

# ACHIEVE BETTER USER EXPERIENCE WITH APPLICATION PERFORMANCE MONITORING AND TROUBLESHOOTING



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# ACHIEVE BETTER USER EXPERIENCE WITH APPLICATION PERFORMANCE MONITORING AND TROUBLESHOOTING

## INTRODUCTION

Gone are the days when IT was primarily about on-site infrastructure and network. With more and more businesses moving into the cloud, companies now have lower infrastructure costs, meaning that they can focus more on the software side and improve customer satisfaction.

This has resulted in evolved web application development. Today's web applications are no longer restricted to a few lines of code on a single server. Instead, they are a complex collection of distributed software components and cloud services that enable even more complex business services.

## THE PROBLEM WITH MONITORING APPLICATIONS TODAY

With all this added complexity, though, comes the risk that one component could slow down the entire application, despite a strong and resilient architecture. Moreover, today's users and employees demand applications that are lightning fast and, allow work from anywhere and on any device.

A 2015 <sup>1</sup>wired.com study found that 47% of consumers expect a web page to load in two seconds or less and, that 40% will totally abandon a website if it takes longer than three seconds. When it comes to mobile viewing, consumers tend to be more discerning: More than 85% of users want pages to load faster than on their desktop.

Thus, we can say that the job of a typical DevOps team has become much more complex and complicated today. They need to be constantly on the alert and keep track of the performance issues plaguing their applications, which means that application performance monitoring (APM) tools are essential.



## MEASURE WHAT MATTERS

Simply put, application performance monitoring tools oversee the performance, availability, and user experience of software applications. They keep an eye on transaction speeds for both end users and the systems and network infrastructure supporting an application, providing an end-to-end overview of potential bottlenecks and service interruptions.

In realistic terms, APM typically involves a suite of software tools—or a single integrated SaaS or on-premises tool—to view and diagnose an application's speed, reliability, and other performance metrics to maintain optimal service levels. Load testing, synthetic monitoring, real user monitoring, and root cause analysis are a few of the primary tools found in a well-rounded approach to APM.

APM can be very helpful for troubleshooting a problem, by providing a holistic report on the problem with a wide variety of data metrics. For example, some data metrics that are commonly used to identify and display performance issues are:

- Apdex Score
- Response Time
- Throughput
- Exception count
- Database metrics and SQL queries
- Memory usage.

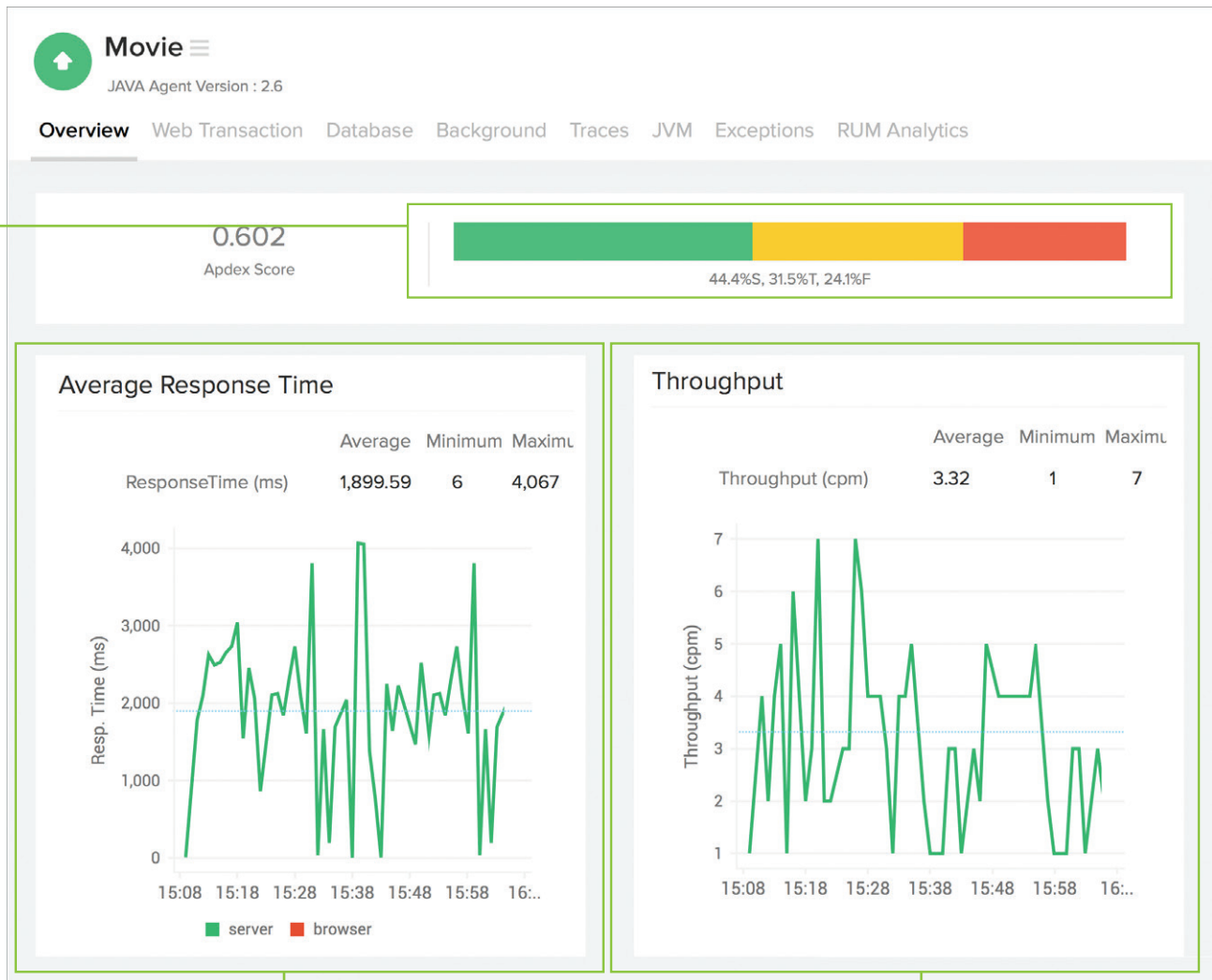
These metrics, individually, or all together, help you get to the root cause of a problem. APM tools are even more potent if they're integrated with real user monitoring (RUM). With RUM-integrated APM, you can easily visualize the complete life cycle of a web page, from front to back end, and learn exactly how real users experience your applications.

To elaborate further, let's check out an example where these metrics are used to monitor and troubleshoot a web application's performance issues.

## EXAMPLE

An e-ticket portal, Movie.com, is experiencing a decline in sales. Their DevOps team decided to use Site24x7 APM Insight to identify and correct the root cause of the problem.

The first indication of trouble is the reduced Apex Score due to the increased percentage of "Tolerating" and Frustrated Users.



For several hours during the time period, response time increased while throughput dropped significantly.

The application developers noticed that there was an increase in the number of "tolerating" and "frustrated" users, which lead to a decrease in the Apex score. At the same time, there was an increase in the response time and a decrease in throughput.



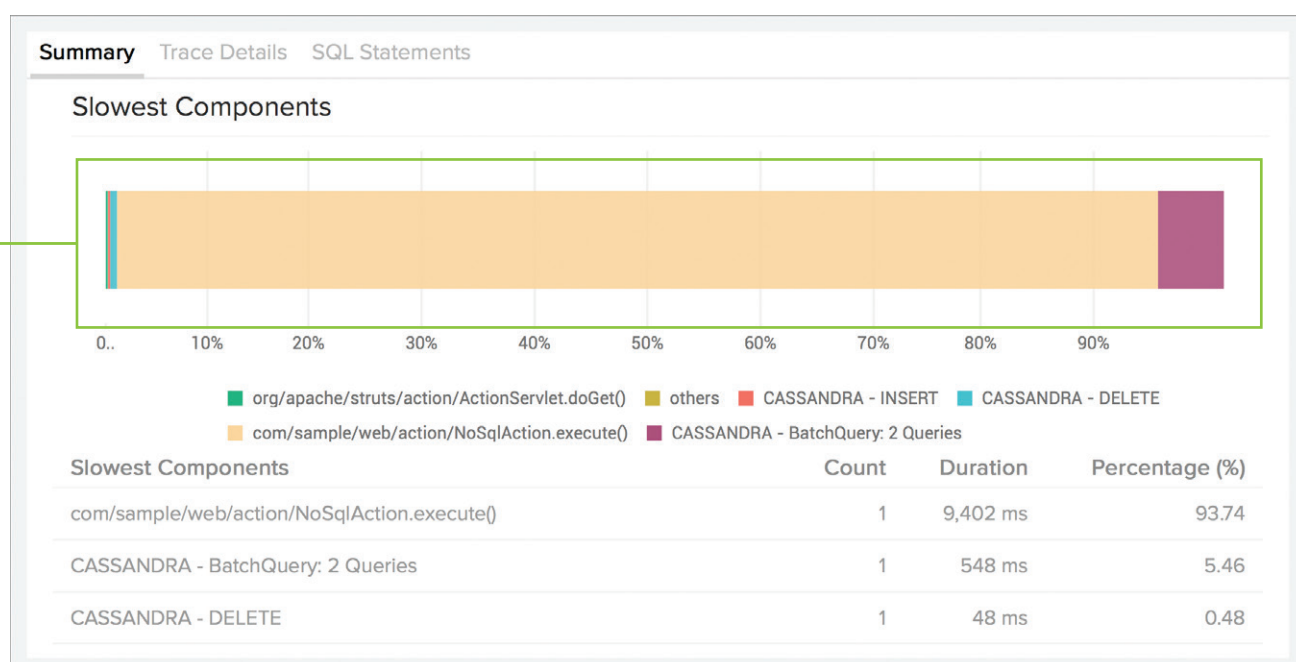
By filtering the Traces to those taking over 10 Seconds, they were able to zero in on transactions that should be analyzed.

The screenshot shows the Site24x7 Traces interface for a project named 'Movie'. The 'Traces' tab is selected, and the filter is set to 'Response Time' is 'above 10 sec'. The table displays six transactions, all of which are 'URLTaskScheduler.run' except for the last one, 'SampleWeb/nosql.do'. The response times for the first five transactions are 10.9, 10.8, 10.6, 10.5, and 10.4 seconds, respectively. The last transaction has a response time of 10.0 seconds. The 'Avg. Resp. Time' for the first five transactions is 5,161 ms, while for the last transaction, it is 814 ms.

Start Time	Transaction	Resp. Time	CPU Time	External Calls	Exception Count	SQL Time	Avg. Resp. Time
May 25, 2016 3:15:31 PM	URLTaskScheduler.run	10.9 sec	0 ms	6	0	0 ms	5,161 ms
May 25, 2016 12:44:00 PM	URLTaskScheduler.run	10.8 sec	0 ms	6	0	0 ms	5,161 ms
May 25, 2016 12:36:58 PM	URLTaskScheduler.run	10.6 sec	0 ms	5	0	0 ms	5,161 ms
May 25, 2016 12:43:00 PM	URLTaskScheduler.run	10.5 sec	0 ms	6	0	0 ms	5,161 ms
May 25, 2016 1:06:52 PM	URLTaskScheduler.run	10.4 sec	0 ms	6	0	0 ms	5,161 ms
May 25, 2016 12:47:44 PM	SampleWeb/nosql.do	10.0 sec	0 ms	3	0	612 ms	814 ms

Let's drill into this particular long running transaction which has ran for 10 Seconds to determine the specific cause of the issue.

This made the development team trace all their transactions to find out which one was causing the slow-down. By filtering those that take more time (say, more than >10000 ms), they were able to narrow down the performance issue to five transactions.



94 % of the response time in this long running transaction is due to this specific component. Focusing on improving the performance of this component could have a big payback for the application.

When they examined each transaction further, they were able to identify the components in each transaction that were taking longer. Depending on what you find, your solution to improving performance and availability will vary. For example, occasional single long-running transactions may have unique characteristics or be edge cases that your application does not handle well.

After drilling down to the specific problematic query, the company DBA will be in a good position to adjust the database and/or application to eliminate this potential bottleneck.

Summary Trace Details SQL Statements

Timestamp (Second)	Execution time (ms)	Query	No. of Queries:3
9.39	16	insert into test.person (name, id) values (?, ?)	
9.406	48	delete from test.person where id = ?	
9.454	548	insert into test.person (name, id) values (?, ?) delete from test.person where id = ?	

They have drilled down into a specific problematic database query. Knowing that this is an issue, the DBA will be in a good position to adjust the database and/or the application to eliminate this potential bottleneck.

And finally, by drilling down to the query level for each component they were able to identify that the three queries given above is causing performance issue. From there, the team made the necessary changes to improve performance and user experience.

## CONCLUSION

We're all familiar with Murphy's law: "Anything that can go wrong, will go wrong.". This is especially true when it comes to today's web applications—they are more and more multi-tiered and complex which, in turn, risks negatively impacted performance.

But this doesn't mean that you can't keep an eye out for these performance issues. With the help of a proper RUM integrated APM tool, you can make sure that even if errors do occur, they are identified quickly and immediately corrected.

## GETTING STARTED

APM Insight is an end-to-end application performance monitoring and troubleshooting service from Site24x7. APM Insight gives you visibility into how your applications behave for your end users. To learn how Site24x7 APM Insight can help monitor your applications in real time, please visit [www.site24x7.com/application-performance-monitoring.html](http://www.site24x7.com/application-performance-monitoring.html)

Site24x7 APM Insight supports monitoring on four different platforms:

- Java
- MS-.NET
- Ruby &
- PHP

## ABOUT SITE24X7

Site24x7 is a web infrastructure monitoring service that helps you oversee the uptime and performance of websites, online applications, and servers. Monitoring is done from 50+ locations across the world, thus giving you a global perspective of end-user experience. Site24x7 supports monitoring HTTP, HTTPS, SMTP, TCP, IMAP, SSL, Ping, FTP, SFTP, DNS, and other internet- facing network services.

Visit [www.site24x7.com](http://www.site24x7.com) to sign up for a free 30-day trial account!

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