Maximizing the Potential of AIOps

5 Steps to Success

Why AIOps, and Why Now?

If you had to pick one technological innovation that is poised to exert the greatest impact on the current decade, AIOps would be a good bet. Just as virtualization was the defining technology of the 2000s, and cloud computing fundamentally reshaped the technology landscape during the 2010s, AIOps is laying the groundwork for another phase of transformational change during the 2020s.

AIOps enables IT operations teams to take full advantage of modern AI and machine learning to improve visibility into IT systems, as well as to automate many operations processes. Instead of having to rely on IT engineers to identify a problem with an application and fix it manually, for example, AIOps can use algorithms to identify and resolve the problem automatically. Likewise, rather than requiring IT staff to determine how best to manage the performance of an application or how many resources to allocate to it, AIOps can provision environments automatically by parsing data to determine the optimal resources.

Why Now is the Time for AIOps

AIOps is not an entirely new concept. The term was introduced in 2016 by Gartner to refer to an emerging set of IT operations solutions and strategies that leveraged AI.

Yet it was not until more recently—the last year or so—that AIOps' moment fully arrived. That was due to the convergence of several technological trends that did not play out fully until the end of the 2010s, including the following:

- **Containerization**. In recent years, organizations have started to deploy containerized applications on a large scale. The switch from conventional application hosting technologies (like virtual machines) to containers has added a magnitude of complexity to application environments. Containers also make applications more dynamic since individual container instances spin up and down constantly. Maintaining visibility into fast-changing, multi-layered environments built with containers requires the automation that only AIOps can deliver.

- **Microservices**. By the end of the 2010s, most organizations had migrated a significant portion of their application architectures to microservices. Like containers, microservices applications are fundamentally more complex than their predecessors because they consist of multiple services, each starting and stopping at different times. These architectures also typically involve complex internal networks that use an array of dynamically configured endpoints to enable communication between microservices. This complexity, too, can only be mastered with the help of AIOps. Attempting to configure and monitor microservices applications manually is just not practical at a large scale.

Why Now is the Time for AIOps (continued)

- **DevOps**. DevOps originated more than a decade ago. However, it has only been in the last few years that the cultural impact of DevOps has become truly pervasive. At this point, few people question the cultural priorities that DevOps promotes, which include automation and seamless collaboration between all stakeholders within the application delivery and management lifecycle. AIOps promotes both of those goals. In complex, fast-moving environments, the visibility and automation that AIOps provides are essential to effective collaboration between teams.

- **Security**. Identifying and remediating security threats is only one of the use cases for AIOps, but it's a powerful one. This is especially true as the cost of security breaches steadily increases, and security incidents remain a never-ending challenge for businesses large and small. AIOps is poised to help teams keep applications and data safer from attackers. By helping to automate not just threat detection but also remediation, even in highly complex environments, AIOps may just prove to be the solution for actually making progress against pervasive security threats.

The Five Stages of AIOps Adoption

It has been said that DevOps is a journey. The same certainly holds true for AIOps. Like DevOps, AIOps is not something you simply turn on or "do" overnight. Instead, it's a strategy that you embrace incrementally and scale up as you learn to leverage AIOps in newer and more sophisticated ways.

Recognizing the gradual nature of AIOps adoption is critical for its success. Teams need to have a strong understanding of how to implement AIOps practices and solutions. With that need in mind, the following pages outline the five common stages that your team can expect to pass through as you progress along your AIOps journey.

AIOps Stage 1: Early Adoption

The first stage of the AIOps journey starts when you deploy an AIOps-powered solution for the first time. At this stage, you can expect the solution to be:

- **Driven by a limited data set**. For example, the solution might ingest logs from a single application that it is helping to monitor. It's not until later stages that you will move toward larger, unified sets of data.

- **Focused on a specific need or pain point**. Rather than helping to manage every aspect of an application's performance, for example, the AIOps solution might just manage resource allocation.

- **Designed to make recommendations rather than to take actions**. The solution will suggest actions that your team can take to improve the performance of your application, but it will not take those actions directly.

This is the type of deployment that helps teams become familiar with the fundamentals of AIOps and learn how to start integrating it into their workflows. However, because AIOps solutions are limited in focus at this stage and teams do not yet trust them enough to act on their own, they serve only as supplements to IT operations rather than as the core of any workflows.

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AIOps Stage 2: Widening the Scope

Teams reach the second stage when they begin using their AIOps-powered solution on a larger scale. Typically, teams won't add an additional AIOps solution; they'll stick with the one they originally deployed. But instead of using it to serve just a single purpose (like managing resource allocation, to use the example from the previous section), they will expand its usage to cover wider ground (like managing multiple applications and supporting services as well).

The team may also take some halting steps toward a more unified data set to power the AIOps solution. Instead of relying on just a single application's logs, they might incorporate logs from all applications of the same type. The data set would still be small and hardly comprehensive, but it would be broader than the one used in the first stage of AIOps adoption.

At this point, the solution will continue to make suggestions rather than take automated action. Your team still won't trust it enough to let it modify anything on its own.

AIOps Stage 3: Diving into Complexity

As your teams become more and more aware of the insights that AIOps can provide, they will become eager to receive guidance on more complex issues from their AIOps solution. For instance, rather than looking for recommendations about the resources to allocate to an application, they may want to use AIOps to help understand how performance issues correlate to resource allocations in order to get to the root cause of problems faster.

AIOps solutions are well suited to parse complex issues like this, but only if they have enough data to understand them. For that reason, stage three of AIOps usually involves further expansion of both the volume and the diversity of data fed to the AIOps solution. Instead of letting your solution analyze only logs from similar applications, for example, you might let it ingest logs from every application in your data center, even for those that are architected in unique ways. Having a large, disparate set of data will help the AIOps solution gain better visibility into how each application is operating and how its performance compares to that of the rest of the data center.

Still, the team will rely on AIOps mostly to make recommendations about how to solve complex problems, not to solve them directly at this point.

AIOps Stage 4: Playbook-Driven Automated Remediation

When you begin embracing the automated remediation features of AIOps for the first time, you reach stage four. At this point, the team finally becomes comfortable letting an AIOps-powered solution sit in the driver's seat (at least some of the time) and automatically take action to resolve problems that it identifies, like an under-provisioned application.

The major caveat here, however, is that the solution's actions will be based on preconfigured "playbooks" that determine which interventions it can make in response to certain conditions. In this sense, the solution won't act in a truly autonomous fashion; it will simply determine when preset conditions are met, then take action accordingly.

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AIOps Stage 5: Autonomous Remediation

When you move beyond the playbooks and let your AIOps solution devise its own remediation strategies, you've reached stage five. This is when the power of AIOps becomes most visible, because AIOps can finally replace (rather than supplement) the human operators within an IT workflow.

This isn't to say that playbooks disappear from the picture. In most cases, AIOps solutions will be planning remediations based on playbooks that they used previously, although they may change some of the steps based on insights they have gleaned from previous operations. The playbook may say that a certain type of application error should be fixed by changing memory allocation by a certain amount, for example. But the AIOps solution may determine that the optimal memory reallocation is actually less than what the playbook specifies and act accordingly.

By this point, your team has placed its full faith in AIOps. Human engineers will still need to address truly complex issues that AIOps can't resolve on its own. But for routine workflows, they trust AIOps to handle everything for them. They will also be feeding as much data as they can collect into their AIOps solutions, realizing that the more data they have driving AIOps, the better.

AIOps and NoOps: Moving Past Traditional Limitations

Stage 5 isn't really the end of the AIOps journey, of course. There will always be opportunities to deploy new AIOps solutions or apply AIOps to new workflows.

In the end, the ultimate goal is to achieve what's known as NoOps. In essence, NoOps is based on the proposition that manual IT operations efforts can be eliminated altogether, freeing staff to address other business priorities.

When Forrester first proposed the idea of NoOps back in 2011, the vision was to leverage cloud-based PaaS and IaaS platforms in ways that eliminated the need to perform basic infrastructure provisioning and application deployment tasks. The idea was that common IT operations tasks, like setting up hosting environments and deploying new versions of applications, could be automated (which, indeed, they largely are today). There was a sense that more complex tasks, like those related to troubleshooting unexpected problems within software environments, would always have to be handled manually.

You could say, then, that NoOps has traditionally been seen as a realistic goal only if you recognized that it couldn't be taken to the extreme. Although the term has been tossed around a lot over the last decade, it was not really with the expectation that IT operations would actually disappear entirely. NoOps functioned more as a provocative way to emphasize the importance of automation, with the unspoken implication that not everything in IT operations can be fully automated.

Realizing the Full Potential of NoOps with AIOps

Today, AIOps is pushing the IT ecosystem toward a frontier where the realization of true NoOps, and the near total disappearance of IT operations, is becoming realistic.

AIOps can achieve automation in areas where traditional approaches to NoOps fall short. A PaaS or an IaaS platform can only automate the things that it is specifically designed to automate (usually application deployment and infrastructure deployment, respectively). But AIOps can use AI to automate virtually any type of IT task, whether it's determining how many resources to allocate to a virtual server, load-balancing traffic between redundant application instances, or determining the root cause of an application failure.

Further, the ways AIOps is employed will continue to evolve. In many instances today, the automated actions that AIOps takes are based on predefined playbooks or workflows that have to be set up manually. As AIOps solutions become more sophisticated, the need for manually generated guidelines will decrease. The best AIOps solutions will be ones that can use data analytics and machine learning to determine how to identify, understand, and react to problems on the basis of what has worked in the past, rather than on playbooks. Going forward, a new generation of AIOps platforms will leverage machine learning to understand unified data sets and make autonomous decisions that take into account the full and unique context of every situation.

That's what complete NoOps is all about. Much more than simply automating certain workflows using preconfigured solutions, a total NoOps approach is one where decisions can be tailored to each problem in a unique, customized way.

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Conclusion

AIOps has already started transforming the way IT operations teams work and collaborate with other stakeholders. Going forward, as applications become even more complex and the demand for automation and collaboration grows more urgent, AIOps solutions and methodologies will become inseparable from successful IT strategies.

Just as DevOps is a never-ending journey, the AIOps journey is never truly over. Every AIOps implementation is unique, but they all involve incremental expansion and improvement upon the ways in which AIOps is leveraged. Keeping the progressive nature of AIOps in mind is essential for getting the most out of it and ensuring that you don't stop before you allow your AIOps strategy to realize its full potential.

By leveraging new techniques as the basis of automation, AIOps can automate IT workflows that were previously impossible to manage without manual effort. Thanks to AIOps, NoOps is starting to look like a more realistic goal every day.

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