 when its website and its business were one and the same, with both changing at meteoric rates.

Cliché alert: Explaining the Google origin and role of SRE in an interview, its "inventor," Ben Treynor Sloss, used a definition that has since been quoted in almost every article or book on the subject (now including this one): "Fundamentally, it's what happens when you ask a software engineer to design an operations function."

Doing work that was historically done by an operations team, Sloss hired seven engineers with software expertise to substitute automation for human labor wherever possible. His SRE teams were responsible for availability, latency, performance, efficiency, change management, monitoring, emergency response, and capacity planning—just as SRE teams are today.

So, what's different now? Microservices, containers, an abundance of public and private clouds, DevOps, AI/ML in AIOps, digital transformation, relentless security threats, end users working around the clock and around the world on a dizzying array of devices at will, and business innovation at a pace that is amplified by pandemic-pushed change.

Today, the SRE function is more critical than could have been envisioned almost 20 years ago. It has evolved far past the now-limited notion of "site reliability" to the enterprise-defining requirement for enterprise "service reliability" that is rock solid, resilient, cost-effective, and wide open for innovation at the speed of digital transformation.

Powered by enterprise-spanning platform technology and practices, enterprise SRE exerts a multiplier effect on individual team productivity. Decentralized IT teams are transformed into efficient parts of a unified organizational whole, with no disruption to their autonomy, speed, and effectiveness.

The need for enterprise SRE

Reliability, because features that aren't available don't count

The SRE function is laser-focused on IT service reliability. It asks and answers the questions:

- What is the minimum level of service that a user will find acceptable for any given task, at a not-to-exceed cost that makes sense from a business point of view?
- How can a specific level of service reliability be quantified, monitored, and enforced?
- What are the earliest and best indicators of any possible service degradation?
- How can automation eradicate repetitive, manual tasks that waste time and add no value?

This question-and-response cycle is iterative and endless, always moving in the direction of improved reliability through automation.

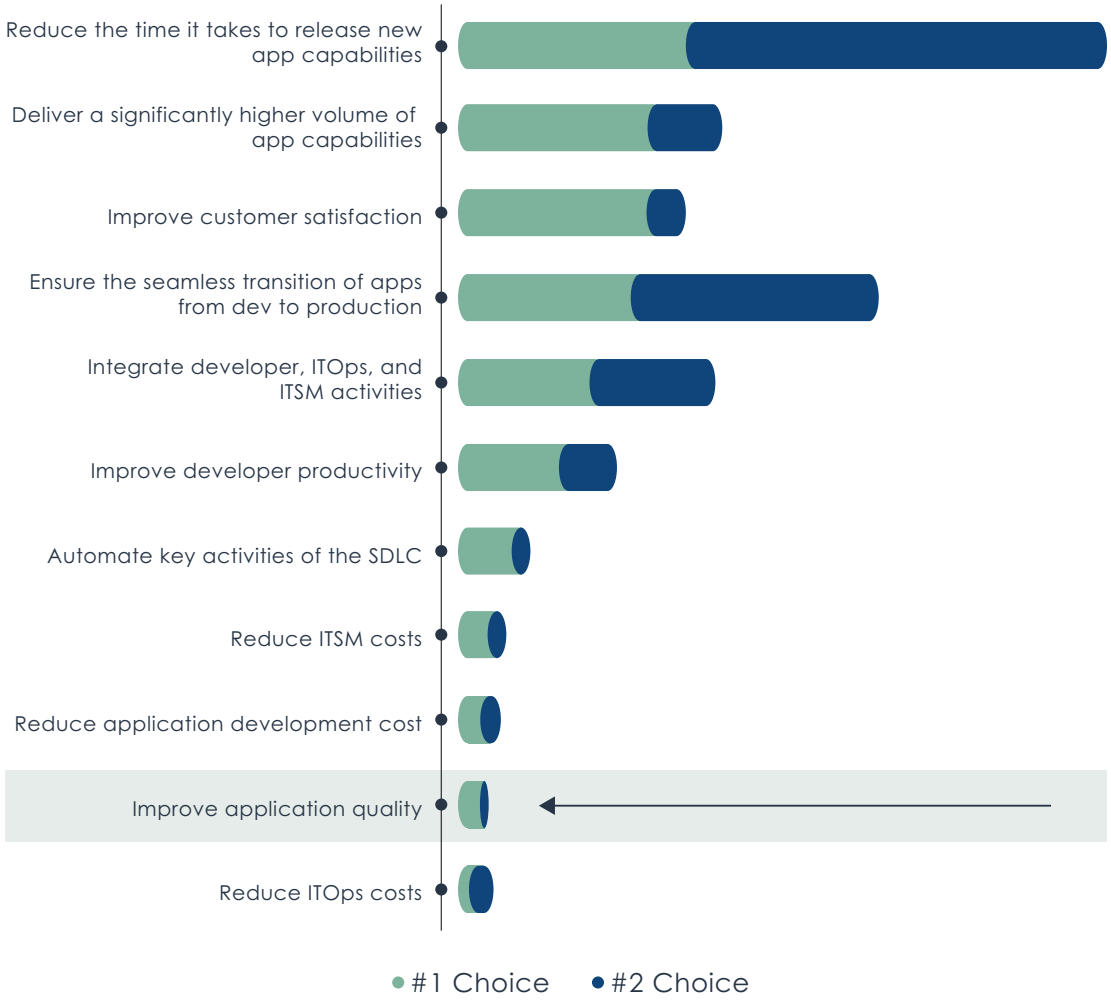
Developers code new applications and features. DevOps speeds those innovations into production. The IT operations team keeps the infrastructure and systems running. Theoretically, they all work together to deliver great service to employees and customers alike. It just doesn't usually work out that way, because when something is everyone's business, it falls to the bottom of everyone's to-do list.

Here's a good illustration of this organizational truism: In a global research initiative, "Optimizing DevOps From Both Sides," EMA surveyed 400 DevOps professionals. When asked to name their objectives in using DevOps principles for custom application development, almost all cited speed of time to release new capabilities, followed by an increased volume of applications. To be fair, 58% chose "improve application quality" and 55% chose "improve customer satisfaction."

This is where it gets interesting. In the next question, when limited to only two choices, application quality took a dive to the bottom of the survey barrel—just as so frequently happens in real life. SREs make sure that service performance and reliability stay at the top of the enterprise to-do list.

SREs focus on reliability, usually defined in terms of availability, because the most innovative capabilities imaginable are useless if they can't be used. Service reliability matters more to enterprise health than speed of innovation for the same reason that a marriage is more important than a wedding. For all the upfront excitement that attends newness, the duration and purpose of one far exceeds the other.

Choose two statements that best characterize your objectives in developing custom applications using DevOps

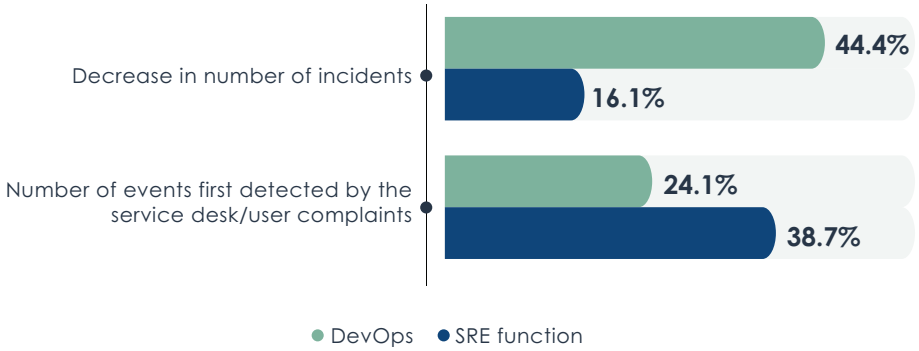


End user-shaped service performance: SLOs and budgeting for error

If change is both the engine of business agility and the agent of instability—and change happens constantly at a high velocity and volume—then end users function as the de facto test environment for enterprise innovation. No one likes to think of it that way, but the SRE philosophy tackles this reality head-on with service-level objectives (SLOs). The SLOs express key user experience attributes as metrics of reliability that are quantified and expressed in terms of availability.

SREs then look for meaningful metrics that underlie that SLO—indicators that could give a hint of service degradation long before a user would notice. These service-level indicators (SLIs) are monitored, analyzed, and if necessary responded to in support of the organization's meeting its SLOs. Automation follows wherever possible. Error budgets are put in place to buffer the SLO. The error budget is a specific measure of availability issues that represents an acceptable margin of error. It is established to encourage innovation and manage the risks of newness.

What metrics does your organization use to track AIOps effectiveness?



An important note: SREs don't make up, own, or dictate SLOs. SLOs are the negotiated and agreed upon standards of IT service that are universal across development, test, engineering, DevOps, IT operations, and the business. SREs monitor SLIs and enforce SLOs. This SLO perspective is why, in EMA research, SREs valued the "number of events first detected by user complaints" over DevOps' parallel choice of "number of incidents."

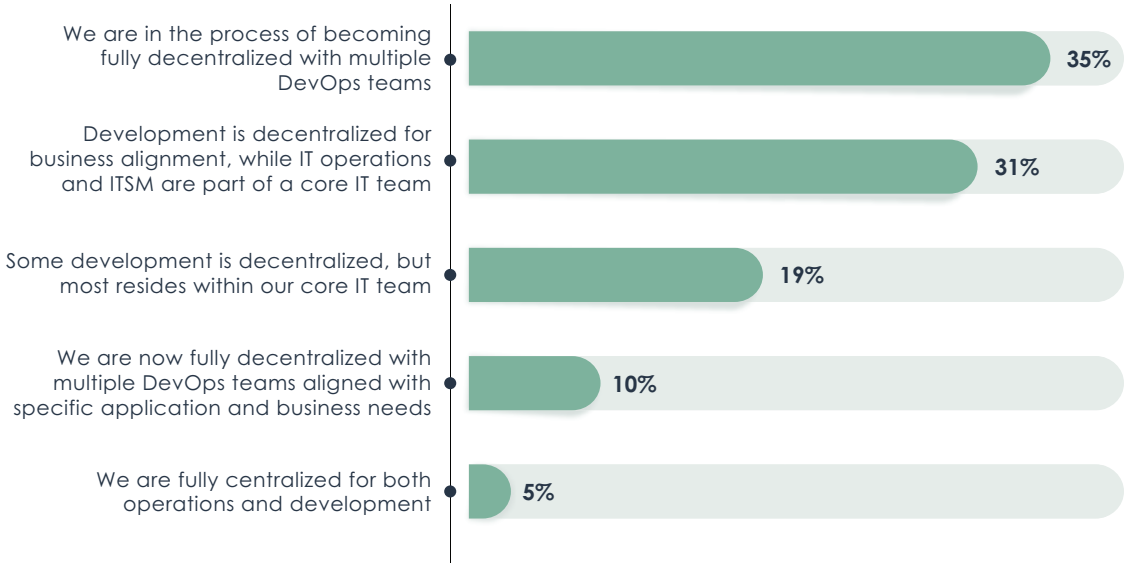
If angels wrote flawless code, the SRE function would still be needed

Enterprise-sized complexity begins in the enterprise. Decentralization, which is on the rise, facilitates business agility and innovation. However, it also multiplies the degree of difficulty for operational excellence and IT service quality as decentralized teams and centralized functions, such as network, storage, and IT service management (ITSM), learn to work together.

Service quality is the sum total of code, networks (including the internet), any third-party contributors, and the infrastructure on which they run. Decentralized teams using distributed component microservices and containers create services in what comes close to real time. Four thousand applications can easily translate into 40,000 service components that no one could possibly keep track of, even if they weren't in a constant state of change.

Enter the SRE function.

How has your organizational model changed for DevOps initiatives?



The road to enterprise SRE adoption

IT automators: SRE skills, inescapable challenges, and predictable rewards

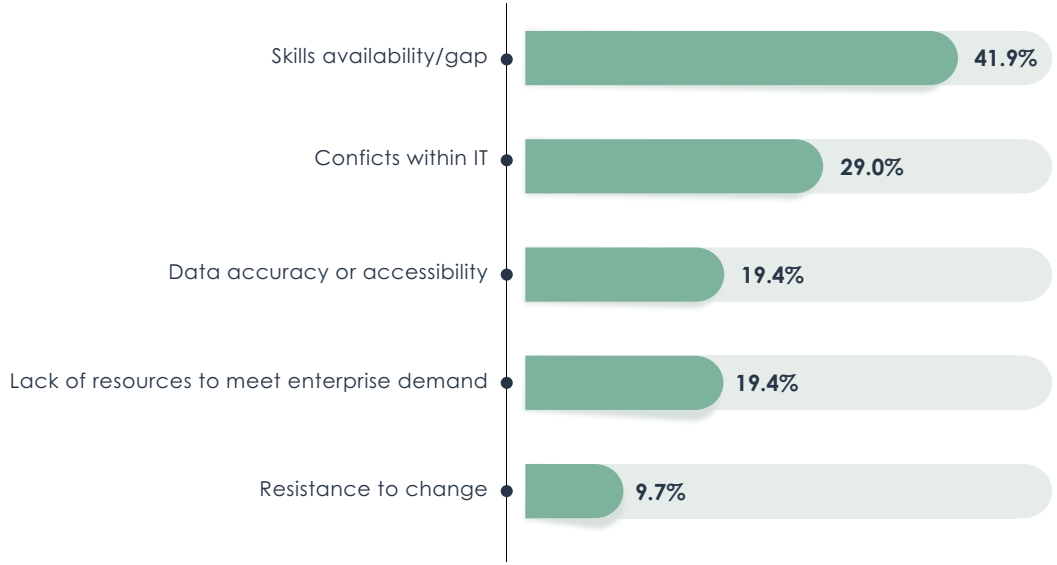
The SRE function picks up applications where they live in real life as a major component in an enterprise service. Whereas development and DevOps major in newness—speed of getting applications and features into production—the SRE function majors in the ongoing health and performance of those applications as they are used by employees and customers. In contrast to classic IT operations talent, which finds and fixes problems, SREs find, fix, and automate.

Armed with code and automation, SREs are hired to straddle the development and operations divide to seek and destroy repetitive, manual tasks (called "toil") that stand in the path of service health. The ideal SRE engineer is either an operations savant with coding skills or, less likely, a software engineer who is fascinated by the challenge of automating operations processes.

Not surprisingly, this skills profile is rare, in high demand, and relatively expensive. However, snagging these IT automators is well worth the hunt. Although the SRE function is relatively new in widespread enterprise use, EMA research shows a definitive correlation between its implementation and a high degree of service quality. Most recently, a global EMA survey found that IT organizations with an established SRE function showed:

- An increase in IT service quality: 42% of SRE respondents reported outstanding quality of IT service vs. an average of 30%
- A higher level of automation: SRE organizations reported that 77% of key IT tasks and processes are already automated compared to an average of 58%

The fact that automation and IT service quality go hand in hand make SRE a C-level sponsored initiative, with more than a passing level of interest from CFOs. EMA research consistently links automation with high levels of IT efficiencies and OPEX savings, factors that make the SRE function interesting to management beyond IT. However, the path to SRE-generated benefits is not a smooth one. When it comes to organizational challenges of standing up an SRE function, EMA research shows that only skills availability beats out the distinctly non-technical issue of human conflict in IT.



Predictable benefits and outcomes of SRE adoption far outweigh the challenges and include:

- Business-defined balance of IT innovation at speed and scale with service reliability and cost
- TCO plummets when reliability is considered early and designed into applications and services
- End-user experience is made visible and actionable with service that is as reliable as necessary for customer satisfaction and retention, but not more reliable than it needs to be
- IT organizations have an automated basis for data-driven, fact-based decision-making
- Product development, DevOps, and IT operations all perform faster and more effectively
- When business agility and stability depend on IT, SRE has an impact on revenue growth

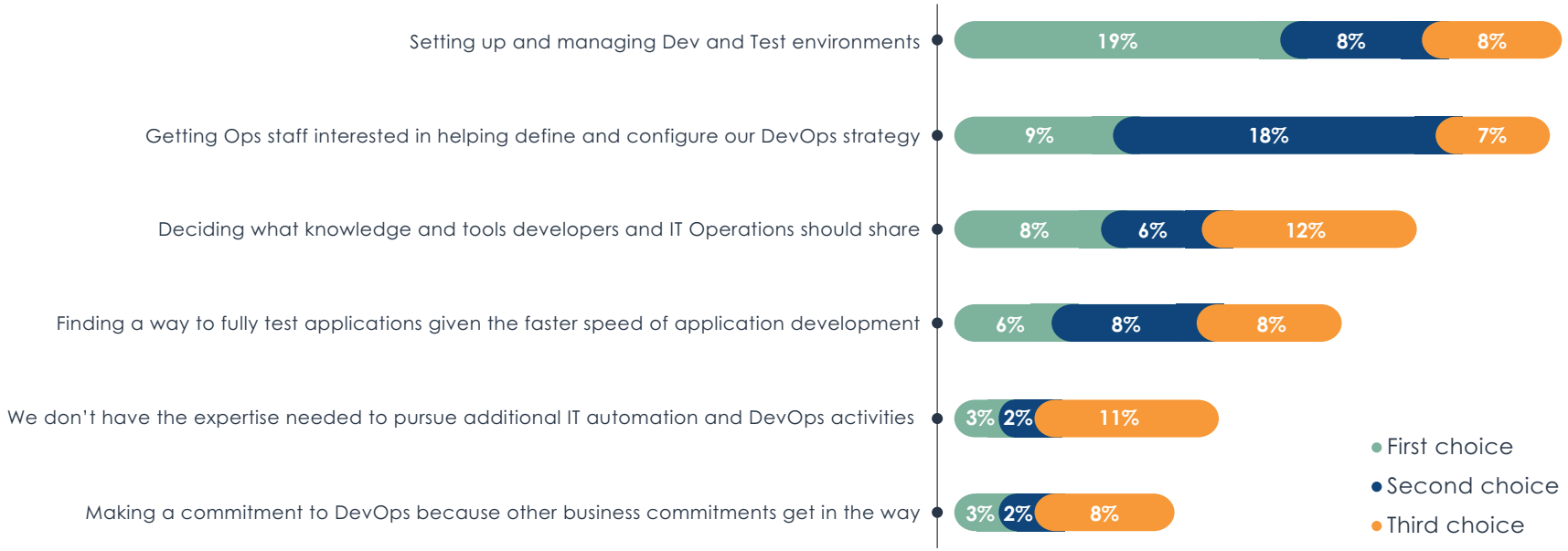
SREs and DevOps each make the other one better

Although SRE was coined before DevOps came of age, it is definitely the less mature enterprise discipline of the two. As a new and fast-rising function, SRE is a moving organizational target in the enterprise. It can take many forms, most often arising within a DevOps function, but also developing as an outgrowth of decentralized teams. Frequently, SRE never fully emerges as a distinct group.

What matters most at this nascent stage of organizational development is the SRE function, by whatever name it is called, and in whatever department it operates.

EMA's research on the state of DevOps ("DevOps 2021") found that, of the top 10 challenges reported by DevOps professionals, SRE functionality would directly address more than half (for more details, see the companion EMA eBook, "DevOps: A View from the Enterprise").

Of the top 10 challenges faced by DevOps teams, at least half can be directly addressed by SRE (rank top 3)



Similarly, in its "Optimizing DevOps" study, EMA found that the SRE function would address all of the top areas that DevOps practitioners self-report as being least effective. Asked to **"Name the top four areas in which your current DevOps solutions are least effective"** the rank-ordered responses were:

1. Support of hybrid team environments
2. Communicating the business impact of IT to LOB
3. Support of migration to private cloud/virtualized environments
4. Understanding digital experience across customer segments, browsers, and geographies
5. Promoting superior dialogue and collaboration between development and operations
6. Supporting the transition between development and production

By their natures, DevOps and SREs are complementary regardless of how their sibling relationship may play out in day-to-day practice. As it turns out, as with most siblings, the relationship often evolves with maturity from a little competitive friction to mutual appreciation and benefit.

AIOps and SRE: an active match of automation and intelligence

Purists define AIOps as the use of artificial intelligence (AI), machine learning (ML), and analytics applied to IT operations. Although they are technically correct, EMA research indicates that most people associate AIOps with automation as well as AI. This common-sense pairing underscores that the purpose of knowing is to take action. In turn, action invites automation, which is the SRE homefield advantage.

SRE respondents tend to make choices that favor taking action (as they did when asked to choose the capabilities that are most important to an AIOps implementation). They also identify low-code/no-code at a higher level of importance than any other group across multiple differing EMA research efforts. The ability to extend AIOps capabilities is high on the SRE wish list because SREs are the group most likely to have the desire, skills, and charter to automate operational processes. It strikes to the heart of their job.

AIOps in the hands of SREs = transformative impact

Asked to name the top capabilities in their AIOps implementations, the SRE group choices were:

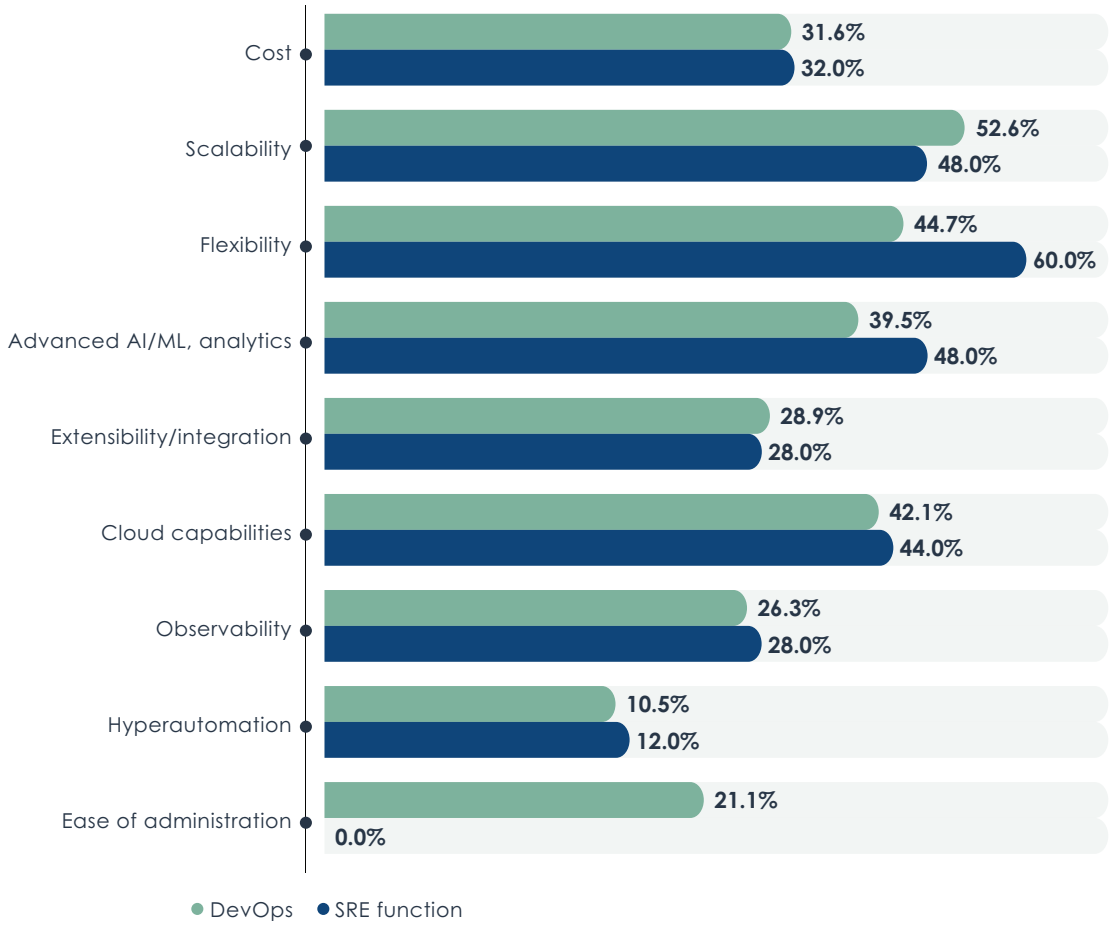
- Observability – end-to-end visibility of logs, metrics, and traces
- Self-learning problem solving (ML)
- Ability to automate complex processes across domains
- Real-time accuracy of CMDB/CMS
- Low code/no code extensibility
- Application/infrastructure dependency mapping
- If/then analytics for change impact
- Prescriptive recommendations

In a 2021 research outreach, EMA asked participants to rate the impact AIOps has had on the relationship between IT and the business. Thirty-six percent of SRE team respondents chose the superlative "transformative" compared to 23% of digital transformation team respondents.

AIOps enjoys a high rate of success and almost universally pays for itself, but SREs excel at deriving value from it. To the question, **"Overall, how successful do you feel your organization has been with its AIOps investments to date?"** 97% of SRE team respondents answered, "extremely and very successful" compared to DevOps, the next most successful group, at 76%.

SREs' natural affinity for AIOps' AI/automation combination was apparent when asked to name the top three reasons for considering a new AIOps platform, here compared to DevOps team selections.

What are the top three reasons that a replacement AIOps solution is under consideration?



Recommendations and considerations

The question of how to implement an SRE function doesn't have one simple answer because enterprises themselves are so varied in size, culture, challenges, organization, goals, and state of technology. On the other hand, there are lots of clear and positive steps to take in that direction. As with all significant IT undertakings, executives will need to consider and address technology, processes, and people aspects to accelerate adoption of SRE practices.

Technology

Platforms enable enterprise service visibility and retain decentralized autonomy of teams

The first stop in any discussion of technology for enabling the SRE transformation has to move beyond automation tools. EMA research clearly shows that transformative results require the end-to-end visibility and automation capabilities that a platform offers. Digital transformation, AIOps, and enterprise DevOps are all reliant on platforms for enterprise-wide innovation and action. The SRE function is as well. Start by selecting a platform that enables visibility of microservices and distributed teams across the enterprise. This visibility will be the launch point in prioritizing SRE initiatives.

A platform can unify an enterprise with cross-domain functionality and visibility at the same time it allows individuals and groups to use the tools that they already use daily and well. This capability is especially critical in today's mix of decentralized teams (app dev, testing, DevOps, troubleshooting) and centralized IT functions, such as storage, network management, and ITSM. It is essential to create end-to-end visibility of applications, services, and microservices, as well as the infrastructures on which they run. That's exactly what a good platform will provide without any disruption of team activities and tools.

Developers can connect their CI/CD pipelines using tools they love, and individual teams can easily register their microservices for visibility while moving at their own speeds. CMDB/CMS information that is current and accurate, along with service discovery and dependency mapping, is available across the organization. After all, the first step in IT service quality and reliability is the ability to see that service in its entirety, complete with all of its component parts. A good platform is the full lifecycle vehicle for dealing with issues, incidents, and improvements once an application has left the DevOps nest and is live in production.

Recommendation: Select a platform that enables visibility of services and applications across the enterprise as a starting point for prioritizing SRE initiatives. Choose a platform that will continue to accommodate innovation as SRE success drives extended adoption and ongoing improvements. Flexibility, scalability, ease of integration with other systems, and extensibility will be the factors that deliver results today and in the long term.

Processes and practices

Cross-domain processes start with cross-domain practices

Automation tops C-level wish lists across industries because it increases efficiency, cuts costs, and makes the work life of people more rewarding. Driven by ongoing digital transformation, the high demand for automation slams to a halt in the face of hardened domain boundaries.

Although IT rightly takes the hit for siloed capabilities, the domain divide starts with practices that often predate technology. Cross-domain thinking, cooperation, organization, and practices have to precede cross-domain processes and automation. This reality means that investments in automation and technologies, such as AIOps, are primarily driven by the C-suite. Economies of scale and the advantages of AI and ML, as well as innovative human initiatives such as enterprise SREs, cannot be achieved in fenced off domains of independence.

Recommendation: Consider starting with modernization of your incident handling processes. This practical integration can be relatively painless and return high value for the effort. Service management and operations both benefit when IT leverages AI/ML to automate incident and event handling processes. Ironically, the unwelcomed changes forced by events of 2020 have accustomed the workplace to change and shaped organizations into a posture of adaptability. It's a good time to innovate.

People and culture

Start small, smart, and centered on people

Enterprise SRE requires a paradigm shift in how operations works with the rest of the enterprise world. It is a recalibration from break/fix to optimization. The principles of SRE apply to every organization that relies on IT because they are founded on common sense. Some practical people considerations include:

- Talk to your DevOps team. Find out where they are frustrated or bogged down. Chances are good that the SRE function can address those pain points. Introduce the SRE function with the charter to directly address those areas. Problem solving is a universal crowd pleaser.
- Shine a spotlight on the end-user experience, both customer and employee. The user forms a relatable context to begin a shifted emphasis on service-level thinking and reliability. Look into a digital experience management (DEM) solution if that capability isn't already in place.
- Even out the dev/ops class differences. In many companies, there is a perceived difference in status and value between the two groups—a difference that is reflected in pay as well. Begin by publicly recognizing and rewarding reliability as well as new, exciting product releases. Understanding that "man bites dog" is always more interesting than "father never misses his child's games," find ways to elevate the status of operations. Organizational innovation is more likely to succeed in a culture that respects excellence across all functions and values results over blame.

Recommendation: Stack the deck in your favor when standing up your first SRE groups. Start small to establish an SRE beachhead and leverage its success to scale across the enterprise. Identify a starter service or two to receive the SRE treatment. Get all major stakeholders to identify 2-4 key aspects of each service that make or break a great user experience. Publicize and track these new SLOs, as well as ways to improve their reliability. Internal marketing and education of the adjacent stakeholders smooths adoption and success of a new SRE function.

If possible, hire your SRE starter team from within. SRE is a high-demand position that many people will see as a great chance for career advancement and will appreciate the opportunity. Use this opportunity to upskill your in-house talent. Seed the team with at least one experienced SRE practitioner, maybe even a temporary highly-skilled consultant. Clearly identify one permanent team member as the SRE leader who will be responsible for expanding the reach of the SRE function over time.

Wherever possible, choose people who have a proven ability to problem solve without drama. The SRE position, although technical in nature, is ironically also a high human touch job. It redefines lines and crosses unspoken boundaries pursuing automation of IT service reliability. Done right, it also reinforces and energizes an organizational culture of innovation over time.

A word from ServiceNow on DevOps and SRE

ServiceNow accelerates customers' adoption of DevOps and SRE practices. Enterprises use the ServiceNow platform to seamlessly connect centralized IT service operations with increasingly distributed DevOps and SRE teams.

Building on the success of the DevOps change automation solution, ServiceNow recently released Site Reliability Operations and Metrics applications available on the ServiceNow store. These solutions enable DevOps and SREs teams to register microservices, connect to telemetry, respond to incidents, and measure performance of services with SLIs, SLOs and Error Budgets.

ServiceNow—one of the most successful software companies in the world today—is no stranger to the challenges of DevOps and SREs at enterprise scale. Simply put, ServiceNow makes the world of work, work better for people.

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