PATHFINDER REPORT

Breaking the Silos

Why integrated monitoring tools are key to driving high performance in modern app environments

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About this paper

A Pathfinder paper navigates decision-makers through the issues surrounding a specific technology or business case, explores the business value of adoption, and recommends the range of considerations and concrete next steps in the decision-making process.

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EXECUTIVE SUMMARY

New technologies and practices such as containers and DevOps methodologies have transformed today's enterprise application environments. With these advancements in hand, organizations can become more agile, able to respond quicker than ever to customer needs and competitive demands. And yet, this modern application development environment often leads to new pain points for the teams responsible for ensuring application performance. These pain points include alert fatigue, data overload and intelligence gaps due to the lack of data correlation. How can these modern teams move fast and still develop top-performing apps? In this paper, we answer that question by examining the tool capabilities required to monitor in modern environments, including advanced analytics, extensive integrations, and both agent and agentless technologies. In addition, we look at emerging organizational models that support the performance goals of agile teams.

KEY FINDINGS

- Modern application environments present several challenges when it comes to monitoring their performance, leading to a common set of pain points. These include alert fatigue, data overload and data-correlation issues, all of which slow down the mean time to resolve application problems.
- Integrated tools using agentless and agent-based technologies that offer granular insight, correlated data views and build on the latest advanced analytics techniques help reduce the time wasted manually comparing information presented in multiple tools and ensure high-performing environments.
- In addition to supporting high-performing applications, these tools and approaches can enable new use cases, free up team members to focus on higher-value work and allow for new organizational models.

Emerging Technology, IT Transformation Shape Today's Monitoring Demands

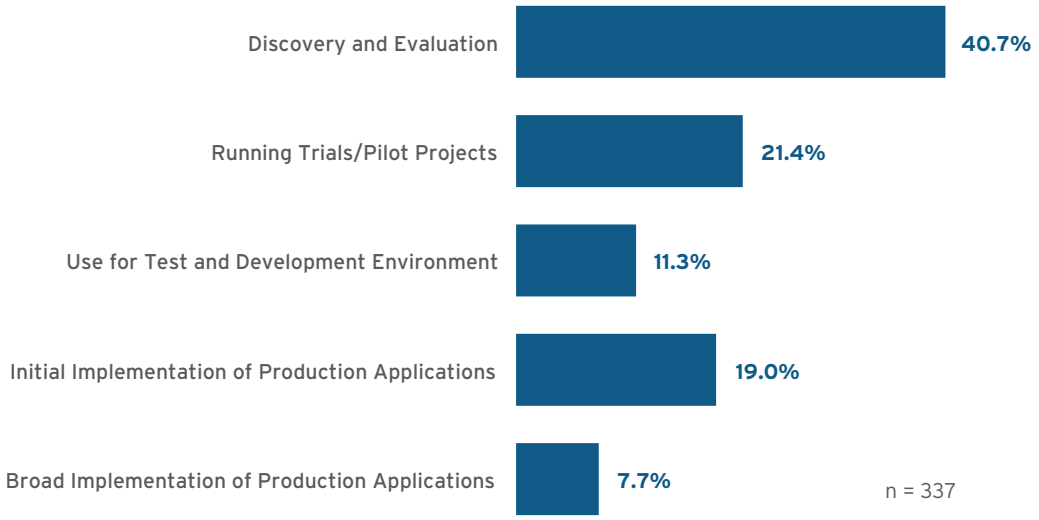
Today's application environments bear little resemblance to those of just a few years ago, presenting new challenges for teams responsible for maintaining and enhancing application performance. No longer are apps built on monolithic code bases, with teams using waterfall practices to push out updates annually. Instead, teams are adopting a range of new technologies that enable them to move much faster, pushing out new code on a monthly, weekly or even daily basis. The new technologies include containers, microservices and cloud, coupled with the adoption of new techniques such as continuous integration and continuous delivery, as well as other automation practices.

The broad interest in and adoption of containers in particular is unlike many other new technologies that have emerged in recent years. We typically observe a standard adoption pattern where nimble startups are the first to embrace cutting-edge techniques to beat out the competition, but with containers, we've seen take-up by companies of all sizes and across industries.

When we asked enterprise IT decision-makers about their use of containers, 26.7% said that they were using them in either broad or initial implementations of production applications. A further 11.3% said they were using containers in test and development, and 21.4% were trying them out. That means nearly 60% of respondents were using containers in some fashion, with the remainder at least evaluating the technology.

Figure 1: How would you describe your organization's use of containers?

Source: 451 Research, Voice of the Enterprise (VotE): Cloud Transformation, Budgets and Outlook 2016



However, containers present new challenges for developers, DevOps professionals, operations staff and other roles in organizations that are responsible for ensuring that applications perform optimally. To monitor containers, end users require insight into several factors:

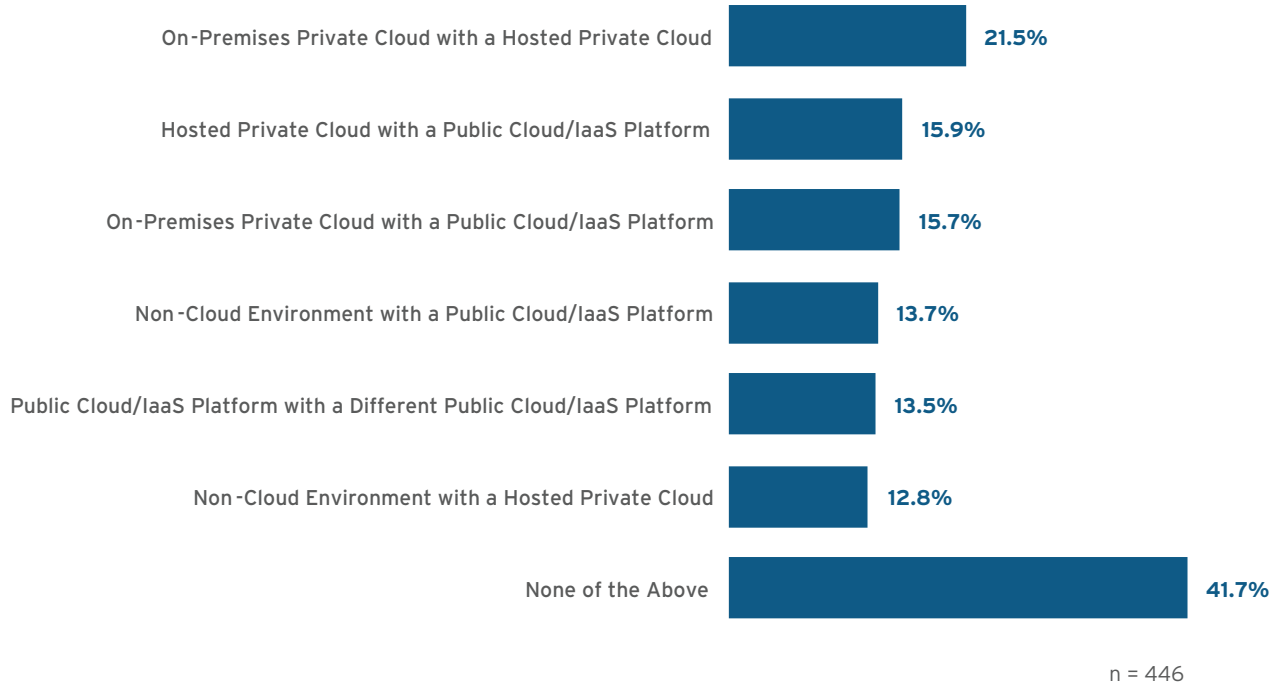
- The software running in the container.
- The impact the container is having on underlying infrastructure.
- The relationship between containers.

Containers present additional challenges. For example, in some deployments they're ephemeral, spinning up and down in a way that may make it difficult to pinpoint the root cause when problems occur.

In addition to container adoption, we're seeing new trends in cloud usage that similarly have a notable impact on monitoring environments. Businesses are increasingly employing a variety of hybrid combinations to best serve their needs. 'Hybrid cloud' now means an array of deployments and increasingly encompasses the use of multiple public clouds, where businesses are looking to leverage the capabilities and cost models of the cloud provider that best fits the need of their workloads.

Figure 2: Has your organization configured any of the following together to achieve seamless delivery of a business function?

Source: 451 Research, Voice of the Enterprise: Cloud Transformation, Workloads and Key Projects 2017



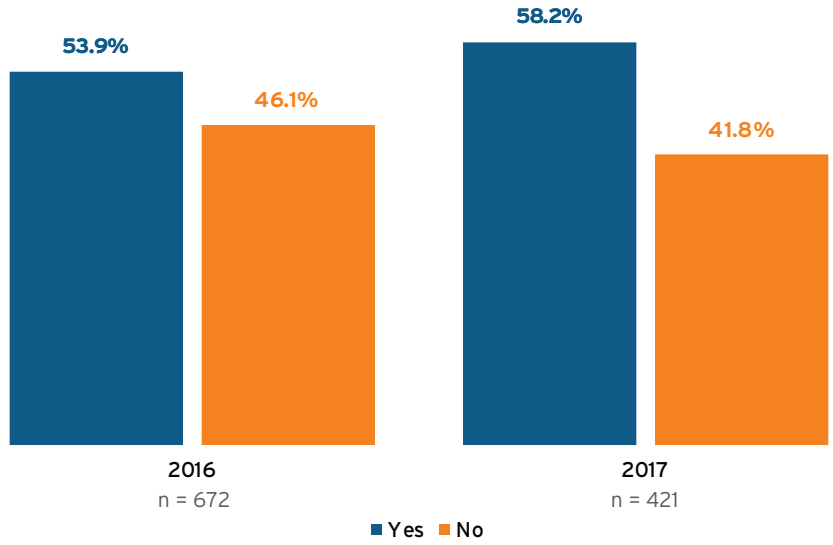
When we asked enterprise IT decision-makers how they are combining cloud resources to deliver individual services, we found a split among a wide range of implementations. More than 13% said that they are combining two public IaaS providers to deliver a function. A similar number said they combine a non-cloud environment – most likely an on-premises or hosted datacenter – with a public cloud. The combinations of hosted or on-premises private clouds with public IaaS each accounted for about 15% of respondents. More than 21% said they're tying together on-premises and hosted private clouds.

Monitoring in these environments adds new complexity for teams that are best served by a tool that can quickly identify the root cause of a problem in an application, regardless of whether the problem is associated with an on-premises deployment or in any of the off-premises cloud environments that might be running workloads powering an app.

Injecting even more complexity into this evolving environment are internal changes that many organizations are undergoing. We've seen an uptick in the number of enterprise IT decision-makers we survey who say that their organizations are currently undergoing IT transformation initiatives. Last year, 53.9% said they're working through IT transformation, and that figure grew to 58.2% this year.

Figure 3: Is your organization currently undergoing an IT transformation initiative?

Source: 451 Research, Voice of the Enterprise: Cloud Transformation, Budgets and Outlook 2016, Cloud Transformation, Workloads and Key Projects 2017



Such transformations have an impact on the makeup of IT teams. In our 2016 VotE Cloud Transformation survey, 32.5% of the 926 enterprise IT decision-makers we surveyed said that they are planning some change to the layout of their IT technical teams. Such changes often entail altering role expectations so that individual contributors have broader, generalist skills or so that teams take on new responsibility, such as when application teams become responsible for their own infrastructure. These changes often drive demand for new tools that can better serve these roles and team structures.

Pain Points of Enterprise Application Management

Today's application development environments, harnessing technologies such as containers and cloud and built on organizations that are transforming internally, are far more complex than they used to be. This complexity leads to a number of new problems in monitoring environments:

- ***Alert fatigue.*** Where once a team might manage individual servers dedicated to a single monolithic app with monitoring tools that set off alerts when CPU or memory usage spiked, now a server may run many containers and microservices supporting multiple apps, some of which might communicate with third-party services or services running on public clouds. The applications themselves might be written using multiple languages. Each of these components could generate an alert when a single problem occurs. The result is that responders begin to ignore alerts – there are just too many to attend to, and the alerts are often meaningless. When responders recognize that there is a real problem, they spend too much time identifying which alert signifies the root of the problem.
- ***Data overload.*** The many components that make up a modern application all emit important monitoring data, drowning organizations in data management headaches. There is a delicate balance between collecting the necessary data to understand the problem and its cause and collecting so much data that problems are obscured. Teams are beginning to recognize that there's an art to determining what information to collect, at what fidelity and now long to retain it.
- ***Correlation woes.*** Organizations commonly complain about juggling too many monitoring tools and the problems that ensue due to a lack of integration across those tools. The most trying issue occurs when an application has a problem and users of different tools – APM, infrastructure monitoring, database monitoring, network monitoring, etc. – try to work together to identify the root cause. The tools often either point to different sources or don't recognize the problem, resulting in time wasted as team members try to sort out whether there is a problem and, if so, what the source is.

Solutions to Relieve the Burden

Despite the challenges that organizations face when deploying applications in a modern environment, there are some commonalities across those that successfully maintain application performance. The factors that contribute to their success include ensuring that their tools have a few important capabilities and allow them to begin to harness new organizational models. Among the key tool requirements are:

- **Agent and agentless capabilities:** To keep up in modern environments, monitoring tools must employ techniques that offer insight into new technologies and that can support the dynamic nature of modern infrastructures. For example, in most cases, agentless monitoring technology alone isn't well-suited to container environments that are ephemeral – with containers spinning up and down irregularly and with some containers running for only short periods. Agents, however, can be set to collect data at short intervals and are, thus, better able to detect and track containers and other application elements that are ephemeral. In some environments, a combination of integrated agentless and agent-based technologies may offer the most granular insight.
- **Integrations across tools:** Organizations increasingly employ a host of tools, each designed to deliver deep insight into targeted components of an application or serve particular end-user needs. While purpose-built tools do indeed deliver deep, targeted details, juggle too many and confusion reigns. Organizations find that when one tool surfaces a problem, others may not. Or, different tools may identify different root causes of an issue. The result is that teams waste time manually analyzing information presented in multiple tools, seeking the true source of a problem. To solve this confusion, they are looking for tools that can be integrated easily so that data can be correlated, taking the work and wasted time out of manually comparing information presented in multiple tools.
- **Advanced analytics:** In many modern, complex application environments, humans literally are not capable of analyzing the large volume of data generated by application components. As examples of just how overwhelming that data volume can be, Lyft gathers 20 million metrics per second about its operations, Pinterest ingests 2.5 million metrics per second, and Slack saves 1.5 million metrics per second. While those examples represent very large online businesses, even a subset of those data volumes would be impossible to easily digest without the assistance of sophisticated analytics tools.

At the same time that these data volumes are growing, machine-learning technologies that can quickly draw intelligence from the data are maturing. Across use cases, we see three main drivers for machine-learning technologies:

- **Digital transformation.** As more companies transform into digital businesses, they're generating and consuming data from more sources. This widespread availability of data, including in the IT operations sector, is driving the need for machine-learning technologies that can intelligently and quickly analyze it.
- **Compute power.** Compute power has grown, driving down costs and making it possible to run machine-learning algorithms on a wide variety of data.
- **Data scale.** IT operations provides the perfect example of just how much data is being generated. Humans simply aren't capable of analyzing it all. This type of data overload is a significant driver in the further development of machine-learning technologies.

In an IT operations use case, machine learning is being harnessed in a number of ways, including to do automatic thresholding, a process that reduces overhead and meaningless alerts. Machine-learning algorithms can also be applied to historical data in order to predict when resources might become constrained, for instance, allowing users to scale before a resource constraint impacts performance.

Organizational Models to Optimize Outcomes

Companies are experimenting with different organizational models that aim to allow teams access to the monitoring tools they need to drive top-performing apps. There are two models that we've commonly seen, each with pros and cons:

IT-MANAGED SELF-SERVICE MODEL

This model takes a cue from web-scale businesses that have found success with it and that have shared their best practices. In this model, a central team builds and supports a monitoring environment that individual application and infrastructure teams tap into.

- ***Pros:*** Teams have the freedom to access the monitoring tools as needed when they are developing new apps or adjusting the monitoring they want to do on existing apps. Experts within the IT team that manage the monitoring tools are available to help application, infrastructure and DevOps teams ensure they're collecting the right monitoring data from their systems. IT can centrally collect all or most IT operations data in one place since teams are using the same set of tools, enabling new use cases, including those from line-of-business groups. Potential cost efficiencies are realized by consolidating multiple subscriptions and by consolidating management under a single team.
- ***Cons:*** Because application, infrastructure and DevOps teams must choose from the set of tools managed by the IT monitoring team, they potentially have a smaller pool of tools to choose from. Some businesses with a central self-service model recommend the tools in their catalog but don't prevent teams from using other options. Allowing this latitude has its own set of pros and cons. Teams can use the tools that suit them best, but central IT may lack the ability to integrate those tools with the others, and central IT might not have the bandwidth to assist the team in making the best use of the tools.

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In these environments, application, infrastructure and DevOps teams in an organization have the latitude to employ the monitoring tools of their choice.

- ***Pros*:** Teams choose tools they are most comfortable with and that do the best job for their particular needs.
- ***Cons*:** The tools chosen may not integrate well, potentially limiting correlation across datasets, leading to possible alert storms and slowing down root cause analysis. Also, with this model comes the potential for various teams to have separate implementations or service contracts with the same monitoring vendor, resulting in spending inefficiencies and a potentially limited ability to consolidate data for analysis.

Expanding Use Cases for Monitoring Tools

Once an organization has a modern monitoring environment – one that offers deep insight into technologies such as containers, tracks components as they spin up and down, and correlates data across tools and delivers sophisticated analytics – then what? We're seeing organizations discover valuable use cases that benefit from their monitoring tools.

Let's start by looking at how traditional roles may change in such modern monitoring environments.

- *Operations teams*: Modern tools can have a dramatic impact on operations staff. With advanced analytics, monitoring products raise the alarm only when necessary, reducing the number of times that on-call staff are alerted at night or interrupted when working on other projects. Rather than sort through scores of meaningless alerts, and occasionally missing the actual important ones, team members can spend their time on more important work, such as capacity planning and optimization strategies. Also, when incidents do occur, operations staffs are likely to identify the root cause of a problem faster when they have access to technology that correlates information across sources.
- *Developers*: Modern tools can help development organizations begin the transformation into agile DevOps teams. With access to correlated information across tools, developers understand the relationship between their code and the infrastructure it runs on. That understanding enables the empathy that we see as a core pillar of DevOps groups because it offers insight into responses required by colleagues in operations when infrastructure performance lags. In addition, developers can begin to take more ownership than they once did of their applications' performance with the ability to detect, investigate and repair more types of problems, including those that impact infrastructure performance.

However, these modern monitoring tools also open the door to new use cases, such as:

- *DevOps roles*: With better insight into both applications and infrastructure, DevOps teams can integrate code development and infrastructure operations support into an agile team that quickly responds to customer needs, competitive pressure and application problems. The result is better-performing applications that meet business needs.
- *Line-of-business users*: The advanced analytics capabilities being built into some monitoring platforms open the door to use cases outside of the IT department. For instance, we're seeing organizations analyze IT operations performance data against business data, both as a way for IT teams to prioritize work around solving performance issues and as a way for business executives to understand the relationship between applications and business results. Product managers can begin to better examine how changes that they drive to applications impact sales, for instance.

Conclusion

In an era of IT transformation, change is a constant – both in terms of organizational models and the applications that modern, agile teams are continuously updating. Modern monitoring tools, those that are well-integrated across functions, can support methods such as agent and agentless technologies in order to gather the most data possible, and embrace advanced analytics technologies such as machine learning in order to surface valuable intelligence.

The result? Agile teams that are no longer drowning in alerts or data and that can quickly identify the root cause of problems in order to quickly repair them. Such teams gain the time to focus on more important work that drives business needs, rather than being solely reactive and resolving application problems. In addition, with such tools in place, new use cases emerge, including those that serve roles such as line-of-business executives and DevOps pros.