[Course Overview](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live)

[Course Overview](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live)

[My name is Glenn Berry, and welcome to my](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=0) [course SQL Server 2017: Diagnosing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=7.3) [Performance Issues with DMVs. I'm a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=10.413) [principal consultant with SQL Skills and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=13.684) [this topic is one that I feel very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=15.389222222222223) [passionate about. In the course of my](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=17.351) [career as a database administrator and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=19.74777777777777) [consultant, I've used my DMV diagnostic](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=21.188333333333333) [queries on a nearly daily basis to find](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=23.365571428571428) [and correct many common SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=26.358249999999998) [performance issues. The queries that are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=29.192666666666668) [detailed and demonstrated in this course](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=31.624) [will help you detect and correct many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=33.202) [common performance issues with your SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=35.77666666666668) [Server instance, hardware, storage, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=38.48533333333332) [your databases. I want to show you how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=41.332600000000006) [properly understand how to interpret these](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=44.349) [queries and then use those results to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=46.326333333333324) [get a better performing SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=48.34366666666667) [environment. If you work with SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=51.45140000000001) [in any capacity, whatever your level, this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=52.78325) [course is relevant to you. Experience](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=55.92433333333333) [using SQL Server 2005 or newer is helpful,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=58.19957142857143) [along with a basic understanding of how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=60.97966666666667) [SQL Server works. I hope you'll join me as](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=63.821999999999996) [we explore proper SQL Server performance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=66.50833333333335) [with SQL Server 2017: Diagnosing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=68.96949999999998) [Performance Issues with DMVs here on Pluralsight.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=6466f105-4e19-40cf-a586-bc689cd5e22d&clip=0&mode=live&start=72.1616)

[Introduction](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live)

[Introduction and DMV Performance Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live)

[Hi, this is Glenn Berry with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=0) [sqlskills.com. This is SQL Server 2017:](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=3.4508571428571426) [Diagnosing Performance Issues with DMVs.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=6.281000000000002) [In this module, I'm going to show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=10.1)[exactly what DMV performance queries are.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=11.996) [Simply stated, they're queries that use](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=15.281) [dynamic management views or objects to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=17.501) [retrieve data that's useful for detecting](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=19.5) [and diagnosing many performance issues.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=21.609) [These queries are very easy to use and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=26.025) [they're incredibly useful for diagnosing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=28.087)[many performance problems, whether they're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=30.615) [instance or database related. These](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=33.17366666666666) [queries are so valuable that I personally](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=35.41728571428571) [use them nearly every day in my consulting](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=36.93566666666666) [work. I'm also going to cover the course](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=41.23849999999999) [objectives and the structure of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=43.199) [course, including the names of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=45.034142857142854) [subsequent six modules. So let's get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=47.77500000000001) [started. So what are DMV performance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=50.943000000000005) [queries? Well they were added to the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=53.804500000000004) [product way back in SQL Server 2005, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=55.24700000000001)[they're one of the main reasons a lot of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=57.416333333333355) [organizations upgraded from 2000 to 2005.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=59.97757142857141) [There have been improvements and additions](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=64.258) [in each new version of SQL Server since](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=66.04) [then. So there's new DMVs and new columns](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=67.95733333333332) [added to existing DMVs. Most of these DMV](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=70.65049999999998) [and DMO queries are very lightweight and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=74.49225000000001) [don't put very much stress on your system.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=77.36185714285715) [They do require VIEW SERVER STATE for most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=81.078) [of them. And they're very easy to use, the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=82.85) [hard part is understanding them, but](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=86.833) [that's what you're going to learn in this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=88.926875) [course. And then you can use these to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=90.88875) [diagnose many performance issues.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=93.4748) [Diagnosing performance issues, how do you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=97.666) [use these queries to do that? Well, most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=99.242) [SQL Server instances that I've run across](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=101.35885714285715)[have performance issues. And they can be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=104.38239999999999) [instance-level issues or they can be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=108.21766666666664) [database-level issues, and they might be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=110.87733333333335) [activity-related issues, or memory and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=113.76233333333332) [storage issues, or finally CPU issues. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=115.99920000000002) [these queries have separate sections that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=119.3) [you're going to learn about that show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=121.17725) [how to diagnose all these different kinds](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=123.08471428571428) [of issues. So these DMV queries are just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=125.42633333333333) [extremely useful, they're very, very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=129.10328571428576) [valuable, and seriously, I use them every](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=131.72899999999996) [day. And many people around the world also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=135.016) [use them every day. So what are the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=136.904) [benefits of DMV performance queries? Well,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=141.76055555555558) [they're relatively quick and easy to use.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=144.00366666666667) [They don't require any special preparation](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=145.96014285714284) [to run so they're not like Query Store](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=148.61942857142856) [where you have to enable Query Store on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=150.61224999999996) [the database, they're not like extended](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=152.63671428571428) [events where you have to set up an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=154.35975) [extended events session. You just run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=156.728) [these queries. And they do provide a lot](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=158.45239999999998) [of very useful performance information.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=160.65533333333337) [And they help you get much closer to the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=163.891) [root cause of many problems. They're just incredibly useful.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=0&mode=live&start=165.806)

[Course Objective and Structure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live)

[So let's go over the course objectives.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=2.073) [We're going to provide a thorough](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=4.473) [understanding of how to use these DMV](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=5.588) [performance queries and how to act on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=7.468) [results that you get back after you run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=9.623714285714286) [them. You're going to understand the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=11.617142857142857) [capabilities and benefits and limitations](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=13.87) [of DMV performance queries. You're also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=17.2714) [going to understand how to detect and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=20.34042857142857) [diagnosis instance and database- level](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=21.747) [performance issues, which is incredibly](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=24.248333333333335) [useful for most DBAs. You're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=27.233285714285717) [learn how to understand how to alleviate](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=30.127374999999997) [common instance and database- level](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=31.913999999999998) [performance issues. Let's go over the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=35.001666666666665) [course focus and structure. The next](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=39.1285) [module is going to be diagnosing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=41.00325) [activity-related instance issues. Then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=41.901) [we'll talk about diagnosing storage-](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=45.68816666666667) [related instance issues. Next we'll cover](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=46.849) [diagnosing memory-related instance issues.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=50.48460000000001) [Then we'll go on to diagnosing CPU-related](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=52.19385714285715) [instance issues. And then we'll do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=56.494) [diagnosing activity- related database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=59.63300000000001) [issues. And then finally, we'll talk about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=61.967) [diagnosing storage and memory-related database issues.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=1&mode=live&start=65)

[Module Summary](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live)

[And with this introductory module, you now](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=1.925) [know what DMV performance queries are.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=4.0555) [They're queries that use dynamic](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=7.018) [management views or objects to retrieve](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=7.941333333333334) [data that's very useful for detecting and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=10.27671428571429) [diagnosing many performance problems.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=12.867833333333335) [These queries are very easy to use and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=16.046)[they're incredibly valuable for diagnosing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=17.878) [many performance problems, whether they're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=20.408) [instance level or database related. We](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=23.316285714285716) [also covered the course objectives and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=26.36657142857143) [structure, including the names of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=28.284) [subsequent six modules. In the next](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=30.273) [module, I'm going to cover how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=32.623333333333335) [diagnosis activity-related instance issues. So let's get going.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=fe8e21e5-c0bd-45e2-9160-35f4435f8ea1&clip=2&mode=live&start=34.4826)

[Diagnosing Activity-related Instance Issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live)

[Introduction and Version Information](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live)

[Hi my name is Glenn Berry from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=0) [sqlskills.com. This course is about using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=3.98125) [DMV queries to diagnose performance issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=5.817499999999999) [with SQL Server 2017. And in this module,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=8.377571428571429) [I'll be discussing diagnosing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=11.837571428571428) [activity-related instance issues. In this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=13.842749999999999) [module, I'm going to cover 10 useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=17.893) [queries for detecting and diagnosing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=19.686) [activity-related instance issues, which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=22.336) [are quite common with many SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=24.58566666666667) [instances. I'll be discussing how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=27.383333333333347) [interpret the results of each query and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=28.825857142857142) [how that relates to other information you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=30.766125000000006) [may have collected about your instance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=32.64228571428571) [activity. I'm also going to cover some](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=35.14975) [useful methods for alleviating many common](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=37.47824999999998) [activity- related database and instance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=40.46159999999999) [issues, so you can apply what you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=43.19420000000001) [learned by running and interpreting these](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=44.96974999999998) [queries. We've got a lot to cover in this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=47.6408) [module, so let's get started. Version](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=49.25477777777776) [information. This query is going to show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=53.4425) [us the SQL Server version and edition](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=55.49133333333335) [information, so whether it's SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=58.12139999999999) [2017 and whether it's Enterprise Edition.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=60.347874999999995) [It's also going to show us the operating](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=63.573)[system version and edition, so Windows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=64.814) [Server 2016 Standard Edition, for example.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=67.845) [And it's also going to tell us whether or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=70.79650000000001) [not there's a hypervisor present on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=73.52714285714285) [host. Going a little bit deeper into this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=77.22625) [query, it's going to show us the exact SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=79.82300000000004) [Server version and edition and the exact](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=82.09566666666672) [build number, which is really important to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=85.27171428571431) [know. Then it's going to show us the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=88.34842857142858) [operating system version and edition](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=90.35937499999996) [information, which is also important to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=92.34979999999997) [know, but not quite as important as the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=94.58683333333333) [SQL Server version and edition. And then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=97.18949999999997) [this will help you understand the features](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=99.732) [and capabilities of your instance. So, if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=102.49183333333333) [you're running on Enterprise Edition, you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=104.85866666666666) [have a lot more features available than](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=106.45400000000001) [you do on Standard Edition. It also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=108.53457142857144) [affects your memory limits, for example.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=110.52533333333334) [It's going to help you know whether your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=112.13025) [SQL Server instance has been properly](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=114.93557142857142) [patched. So just by looking at the build](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=116.43485714285714) [number and then looking up the build](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=119.02575) [information online, you can find out if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=121.54185714285715) [you're up to date on your cumulative](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=123.51400000000001) [updates for SQL Server 2017. Finally,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=125.355) [knowing if you have a hypervisor present](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=129.2507142857143) [is useful, but it doesn't mean that your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=131.497375) [SQL Server instance is actually running in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=134.08883333333333)[the hypervisor. We have to run other queries later on to confirm that.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=0&mode=live&start=136.37099999999998)

[Demo: Version Information](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live)

[For this demonstration, I'm going to show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=1.447) [you how to pick up some SQL Server and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=2.348) [operating system version information for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=4.769) [the current instance that you're connected](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=7.391166666666667) [to. But before I do that, I just want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=8.474428571428572) [run this query here to make sure that I'm](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=11.046555555555559) [connected to a SQL Server 2017 instance.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=13.090499999999999) [So when I run that, it comes back and says](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=17.168) [I have the correct major version of SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=18.7) [Server for this script, so that's what I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=21) [want to see. Now if I come down here, this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=22.166) [is the actual query that we want to run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=26.53311111111111) [for this demo. So when I run this against](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=28.56711111111111) [my workstation, we'll see what comes back.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=31.66) [And it comes back and tells me that I've](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=34.379111111111115) [got a named instance called SQL2017 on a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=37.559428571428576) [machine called BIGBEAST, and then if I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=40.278000000000006) [expand this column, it shows me that I've](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=42.97871428571428) [got SQL Server 2017 RTM-CU11 with a KB](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=45.94133333333334) [article associated with it, and the exact](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=49.699428571428584) [build number, and the fact that it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=53.321999999999996) [64-bit, which is all you're going to see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=55.751333333333335) [with SQL Server 2017, by the way. And if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=57.217888888888865) [we scroll over to the right, we get some](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=60.344500000000004) [more information, it shows us that it is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=62.41449999999999)[Developer Editor and it's running on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=64.44328571428571) [Windows 10 Pro for Workstations, which is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=66.56214285714285) [a special workstation sku for high-end](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=69.99100000000001) [desktop machines, and then shows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=72.84628571428571) [Hypervisor. And when you see Hypervisor](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=75.42271428571426) [there, that does not necessarily mean that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=77.64049999999997) [you're running inside of the hypervisor,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=79.59671428571428) [what it means is there's a hypervisor](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=82.355) [present on the host. And in my case, this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=83.75) [instance that I'm connected to is not](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=87.39887500000003) [running in the hypervisor, it's running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=89.38485714285716) [natively on the workstation, and I happen](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=91.3895) [to have Hyper-V running on that same](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=94.17785714285714) [workstation. So that's what this query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=98.28480000000002) [looks like. And the reason why it's so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=99.70242857142857) [important is I want to know, am I on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=101.93500000000002) [latest cumulative update for SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=105.34233333333334) [2017 or not? I want to know, am I on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=107.52699999999997) [Enterprise Edition or Developer Editor or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=111.33377777777774) [Standard Edition. And also I'd like to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=113.32933333333335) [know what operating system I'm running on.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=115.47787500000004) [So I get all that information back from this query.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=1&mode=live&start=117.7)

[Hardware Information](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live)

[Hardware information. This query gives you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=1.943) [processor core counts, how much memory is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=5.018571428571429) [in your machine, whether it's physical or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=7.006142857142856) [virtual, how many NUMA nodes you have and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=9.4194) [whether or not soft NUMA is enabled or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=11.271625000000002) [not, and your SQL Server memory model, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=13.887625000000005) [it shows you if you're using locked pages](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=16.29733333333333) [in memory or not. Now, going a little bit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=17.916) [deeper into this query, it's going to give](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=21.455) [you a very good high-level overview of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=23.411) [your processor and memory configuration.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=25.991375000000012) [It's also going to help you understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=29.937) [what kind of environment you're running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=31.814) [in, whether it's a 4 core machine or a 64](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=33.20085714285714) [core machine and how many sockets and how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=36.361499999999985) [many NUMA nodes you have, and so you want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=38.71962499999998) [to understand this as you're trying to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=40.926444444444435) [evaluate the performance for your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=42.803) [instance. SQL Server 2017 added several](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=45.93800000000001) [new columns of very useful information to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=48.53357142857144) [this query, so before you couldn't really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=50.908142857142856) [tell, for example, whether or not you were](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=53.22133333333334) [dealing with logical cores or physical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=55.117) [cores very easily from this query, but the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=57.512) [new columns make that a lot easier. This](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=60.430777777777784) [information is applicable to both virtual](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=63.84516666666667) [machines and bare metal machines. So it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=66.05499999999999) [handy for both of them. And finally, don't](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=68.82114285714286) [be deceived by the virtual machine type](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=72.16014285714287) [column, just because it says hypervisor,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=74.71975) [what that really means is there's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=77.12) [hypervisor present on the host. It doesn't](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=78.309) [necessarily mean that your instance of SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=81.32900000000001) [Server is running inside of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=83.76328571428571) [hypervisor. So just make sure you're aware](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=85.65214285714285) [of that. There's other ways to tell whether that's the case or not.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=2&mode=live&start=87.78150000000001)

[Demo: Hardware Information](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live)

[For this demonstration we're going to take](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=1.874) [a look at the hardware on my workstation](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=2.641) [that I'm running these queries against. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=5.3) [when I run this query, it shows me a lot](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=7.517833333333333) [of useful information about the hardware.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=10.448874999999997) [And this is relevant whether it's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=11.752857142857144) [physical machine or a virtual machine. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=13.538428571428572) [in this case, it tells me I've got 32](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=15.9845) [logical CPUs and I've got 32 schedulers. I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=19.587333333333337) [have 16 physical cores, which is really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=23.625999999999998) [important to know for licensing purposes.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=25.733) [I have 1 socket and 16 cores per socket,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=28.102) [and I have 2 NUMA nodes, this is an AMD](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=32.808) [processor that actually splits its cores](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=35.55) [across two NUMA nodes on a single socket.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=38.742) [And I've got 64 gigs of memory. And it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=42.252) [tells me my max workers count and my](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=45.45740000000001) [affinity type, my processor affinity is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=47.619) [auto. And SQL Server start time, that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=50.992714285714285) [really important to know because you need](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=53.339666666666666) [that for a lot of the subsequent queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=55.105888888888884) [in this course to understand what the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=56.98314285714286) [results mean. So knowing you've been](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=59.919714285714285) [running for a few hours versus a few days](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=61.982) [is really important. And then the virtual](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=64.975)[machine type shows up as hypervisor. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=66.7555) [again, that doesn't mean that I'm running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=69.302) [inside of the hypervisor, it just means](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=71.38214285714288) [there's a hypervisor present on the host.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=72.71057142857141) [Soft NUMA configuration is set to on. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=76.181) [SQL memory model description is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=79.76299999999999) [conventional. If I had locked pages and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=82.54299999999998) [memory enabled, like I normally would for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=84.51800000000003) [a production SQL Server, that would say](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=86.69457142857142) [locked pages, but I have that turned off](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=89.21957142857146) [on my workstation by design. So this is a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=91.62200000000001) [very useful query that gives you a lot of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=95.45911111111108) [good information about your hardware, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=97.42600000000002) [you're going to get good information whether it's a VM or physical machine.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=3&mode=live&start=99.27171428571428)

[Average Task Counts](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live)

[Average task counts. This query gives you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=1.912) [a very quick overview of the activity on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=4.7139999999999995) [your instance, and the values you get back](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=7.923333333333333) [from this query are going to be changing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=10.017999999999995) [from second to second on an actual](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=11.841000000000001) [production instance. So don't just run it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=13.785000000000002) [one time and think that's what's really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=15.86133333333333) [going on. It's going to very quickly](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=18.2226) [reveal the high level area that's getting](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=20.481125000000006) [the most pain right now. So it's a very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=22.58857142857143) [useful query for a DevOps point of view.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=25.752499999999994)[Now going deeper into this query, what](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=29.277) [you're going to find out is that Average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=31.789) [Task Count is basically the magnitude of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=33.095166666666664) [your workload or whether you're seeing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=36.41566666666667) [lots of locking and blocking, so if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=38.825857142857146) [see very high average task counts, it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=41.17837499999999) [either means that your server is very busy](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=42.867571428571424) [or you're seeing a lot of locking and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=44.75266666666666) [blocking. Average Work Queue Count is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=48.078) [another measure of the magnitude of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=50.413428571428554) [workload, and typically that's going to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=52.51466666666667) [0, unless your system is extremely busy.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=54.60085714285715) [Average Runnable Task Count is tasks that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=57.266) [are waiting for CPU time. And remember,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=59.601) [all these counts are the average across](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=62.77457142857142) [all the schedulers that are visible to SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=64.763) [Server, and so if Average Runnable Task](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=67.57600000000002) [Count is above 0 for any significant](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=69.78349999999998) [period of time, that means that you have a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=72.13885714285713) [lot of tasks waiting for CPU time and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=74.56566666666663) [you're probably under a little bit of CPU](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=76.28542857142854) [pressure. Finally, Average Pending DiskIO](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=79.34885714285713) [Count represents tasks waiting for I/O to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=82.22679999999998) [complete, so that means you're waiting for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=85.105) [I/Os to finish and you're probably under](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=87.025) [some storage pressure. So again, this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=88.652) [query is very handy for getting a quick](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=91.67024999999998) [idea of what area that SQL Server is feeling the most pain in.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=4&mode=live&start=94.1895)

[Demo: Average Task Counts](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live)

[For this demonstration, I'm going to take](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=1.824) [a look at the average task counts on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=2.548) [machine we're connected to. So when you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=4.789) [run this query on a production server, the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=7.477666666666666) [numbers are going to jump around quite a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=9.198999999999998) [bit, unless the server is really pretty](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=10.993374999999999) [idle. And we run it here, what we're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=12.85875) [seeing is the Average Task Count is 3,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=15.396749999999999) [which is a good, low number that you'd](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=17.300777777777782) [like to see. Average Work Queue Count is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=19.715) [0, which is also a good value. Average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=22.510555555555555) [Runnable Task Count is 0 and Average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=25.02142857142857) [Pending DiskIO Count is 0. And that's what](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=26.712833333333332) [you want to see, low numbers like this.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=29.21271428571428) [But if you see higher numbers when you run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=32.106) [this query, if you see higher numbers on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=33.691874999999996) [Average Task Count, the first column, that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=36.348) [either means that your server is just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=39.190375) [really busy or more likely you might be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=40.691) [seeing a lot of locking and blocking and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=43.375) [perhaps even some dead lock activity. If](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=46.024) [you see Average Runnable Task Count above](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=49.31728571428571) [0 for any sustained period, that means](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=51.2455) [you've got tasks that are waiting for CPU](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=54.56171428571428) [time, they're in a runnable state, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=57.00312499999999)[that's sort of a secondary indicator of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=59.064142857142855) [CPU pressure. And then if you see Average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=61.646) [Pending DiskIO Count above 0, that means](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=64.1945) [you have tasks that are waiting for I/O to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=66.66225000000003) [complete and that's another sign of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=69.73500000000001) [storage bottlenecks or storage pressure.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=72.68233333333335) [So this is a very handy query to run in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=75.312) [real life, but don't just run it once and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=77.571) [think, okay that's what it is, because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=80) [it's going to jump around from second to second on an active server.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=5&mode=live&start=81.84685714285713)

[Top Waits](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live)

[Top waits. This query shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=1.813) [cumulative top wait types for SQL Server,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=4.332) [and it's going to help direct your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=7.186) [analysis to a more specific area. Instead](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=9.020000000000003) [of just guessing what SQL Server is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=11.7415) [waiting on, you can actually measure it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=13.593) [with this query. Now the wait statistics](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=15.376) [that are shown are since the last SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=17.73) [Server service start or since you cleared](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=20.373) [the wait statistic with a DBCC command.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=23.694) [Now, this query is also the most useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=26.919) [when the instance is under a heavy load,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=28.867) [it's not as useful when it's a relatively](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=30.851) [idle instance because SQL Server is always](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=33.279) [waiting on something. So if you're under a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=36.074) [heavy load and you're trying to figure out](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=38.63588888888888) [what the problem might be, this query is a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=40.08700000000001) [little bit more useful. Now going further](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=42.56522222222224) [into this query, this can be very useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=45.069) [information, but you want to make sure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=47.973833333333324) [that you're careful how you use it. What a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=49.20174999999998) [lot of people will do is they'll run this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=51.78044444444444) [query and then they'll just start changing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=53.62350000000001) [things without doing any more analysis.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=55.83128571428571) [So, don't do what's call knee-jerk](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=58.611) [performance tuning, where you run this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=60.601) [query and then you Google whatever the top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=62.277) [wait type is and you follow whatever](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=64.501) [advise you find on the internet to do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=66.92737500000003) [based on what that wait type is. That's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=69.23088888888893) [usually a formula for disaster. What you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=71.68083333333333) [want to do instead is gather more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=74.75788888888889) [information about what's going on and do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=76.308)[some thoughtful analysis about your entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=78.939) [workload before you start making changes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=81.745) [based on the results that come back from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=84.087) [this query. And wait statistics, again,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=85.85) [are not as useful on a relatively idle](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=88.803) [instance. So, don't lose sleep over what](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=91.56477777777775) [the top wait type is if SQL Server is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=93.71825000000004) [running really well and nobody's complaining about performance.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=6&mode=live&start=96.575875)

[Demo: Top Waits](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live)

[In this demonstration, I'm going to take a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=2.236) [look at the top waits for the SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=3.125) [instance that we're connected to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=5.461) [currently. And this is a fairly large](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=7.574333333333332) [query. I'm going to scroll down through it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=9.772999999999996) [so you can see it, but basically all this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=11.485333333333337) [stuff that's in red are specific wait](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=14.291875000000005) [types that I think are benign waits that I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=17.044749999999997) [filter out. And so, you know, it's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=21.176111111111116) [fairly large query, but don't let that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=23.647249999999993) [upset you. What we want to do here is just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=25.989000000000004) [run the query and see what happens. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=27.972599999999986) [this query is very, very useful, but it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=30.763142857142856) [also very easy to misinterpret and do bad](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=33.624500000000005) [things with the results. So this is going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=36.38966666666666)[to tell you what different types of waits](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=39.324999999999996) [that SQL Server has spent the most time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=41.87162500000001) [waiting on since the last time the SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=44.51987499999999) [Server service was started or the last](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=47.438857142857145) [time that the wait stats were cleared with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=49.177666666666674) [the DBCC command. And a lot of people will](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=51.438599999999994) [run this query and then use their favorite](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=54.69166666666667) [search engine to search for whatever that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=57.72042857142857) [wait type is and then just mindlessly do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=60.176750000000006) [whatever some blog post tells them to do,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=62.63714285714287) [and that's really not a good way to use](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=66.047) [the results of this query. What you want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=67.75070000000002) [to do is do a little bit further](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=70.1071) [investigation and make sure you're going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=71.87766666666667) [to a source that you trust on what that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=74.07488888888889) [wait type means and what, if anything, you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=77.08687499999999) [might want to do when you see it. So when](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=79.70488888888889) [you run this query, it shows you the top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=82.16822222222223)[wait types and it's sorted by wait](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=84.89522222222223) [percentage and it also shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=86.989) [average wait seconds, for total, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=89.58) [the average resource waits, and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=94.29333333333332) [average signal waits. And then it tells](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=96.4632) [you the total wait seconds and it's broken](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=98.5985) [down into resource and signal. And signal](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=100.91166666666669) [waits are CPU related and resource is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=104.39685714285713) [anything that's not CPU related. And then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=107.15400000000001) [it shows you the number of waits. And then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=110.00122222222224) [here's a really key column here, this is a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=112.0155) [link that goes to Paul Randall's pages on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=115.41766666666669) [SQL skills that explain what all these](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=118.79625000000001) [wait types mean and tell you what, if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=121.68549999999999) [anything, you might want to do if you are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=124.44177777777777) [encountering this wait type. And if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=126.8972) [take a look, sometimes the wait](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=130.0776666666667) [descriptions, or the wait type name, is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=132.141) [sort of deceptive. So right now we've got](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=135.1235) [ASYNC\_NETWORK\_IO, and a lot of people when](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=138.48849999999993) [they see that they might think, oh, I've](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=139.80033333333327) [got a network performance problem. Usually](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=141.35087499999992) [what this actually means is that your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=144.1327142857143) [client is slowing down SQL Server, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=147.14385714285714) [whatever is calling this and SQL Server is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=149.587875) [sending back a whole bunch of results to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=152.2315) [the client, which could be a middle tier](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=153.828) [machine or it could be even Management](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=156.1) [Studio, that's what the delay is, it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=157.967) [waiting for the client to consume all the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=160.93328571428572) [data that's coming back. CXPACKET waits is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=163.75199999999998) [another common wait type that is often](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=165.85885714285712) [misinterpreted and has to do with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=167.94499999999996) [parallelism. So anyways, the point here is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=170.46433333333334) [that don't just run this query and just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=172.69625000000002) [start making changes based on this result](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=175.14199999999994) [alone. You want to do further research and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=177.79549999999995) [figure out whether you want to make any changes or not after you run this query.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=7&mode=live&start=180.101375)

[Detect Blocking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live)

[Detect blocking. This query can reveal key](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=1.707) [information about blocking, but it's only](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=4.793749999999999) [useful while the blocking is actually](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=7.4479999999999995) [happening. So if it happened a few seconds](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=9.489999999999998) [or a few minutes ago, this query is really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=11.044900000000005) [not going to help you very much. You need](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=12.831249999999995) [to run this query multiple times to get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=15.150249999999998) [complete information because it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=17.637333333333334) [be changing from second to second on an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=19.459249999999997) [active server. Going into more detail on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=22.801499999999997) [this query, this gives you very useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=25.734428571428577) [information when blocking is occurring.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=28.164142857142863) [It's going to show you the lock type,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=31.462) [database, the SIDs for the blocker and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=33.512)[waiter, and then the blocker and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=35.582) [waiter batch. So you're going to get a lot](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=37.87333333333335) [of information about the blocking when it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=39.37188888888888) [is occurring. And again, if you run the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=42.34657142857144) [previous query before this and see high](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=44.461500000000015) [average task counts, then you want to run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=46.50771428571428) [this query and you might see some blocking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=49.25925000000001) [that's going on, and the results from this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=51.302428571428564) [query are going to change from second to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=54.01125000000002) [second, they're very dynamic on an active,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=55.5945) [busy server. This query is going to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=59.14800000000002) [you understand what might be causing the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=61.69524999999999) [blocking. So you're going to see which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=63.65399999999998) [queries are blocking other queries, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=65.24100000000001) [that's very useful if you're trying to diagnose blocking issues.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=8&mode=live&start=67.17500000000003)

[Demo: Detect Blocking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live)

[In this demonstration, I'm going to run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=1.645) [the query that you can use to detect](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=2.743124999999999) [blocking on your instance. And this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=4.69025) [another pretty large query, so I want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=6.626857142857141) [scroll down and show you the rest of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=9.600250000000003) [query. I've got it highlighted in blue](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=11.584999999999994) [here. And normally if you run this on an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=14.338428571428572) [idle instance, you won't get any results](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=16.26888888888889) [back. But I set up an example, so we'll](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=18.74728571428571) [actually get something to look at. So when](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=21.015222222222217) [I run this query, it comes back and says](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=23.324111111111108) [I've got a key lock in this database, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=25.847666666666665) [it shows you the object name of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=29.22575) [blocking object, the type of lock request,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=31.74875) [the waiter SID, how long it's been](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=34.25575) [waiting, and then the waiter batch. So it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=37.299) [shows a select statement that's waiting.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=40.78271428571428) [And then the waiter statement, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=43.254333333333335) [the blocker SID and the blocker batch. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=47.603) [what's going on here is I began a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=51.30611111111111) [transaction and then I went to another](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=53.995) [connection and ran a select statement and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=56.029) [with the default isolation level, this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=58.6575) [will wait forever because it's got a key](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=60.595285714285716) [lock on the row that we're trying to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=62.80877777777778) [update in one connection, and then we're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=65.393125)[trying to select that same row from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=68.25) [another connection. And unless you use a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=70.75600000000003) [no lock hint and change your isolation](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=72.78700000000002) [level, you're going to wait for this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=75.19425000000001) [transaction to complete and the read](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=77.28228571428572) [statement can't finish. So this is very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=79.38312499999998) [useful in real life and if you are seeing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=82.27733333333332) [high average task counts, the first thing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=86.07) [I'm going to want to do then is run this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=87.94966666666667) [query and see if I can catch the blocking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=90.07539999999999) [that's actually going on, that could be a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=93.2015) [cause of those high average task counts.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=95.88666666666667) [Now again, it could be just that your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=98.63) [server is really, really busy and there's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=100.388) [not really any blocking going on, but](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=102.342) [usually in my experience if you see high](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=104.90075) [average task counts on the previous query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=107.03757142857143) [and then you run this query, you will see some blocking.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=9&mode=live&start=109.44800000000001)

[Version Store Space Usage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live)

[Version store space usage. This query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=2.266) [returns version store space usage in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=4.737666666666667) [tempdb. And the results are going to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=6.924250000000001) [aggregated by user database. So you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=9.818999999999999) [see which user databases are using a lot](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=12.142) [of version store space in your tempdb](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=14.409666666666668) [database. It's going to give you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=16.65957142857143) [returned page count and the reserved](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=19.217142857142857) [megabyte space usage for each database. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=22.158) [this helps you understand what's using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=25.424285714285713) [most of the space in tempdb that's being](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=26.896) [used for version store space usage. Now](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=28.674) [diving deeper into this query, it's going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=33.068) [to show you which databases are using most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=34.78442857142858) [of the version store space. And you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=37.102124999999994) [going to see this, especially when you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=39.82600000000001) [database are using snapshot isolation or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=41.868500000000004) [recommitted snapshot isolation, RCSI. If](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=44.3978)[you're using either one of those isolation](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=47.0675) [levels, you're going to use space and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=50.08840000000001) [tempdb to track the values in tempdb](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=52.008) [rather than using traditional locking, for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=54.703) [example. This is going to help you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=58.720600000000005) [understand which workloads in your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=60.508142857142836) [databases are using all that space in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=62.48766666666667) [tempdb. It's also going to help you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=66.76983333333334) [evaluate how large you need tempdb to be.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=68.32014285714283) [So if you're seeing a particular user](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=71.495) [database use a huge amount of space in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=72.9) [tempdb, that might be a clue that you need to make tempdb larger.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=10&mode=live&start=74.884)

[Demo: Version Store Space Usage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live)

[For this demonstration, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=2.053) [look at tempdb version store space usage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=2.8167142857142853) [by database. So this is especially](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=6.104499999999999) [important if you're doing something like](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=8.072285714285714) [recommitted snapshot isolation, you want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=10.3378) [to keep an eye on how much version store](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=12.31275) [space usage is being used by each one of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=14.842714285714283)[your databases. So when I run this query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=17.621999999999993) [right now, it'll come back and show me how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=20.637749999999993) [much space is being used by the various](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=22.847333333333342) [databases on the instance that I'm](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=25.31485714285715) [connected to. And the only one that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=27.400857142857145) [really using any space at all right now is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=28.57987500000001) [msdb, and that's fairly common if you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=31.915285714285716) [not using RCSI. And this is more useful if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=33.88442857142857) [you are using RCSI and using that version](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=37.829125) [store space inside of tempdb and RCSI and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=40.836666666666666) [using that version store space inside of tempdb.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=11&mode=live&start=44.40128571428571)

[Top Average Elapsed Time Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live)

[Top average elapsed time queries. This](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=1.34) [query is going to give you some very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=4.413125) [useful metrics about the highest average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=5.7035) [elapsed time queries across your entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=7.3328) [instance, and this is ad hoc queries and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=9.8655) [stored procedures, for example. And this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=12.907) [is often going to reveal some easy query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=15.49775) [tuning opportunities. It's the proverbial](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=18.512500000000003) [low hanging fruit. If you can find a query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=21.272) [that takes 20, 30, 40 seconds to execute](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=23.781666666666666) [on average, and you can go and tune it so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=26.150857142857138) [it comes back in say less than a second,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=27.6756) [that can be a huge change for your system](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=29.914) [and your users. You want to pay attention](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=33.028) [to the missing index warning column](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=35.336) [because that tells you that the cache plan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=37.65) [for this query has a missing index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=39.581) [warning, which might be something you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=41.89362499999998) [could easily fix to have a huge impact on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=43.22257142857143) [that query. You want to concentrate on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=47.1601111111111) [top five results first because you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=49.287) [going to find, with experience, that the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=50.56928571428572) [average elapsed times tend to trail off](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=52.92199999999999) [pretty quickly and if you focus on the top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=55.966285714285725) [five, you're going to get the most benefit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=58.16074999999999)[from your tuning effort. Now diving a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=59.83200000000002) [little deeper into this query, the elapsed](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=63.43699999999999) [times are in microseconds, not](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=66.28799999999998) [milliseconds. So make sure you understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=68.15783333333333) [that, it's going to take a million](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=70.41128571428571) [microseconds to equal 1 second. And you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=72.794) [want to look for wide variations between](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=75.739) [the minimum, average, and max elapsed time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=77.74275) [because that could indicate a plan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=80.54657142857141) [stability problem that might be caused by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=82.65199999999999) [parameter sniffing, for example. And you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=85.27400000000002) [want to look at the execution count to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=86.81299999999999) [help evaluate whether this query is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=89.49199999999999) [executed very frequently or not, maybe it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=91.61666666666669) [takes a long time, but it's only executed](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=93.79825000000001) [once a day. So the fact that it takes 30](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=96.62950000000004) [seconds is not that big of a deal in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=99.24033333333337) [overall scheme of your workload. Now, you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=100.86544444444445) [also want to consider all the other](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=103.38225) [metrics that come back with this query to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=105.05985714285714) [help evaluate the importance of the query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=107.91033333333333) [that comes back in the top five to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=110.84233333333336)[understand whether it's worth your tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=113.16233333333335) [time. And then, you want to look at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=115.11375) [graphical execution plan for the top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=117.85457142857145) [queries to try to understand why they're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=119.86375000000001) [so expensive and they're taking so long to execute on average.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=12&mode=live&start=122.79416666666667)

[Demo: Top Average Elapsed Time Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live)

[In this demonstration, we're going to look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=1.656) [at the top average elapsed time queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=2.6) [for the entire instance. So this is going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=4.9205000000000005) [to pick up ad hoc queries and stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=7.424799999999999) [procedures. So when I run this against the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=9.875333333333334) [entire instance, it comes back with the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=12.40275) [queries that have used the highest average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=15.619714285714283) [elapsed time. And these times are in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=19.08875000000001) [microseconds, not milliseconds. So this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=21.78366666666667) [about 7/10 of a second for this one at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=24.186857142857143) [top. And, as you look at these results](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=27.01022222222221) [here, you see the average elapsed time,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=29.45975000000001) [the minimum, the max, and then the last](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=31.559) [elapsed time, and then the execution](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=35.912) [count. And you also get some other](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=38.81171428571428) [statistics like average logical reads,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=40.2505) [average physical reads, average worker](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=42.446) [time, and then this is sort of a key one,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=44.50699999999999) [the has missing index column. So if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=47.59355555555557) [see a 1 here, that means that the cache](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=50.3365) [query plan for that particular query has a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=52.508571428571436) [missing index warning in it. And then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=55.3805)[we've got the complete query text. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=57.8885) [then over at the far right, we have the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=59.679100000000005) [cached query plan, so we can look at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=61.876) [graphical execution plan for one of these](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=63.819) [and see what's going on. So this is really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=65.595) [useful for finding easy tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=68.854) [opportunities. So if you have a query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=71.39750000000001) [that's taking 10, 20, 30 seconds and maybe](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=73.40066666666664) [you can go in and do some tuning or index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=75.53455555555553) [tuning and then make that thing come back](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=78.45785714285718) [in less than a second, that can have a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=80.28500000000003)[huge impact on your application and make your user's lives a lot easier.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=13&mode=live&start=82.70388888888893)

[UDF Statistics by Database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live)

[UDF statistics by database. This query is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=1.631) [going to show information on scalar UDF](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=4.815428571428573) [usage across all the databases on your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=7.029) [instance. Scalar UDFs are very well-known](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=9.75425) [performance issue for SQL Server. You](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=13.067) [really want to try to avoid using them,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=15.502555555555556) [but if other people have already been in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=17.507) [there doing this, you just want to find](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=18.797) [them and see what you can do to tune them.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=20.714) [So you want to consider refactoring scalar](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=23.911) [UDFs by changing them to table valued UDFs](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=26.109) [that would just return one column and one](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=29.903) [row, for example, as one way to refactor](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=32.673) [it. Going further into this query, scalar](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=35.6827777777778)[UDF code gets executed for every row in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=38.186375) [the ResultSet. So it's row by agonizing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=41.636375) [row execution. And to make it worse, it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=43.767) [doesn't show up the way it should in your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=47.33244444444445) [execution plan, so it's kind of hard on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=49.17375) [older versions of SQL Server to find out](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=51.42333333333333) [where UDFs are being called. But this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=53.866) [query is going to give you a lot of good](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=55.8146) [information to help you track down the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=57.34225000000001) [scalar UDF code. You want to consider](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=60.25725) [in-lining scalar UDF code if possible. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=63.131571428571434) [if it's doing something very trivial in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=64.80771428571427) [the UDF, you can just pull that code out](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=67.76933333333334) [of the scalar UDF into the query or stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=70.26855555555557) [procedure that called the scalar UDF in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=73.296) [the past and often get a huge performance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=75.09937500000004) [benefit just by some simple refactoring.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=77.669) [Converting to a table-valued UDF that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=82.1)[returns one value is another way of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=83.586) [handling this. And then finally, you might](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=85.682) [be able to that scalar UDF code to a T-SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=88.97255555555556) [stored procedure that gets called from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=91.7362857142857) [whatever stored procedure was previously calling the scalar UDF.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=14&mode=live&start=93.823)

[Demo: UDF Statistics by Database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live)

[In this demonstration, we're going to look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=1.5) [at UDF execution statistics by database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=2.988) [for the entire instance. So this is going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=5.891) [to pick up any scalar UDFs that are being](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=8.7882) [used across all your databases. So when I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=11.666625000000002) [run this query, it comes back and on many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=14.193499999999998) [instances, you're going to see msdb show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=16.90675) [up quite a bit because Microsoft has a bad](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=19.99877777777778) [habit of using scalar UDFs inside of msdb.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=22.430888888888887) [But we also have one of our user databases](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=25.582) [coming back with this scalar UDF, and it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=27.801) [shows you some statistics about your UDF](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=31.89114285714286) [usage, so you see the total worker time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=34.22555555555555) [and the execution count, and the total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=37.071875) [elapsed time, along with the average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=40.053) [elapsed time and the last elapsed time,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=42.357) [and then also the last execution time and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=44.938) [the cached time. So hopefully this comes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=48.139) [back clean because your developers and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=50.765) [other DBAs are not using scalar UDFs, but](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=52.743) [if you come back and you find a lot of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=55.60963636363636)[UDFs in your databases, then you want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=57.596) [start talking to the developers and other](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=60.291) [DBAs about what can we do to not use these](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=62.48) [scalar UDFs? So if you can inline the code](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=66.35) [and the scalar UDF into the stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=70.13) [procedure or query, or convert it to a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=71.841) [table valued function, or convert it to a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=74.506) [T-SQL stored procedure, those are all common refactoring methods.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=15&mode=live&start=77.2235)

[Missing Indexes for All Databases](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live)

[Missing indexes for all databases on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=1.877) [instance. This is a very, very useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=4.7330000000000005) [query for index tuning, but you want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=6.693666666666665) [make sure not to over-index based on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=9.21388888888889) [results of this query by itself. That's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=12.270142857142856) [very common mistake that I see people](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=14.612428571428572) [doing. You need to understand how long the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=17.331833333333336) [instance has been running before you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=19.94) [evaluate the results of this query because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=21.3) [it makes a big difference if it's just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=23.621) [been running for a few hours or a few days](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=24.64411111111112) [versus many weeks or even months. You also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=27.279) [need to understand your entire workload](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=30.763999999999996) [and the existing indexes on your databases](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=32.06614285714286) [before you start making changes based](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=35.03366666666666) [solely on the results of this query. Now](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=37.7645) [going further into this query, it's going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=42.03366666666667) [to give you missing index suggestions for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=44.21099999999999) [all the databases on the instance. And be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=46.06399999999999) [aware that SQL Server, with this query,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=49.757) [tries to cover every single query that has](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=52.267999999999994) [any kind of a missing index request, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=55.05466666666668) [quite often you're going to get a lot of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=58.02085714285713) [duplicate index and overlapping index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=61.28924999999998) [suggestions when you run this query. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=63.065) [it's better to create a fewer number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=65.984625) [wider indexes, and by wider indexes I mean](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=69.009375) [indexes that have more columns in them,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=71.44714285714288) [rather than more narrow indexes when](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=74.07757142857143) [you're creating additional indexes based](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=76.8378) [on what this query is telling you to do.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=78.50124999999998) [And you want to very carefully consider](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=81.42833333333331) [the average total user cost, which is a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=84.18016666666666) [measurement of how expensive it is, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=88.04475000000001) [the average user impact, and the number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=90.53066666666668) [user seeks. So those columns are going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=93.778) [help you determine how important this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=95.71224999999995) [particular missing index is for the query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=98.38719999999998) [that's requesting it. And then you'll want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=101.04828571428568) [to consider the volatility of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=103.57628571428575) [particular table as you create additional](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=105.83733333333332) [indexes. So it's a very volatile table](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=107.95616666666669) [with lots of insert, updates, and deletes.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=109.97333333333336) [You want to be more cautious about adding additional indexes.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=16&mode=live&start=112.695)

[Demo: Missing Indexes for All Databases](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live)

[For this demonstration, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=1.291) [look at missing indexes for all databases](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=1.9844285714285719) [ordered by index advantage. And this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=5.269) [going to look at all the databases on your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=8.004999999999999) [instance and look for any missing index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=10.070857142857143) [requests that SQL Server has a record of.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=12.594428571428573) [So when I run this, this comes back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=15.776777777777777)[shows us the index advantage on the far](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=18.5915) [left, and that's a calculated number that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=20.776500000000002) [is sort of a measurement of how important](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=22.545142857142856) [this potential new index might be, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=25.47666666666667) [whether or not a certain number is large](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=27.447222222222226) [enough to be significant depends on how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=29.868999999999996) [long SQL Server has been running. Has it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=32.14828571428572)[been running just for a few hours or a few](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=34.38474999999999) [days, or has it been running for many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=36.749727272727256) [weeks or months? Because the longer it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=38.90214285714285) [been running, the larger this index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=41.12933333333335) [advantage has to be before it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=42.937714285714286) [be important to your workload. Now the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=45.45675000000001) [last user seek column is the last time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=48.11028571428571) [that SQL Server wanted this index, and you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=50.64112500000001) [need to look at that and compare it to the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=53.216750000000005) [current time and see, is that a few](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=56.64233333333333) [seconds or a few minutes ago? If that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=58.44020000000001)[the case, that's going to tell you that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=61.094999999999985) [whatever query is triggering this is part](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=63.556285714285714) [of your regular workload and you need to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=65.37625) [pay more attention to it. But if it was](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=67.32325) [from several days or several weeks ago,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=69.52787499999998) [then it's probably just an ad hoc query or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=72.072) [a reporting query that's not run very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=75.058) [often, so it's not quite as important to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=76.976) [your total workload. But again, that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=79.548) [going to vary based on your workload and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=82.00025) [your business requirements. And then if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=84.18)[you look at the next column, database,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=85.83366666666666) [schema, and table, that's telling you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=87.7435) [database and the schema and the table that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=90.82357142857144) [this requested index would be on. And then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=93.12100000000001) [we've got a couple of columns,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=95.24633333333337) [missing\_indexes\_for\_table, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=97.291) [similar\_missing\_indexes\_for\_table, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=100.249) [this is telling you how many missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=101.69775) [indexes we have according to the query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=103.096) [optimizer for this table as a whole and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=106.078) [how many of those are similar to each](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=108.557) [other that maybe you could combine into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=110.0476666666667) [just one wider index, because you want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=113.15750000000001) [try to do that rather than having lots of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=115.02066666666664) [narrow indexes with just one or two](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=117.83157142857146) [columns in them. And then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=120.2006666666667) [equality\_columns is the columns that are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=122.60750000000002) [showing up usually in the where clause of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=124.69112499999999) [a query or in a join, and the same way for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=126.84866666666665) [inequality\_columns, but instead of being](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=130.50500000000002) [equal, you're going to have a less than or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=131.70149999999998) [greater than, so usually they're in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=134.04557142857138)[where clause, but they can also be in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=135.88542857142863) [join clause sometimes. And then finally,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=138.08759999999992) [you've got included\_columns, and that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=139.711) [showing you columns that would be in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=142.002) [select portion of the query. And you need](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=144.63487499999997) [to be warned that SQL Server really tries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=147.583) [hard to create a covering index, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=149.8932857142857)[sometimes it might include every single](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=152.59666666666666) [column in the table that's not part of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=155.73324999999997) [equality or inequality columns. So just be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=158.956) [aware of that. And then when you go far to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=161.40599999999998) [the right here, you've got](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=164.825) [average\_user\_impact, which is the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=166.96066666666667) [percentage that the query optimizer](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=168.4512857142857) [believes that the cost of this particular](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=170.23542857142857) [query that triggered this request would be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=173.552) [reduced, so higher numbers are more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=175.91328571428573) [significant. And then average user cost is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=178.507) [a measure of how expensive it is not to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=180.96499999999997) [have this index for the particular query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=184.28600000000003) [that triggered it, so higher numbers are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=186.87942857142858) [more significant. And then user\_seeks,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=189.465)[that's how many times SQL Server has](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=191.7681428571429) [wanted this index. So by looking at all](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=194.76850000000002) [these numbers together and then looking at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=197.48562499999997) [your existing indexes, and taking a look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=200.49957142857147) [at how volatile the tables are that are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=203.04600000000002) [involved here, you can do a much better](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=205.64866666666666) [job of creating new indexes. But what you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=208.47466666666665) [don't want to do is don't just run this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=210.7085) [query and decide I'm going to create 50](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=212.97200000000004) [new indexes, because that's usually a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=215.44728571428573) [really bad thing to do. It's very easy to abuse this and over-index your tables.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=17&mode=live&start=217.27585714285712)

[Connection Counts by IP Address](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live)

[Connection counts by IP address. This is a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=1.912) [good indicator of your relative workload.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=5.308666666666668) [So understanding whether you're seeing 100](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=7.158) [connections or 500 connections or 1000,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=8.857) [it's a really good idea to understand that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=11.144875) [as a baseline. And it's very useful for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=14.084375) [troubleshooting connectivity issues. So if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=17.34)[somebody is saying that they can't connect](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=19.153750000000002) [to your instance of SQL Server and you run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=20.83742857142857) [this query and you see connections from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=23.8685) [that IP address, that's pretty useful to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=25.7272) [understand that. So I'm going to show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=28.54333333333333) [where your connections are coming from. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=30.148500000000006) [if you've got multiple application servers](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=31.8205) [or multiple web servers or just multiple](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=33.67671428571428) [individual users coming in and hitting](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=36.358333333333334) [your SQL Server instance, this will help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=38.4824) [you understand that. Now going deeper into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=41.480000000000004) [this query, it's going to aggregate the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=44.38866666666665) [connection counts by IP address, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=46.02066666666667) [that's usually useful in an end tier kind](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=48.25857142857142) [of an application architecture where](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=51.16725000000001) [you've got middle tier servers that have a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=53.205200000000005) [high number of connections coming in from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=56.03200000000002) [that server to your database instance.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=58.796) [It's going to show you the program\_name](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=61.603) [for the connection, it's going to show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=62.652) [the host name for that connection, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=65.098) [then finally the login\_name for the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=67.209375) [connection. So this is all nice to know](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=69.44962499999997) [sort of as a baseline, and also, if things](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=71.26563636363632) [are running poorly, then you can come in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=73.86285714285717) [here and run this query and find out that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=75.95466666666667) [you're running a much higher number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=77.84150000000002) [connections than usual. That's nice to know as part of your diagnostic process.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=18&mode=live&start=80.16187500000002)

[Demo: Connection Counts by IP Address](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live)

[For this demonstration, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=1.573) [look at the query that gives you a count](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=2.539) [of your SQL Server connections by IP](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=4.0872) [address. So they're ordered by or grouped](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=7.669000000000001) [by IP address. And when you run this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=10.473333333333334) [query, it comes back and tells you if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=13.625333333333336) [had any remote connections, it would show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=16.272125) [you the IP address. In my case, they're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=18.3865) [all local connections. And then it shows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=21.536) [you the program name that's connected to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=23.618500000000004) [your SQL Server instance and tells you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=25.745499999999996) [host name and the login name. So you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=28.251625000000004) [see where they're coming from. And then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=30.517749999999996) [finally, the connection count. And why](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=33.064) [this is useful in real life is that quite](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=34.8194) [often you'll have multiple web servers or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=37.417833333333334) [application servers and you may have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=39.48485714285714) [people connecting directly from their](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=41.58183333333333)[desktop to a SQL Server instance and you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=43.281) [can see where your load is coming from and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=46.206) [who's logged in to your instance, and it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=49.05171428571428) [also useful for troubleshooting connectivity issues.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=19&mode=live&start=51.906)

[Module Summary](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live)

[So what have we covered in this module? In](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=1.889) [this module, we covered how to run and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=4.359555555555556) [analyze 10 activity-related instance issue](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=5.5) [queries. Now I've talked about how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=8.965428571428571) [interpret the results of these queries so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=10.903142857142857) [you can better understand what the results](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=12.911428571428571) [mean. We also covered some useful methods](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=14.448857142857143) [for alleviating many common](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=17.4286) [activity-related instance issues, so you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=19.727) [can better apply what you've learned by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=22.187499999999996) [running and interpreting these queries. In](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=24.417166666666667) [the next module, I'm going to cover how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=27.153333333333336) [diagnose storage-related instance issues. So let's go.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=4ba7f277-376d-4fd5-b0b9-f691da15a6c6&clip=20&mode=live&start=29.1648)

[Diagnosing Storage-related Instance Issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live)

[Introduction and I/O Usage by Database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live)

[Hi, my name is Glenn Berry from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=0) [sqlskills.com. This course is about using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=4.1125) [DMV queries to diagnose performance issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=6.187500000000002) [with SQL Server 2017. And in this module,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=8.599714285714285) [I'll be discussing how to diagnose](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=11.588000000000003) [storage-related instance issues. In this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=14.558800000000002) [module, I'm going to cover five useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=17.83975) [queries for detecting and diagnosing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=19.204666666666668) [storage-related instance issues, which are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=22.013) [quite common with many SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=24.953) [instances. I'll be discussing how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=27.214999999999993) [interpret the results of each query and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=28.760571428571424) [how that relates to other information you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=30.6305) [may have collected about your storage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=32.827999999999996) [subsystem. I will also cover some useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=35.756) [methods for alleviating many common](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=37.440749999999994) [storage-related instance issues so you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=39.49175) [apply what you've learned by running and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=41.91828571428572) [interpreting these queries. We've got a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=44.638666666666666) [lot to cover in this module, so let's get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=46.08899999999999) [started. I/O usage by database. This query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=50.70857142857144) [shows which databases on the instance are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=54.16014285714285) [generating I/O, and it ranks them. It's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=56.6575) [going to be the cumulative I/O statistics](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=60.135285714285715) [since the last server restart, and that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=61.71066666666667) [important to keep in mind. And also, this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=64.23557142857143) [query is going to include all the I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=66.327) [activity, not just your regular workload.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=68.82733333333331) [So things like database backups, running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=70.828)[DBCC, CHECKDB, doing any kind of index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=73.936) [maintenance, any HADR-related activity](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=77.2175) [that's I/O related, that's all going to go](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=80.4625) [into these numbers. So going further into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=82.5865) [this query, it shows the total cumulative](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=84.93600000000002) [I/O activity for each database on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=87.92314285714289) [instance. And it's going to help you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=91.54316666666668) [understand which databases are generating](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=93.57550000000003) [the most I/O activity, which if you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=95.59500000000001) [seeing any kinds of I/O bottlenecks at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=97.99128571428572) [instance level, this is important to know](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=101.10899999999998) [so you know which databases to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=102.67562499999998) [more closely. So once you identify that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=105.05114285714286) [database, you can do more detailed](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=107.88950000000001) [analysis of why it's generating so much](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=109.76062500000002) [I/O. And one reason might be, part of it,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=112.1384) [just the size of the database because,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=114.941) [again, this includes database backups and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=116.213) [it's a very large database, you're backups](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=119.429) [are going to generate more activity. So,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=122.0595) [doing index and query tuning, along with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=124.615) [using SQL Server data compression or using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=128.28966666666665) [column store indexes, can help dramatically reduce your I/O activity.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=0&mode=live&start=130.2865)

[Demo: I/O Usage by Database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live)

[For this demonstration we're going to take](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=1.986) [a look at a diagnostic query that gives](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=2.9) [you the total I/O utilization by database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=4.163111111111111) [for all your databases on the instance. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=7.4769999999999985) [when I run this query, it comes back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=11.0511) [shows me the I/O Rank in the first column,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=12.555) [and then the Database Name, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=16.128)[Total I/O in megabytes, and this includes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=17.983) [all the I/O that's touched that database,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=21.074) [not just your regular workload, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=23.54) [it breaks it down into percentage, so you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=25.377499999999994) [can see the percentage at this database is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=27.49587500000001) [taken up as a whole compared to the entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=30.334) [instance. And then it breaks it down into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=34.1752) [Read I/O and Write I/O. And this is really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=35.9327777777778) [helpful because it helps you understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=37.81362499999998) [whether or not you have more of a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=39.39442857142856) [reporting style workload or more of an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=42.19400000000002) [OLTP sort of a workload for this database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=44.399999999999984) [as a whole. So, that's handy information](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=47.36114285714286) [to have. So, if you are seeing any signs](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=50.17766666666665) [of I/O bottlenecks or storage subsystem](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=53.74855555555555) [performance issues, understanding which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=57.153) [database is generating the most I/O is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=59.39900000000001) [really important, so then you can focus](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=62.19433333333334) [your efforts into looking at that database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=64.068) [to see why it's generating so much I/O and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=66.01300000000002) [what, if anything, you might be able to do about it.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=1&mode=live&start=69.09866666666667)

[Volume Information](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live)

[Volume information. This query returns all](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=1.883) [volumes that have any SQL Server database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=4.538857142857143) [files. So if you've got other volumes that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=7.2556) [don't have any SQL Server database files,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=9.108499999999998) [they won't show up on this query. And it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=10.847) [going to give you the total size and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=13.393999999999998) [available space on that volume or logical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=15.552000000000001)[drive. The available space can potentially](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=19.187) [affect your storage performance depending](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=21.965000000000003) [on what's going on with the underlying](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=23.627333333333333) [storage, and this can be true with both](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=25.666285714285717) [magnetic storage and with flash storage.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=28.55771428571429) [Going further into this query, it's going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=31.698) [to give you the volume mount point, the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=34.20375) [file system, whether it's NTFS or REFS,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=36.24842857142857) [for example, and the logical volume name.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=39.054428571428566) [Also, it tells you the total size of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=41.5105) [volume, how much space is available, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=44.5945) [then your available space percentage. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=47.433857142857136) [it's going to give you whether it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=50.4855) [compressed or not at the volume level,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=51.952) [whether there's sparse files, and whether](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=54.132) [there's alternate streams. Finally, again,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=57.05479999999999) [it's really important not to run out of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=59.509) [disk space, for obvious reasons, but even](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=62.11366666666666)[running low on disk space is bad because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=63.89928571428573) [depending, again, on what's going on with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=66.79185714285715) [the underlying storage, you could lose](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=68.3492857142857) [quite a bit of performance as you get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=70.50099999999998) [lower on space because the short stroking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=73.18475000000001) [is not helping you with magnetic storage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=75.47514285714287) [and the fact with flash storage, you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=77.65442857142854)[not getting the benefit of lots of free](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=79.95814285714285) [space, so doing trim operations is more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=82.44642857142861) [expensive and your write performance tends to deteriorate as you get low on space.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=2&mode=live&start=85.37171428571425)

[Demo: Volume Information](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live)

[This diagnostic query returns volume](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=1.906) [information for all the logical drives](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=3.56) [that have any SQL Server files on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=5.519428571428572) [current instance. So when I run this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=8.677111111111111)[query, it's going to show me the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=10.598222222222226) [volume\_mount\_point, the file\_system\_type,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=13.3585) [the logical\_volume\_name, the total size of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=16.323) [the volume in gigabytes, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=19.384875) [available space and percentage of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=20.952) [available space on that volume. And you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=22.890333333333338) [want to make sure you don't run out of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=26.751399999999997) [disk space because that's obviously really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=28.104333333333333) [bad for SQL Server, but as you run low in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=29.900666666666666) [disk space, depending on the underlying](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=32.93371428571429) [file system or storage type, I should say,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=35.00933333333334) [that can have an effect on your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=38.28500000000001) [performance. So you want to keep an eye on that also.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=3&mode=live&start=40.16625)

[Drive-level Latency](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live)

[Drive-level latency. This query is going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=1.447) [to show you all the volumes that have SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=4.065777777777778) [Server database files and their cumulative](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=7.2892857142857155) [total average latency since SQL Server was](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=9.655000000000001) [last started. It includes all activities](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=13.099666666666666) [since the last SQL Server restart. So not](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=15.638571428571428) [just your regular workload, but again,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=18.59985714285715) [things like database backups, running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=21.168) [DBCC, CHECKDB, running index maintenance,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=23.2555) [anything that generates I/O activity](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=26.344) [against any of your SQL Server database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=28.13) [files will be included in these numbers.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=30.6) [And this is going to include the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=33.098) [drive-level read latency and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=35.133) [drive-level write latency. So going into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=37.627) [more detail on this query, it's all the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=41.59125) [I/O activity against all the SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=43.889875) [database files on each logical drive. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=46.300000000000004) [the latency numbers from this query are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=49.79114285714286) [going to be higher than you're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=51.080875) [see in most other tools, particularly SAN](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=52.72083333333333) [level tools. So don't let these numbers](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=56.04849999999999) [throw you off, it's more of a comparative](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=59.25887500000001) [tool and it's going to help you evaluate](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=61.9145) [the relative performance of each drive. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=64.16842857142856) [if you've got your SQL Server database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=66.848) [files spread across multiple logical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=68.43) [drives, this helps you compare the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=70.398) [performance of each one of them, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=72.845) [if you see high numbers here, you can do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=74.633) [further investigation. So, you want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=77.5136) [look for other confirming evidence of I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=79.71200000000002) [performance issues before you sound the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=81.98450000000001) [alarm based just on this one query. So you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=84.04910000000001) [want to look for I/O related wait types,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=87.104) [for example, and you want to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=89.255) [file-level latency, and things of that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=90.839) [nature before you decide, oh I've got really bad performance on this drive.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=4&mode=live&start=93.395)

[Demo: Drive-level Latency](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live)

[For this diagnostic query, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=1.9) [take a look at drive-level latency](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=2.621) [information. So this is going to be all](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=5.429857142857143) [the drives, all the logical drives, that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=7.691555555555555)[have any SQL Server database files on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=9.711142857142859) [them. And when I run this query, it comes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=12.580666666666666) [back and shows me the drive letter and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=14.966333333333331) [then the mount point, if there are any,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=17.133666666666667) [and then shows you the read latency and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=19.035) [the write latency and the overall latency,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=20.98522222222221) [all measured in milliseconds. And it also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=24.059) [is going to show you the average bytes per](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=26.773) [read, the average bytes per write, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=29.464285714285715) [then the average bytes per transfer. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=32.36233333333333) [this helps you understand your workload a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=34.305) [little bit better. But what most people](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=36.321250000000006) [are going to focus in on are the read](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=37.666) [latency numbers and the write latency](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=39.8085) [numbers. And this is pulling from virtual](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=42.547999999999995) [file stats, and the numbers are going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=45.07057142857141) [include everything that's touching those](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=48.15550000000002) [database files, not just your regular](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=49.80400000000001) [workload, so you're usually going to see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=52.17866666666668) [higher latency numbers here than you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=54.10814285714287) [going to see in Windows PerfMon or on a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=56.29671428571427) [SAN monitoring tool, for example. So don't](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=59.675) [get too excited about the absolute numbers](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=62.50299999999999) [here. What you want to look at is sort of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=64.22344444444444) [the comparative numbers, and see which of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=67.233) [your drives have the highest latency for reads and for writes.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=5&mode=live&start=69.6385)

[I/O Metrics by File](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live)

[I/O metrics by file. This query gives you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=1.867) [the cumulative I/O statistics for each SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=4.755000000000001) [Server database file. So not just at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=7.2672857142857135) [drive level, like the previous query, but](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=9.849285714285715) [this goes into the file level. And it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=11.496999999999998) [going to show you the read and write](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=14.042333333333334) [latency for each file, and it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=16.3976) [show you the file size and location so you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=19.26044444444445) [know what drive and what directory and how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=21.383499999999998) [large that file is. And it's going to show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=23.7875) [you the numbers of reads and writes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=26.27566666666667) [against the file, so this helps you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=27.937) [characterize your workload, whether it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=30.17966666666667) [more of an OLTP workload with lots of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=31.637571428571427) [writes, or more of a reporting workload](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=33.75399999999999) [with lots of reads, and you know it at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=36.107857142857135) [file level. So going into more detail on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=39.50125) [this query, all the I/O activity against](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=41.84849999999999) [all the SQL Server database files on each](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=44.18528571428572) [drive show up in this query, and it's at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=46.78214285714287) [the file level rather than the drive](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=48.89366666666667) [level. And file-level latency is going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=51.22999999999998) [help you figure out which databases might](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=53.354142857142854) [have storage issues. And not just the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=56.49800000000001) [database, but the individual files within](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=59.361000000000004) [the database. So if you've got multiple](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=61.43699999999999) [data files and then your log file, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=63.76185714285716) [you're going to know that instead of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=65.34566666666666) [having to guess. And that's the beauty of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=66.70300000000002) [this query. and it's very common, in my](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=69.06285714285711) [experience, to see high right latency for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=72.18857142857144) [tempdb data files. And it's also quite](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=75.1496666666667) [common to see high read latency for user](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=77.6305) [database data files. So that's something](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=80.69785714285713) [you've going to see a lot of times when](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=82.56675000000001) [you run this query, and there's different](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=84.23549999999999) [ways to try to alleviate both those issues.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=6&mode=live&start=85.59971428571428)

[Demo: I/O Metrics by File](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live)

[For this diagnostic query, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=1.833) [look at the average latency per read and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=2.875) [write, broken down at the file level. The](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=5.887) [previous query looked at the logical disk](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=8.742857142857144) [level, and we're going to look at the file](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=10.679875000000001) [level when we run this query. And I'll](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=12.135750000000002) [scroll over and show you the rest of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=14.613555555555555) [query here, it's fairly large, and so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=17.34957142857143) [that's what it looks like. And we'll go](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=20.157571428571426) [ahead and run this, and this shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=22.063000000000002) [database name and then the average read](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=24.821428571428577)[stall in milliseconds, the average write](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=26.80257142857143) [stall in milliseconds, and the average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=28.850000000000005) [total stalls in milliseconds, and then it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=31.484400000000004) [shows you how big the file is and where](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=35.16714285714285) [it's located, which is really useful to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=38.73666666666668) [understand. And it tells you the total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=41.95399999999999) [read milliseconds and the number of reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=45.514428571428574) [and the total write milliseconds and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=48.03814285714284) [number of writes, and the number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=49.81466666666667) [stalls, and then whether resource governor](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=53.61042857142858) [has been involved in throttling I/O to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=55.48333333333333) [this file. So this helps you understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=58.48749999999998) [which one of your database files is seeing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=61.172999999999995) [the highest read latency and the highest](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=64.32642857142858) [write latency and where it's located in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=67.727) [the file system, and so it's really useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=70.05375) [to understand which of your databases is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=72.4875) [causing the most pain from a storage subsystem perspective.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=7&mode=live&start=75.35825)

[I/O Warnings](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live)

[I/O warnings. This query shows any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=1.774) [15-second I/O warnings from the 5 most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=4.28) [recent SQL Server error logs. And you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=7.285) [easily modify that query to look further](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=9.968125) [back in time if you really want to. Now](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=11.285999999999998) [15-second I/O warnings are very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=13.853142857142858) [significant events. That's an eternity for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=16.389) [a storage subsystem to complete an I/O.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=18.993857142857138) [And you want to look for any kind of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=21.47155555555556) [patterns you might see if you see those](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=24.16911111111111) [warnings in the error log. So, are they](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=26.021625) [always happening at the same time of day?](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=28.097250000000003) [Are they always happening on the same](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=30.339) [drives with the same files? Because that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=32.425749999999994) [could be very significant and tell you one](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=34.91966666666667) [thing. And if you don't see any kind of a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=37.47700000000001) [pattern, it's just sort of all over the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=39.26839999999998) [place, different times of day, different](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=40.644625) [files, that's just pretty good evidence of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=43.19799999999999) [generally poor storage performance. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=45.3) [going further into this query, these I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=49.57333333333333) [warnings are a lot more difficult for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=51.95225) [storage admins to just dismiss and ignore.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=54.135000000000005) [A lot of times you'll show them some of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=57.817) [the other previous queries where you see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=58.843900000000005) [high latency, and they'll look at their](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=61.39142857142856) [tools and then just sort of dismiss your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=64.07014285714286) [results, oh well, that's not a big deal,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=66.09662500000003) [the SAN thinks that it's fine. But with a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=68.807) [15-second I/O warning, that's really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=70.81549999999999) [significant, and that's really strong](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=72.97533333333334) [evidence of some sort of an issue. And you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=74.55628571428572) [want to look for those repeating patterns](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=77.08799999999997) [of the same drive and the same file or the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=79.13414285714288) [same time of day because maybe you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=82.07266666666666) [running DBCC CHECKDB at 3:00 AM and that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=84.14499999999998) [temporarily over stressing your system,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=87.55728571428574) [and having things like DBCC CHECKDB](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=90.927) [running while you're doing index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=92.91642857142854) [maintenance, you know, any kind of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=95.18719999999998) [overlapping maintenance activity can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=96.73366666666666) [temporarily overstress your storage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=99.07825000000001) [subsystem, so maybe you can go in and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=100.90724999999999) [change that scheduling to help relieve](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=103.07433333333331) [that temporary overstress. And again, you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=105.90871428571428) [always want to look for whatever you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=108.293875) [do as a SQL Server DBA to reduce your I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=110.18166666666666) [requirements. You don't just go to the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=113.4102) [storage admin and tell them that their](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=115.24400000000003) [storage subsystem is performing poorly.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=117.44957142857145) [You want to go through and do what you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=118.96085714285715)[do to reduce how much I/O that SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=121.4915) [is generating. And once you've done](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=124.41966666666664) [everything that you possibly can, then you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=125.92342857142856) [can go to the storage admin and say, okay,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=127.95400000000002) [I've done all this stuff, and what can we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=130.571625) [do to make the SAN, or whatever storage we're using, perform better.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=8&mode=live&start=132.82439999999997)

[Demo: I/O Warnings](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live)

[For this diagnostic query, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=2.232) [look at I/O requests that have been taking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=2.83) [longer than 15 seconds, and we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=5.1) [look at the 6 most recent SQL Server error](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=6.7) [logs to do that. Anytime you have an I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=9.562) [that takes longer than 15 seconds, SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=12.517) [Server will put it in the SQL Server error](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=14.59988888888889)[log, but you might not notice it unless](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=16.458750000000002) [you're looking really closely. So running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=18.6534) [this query will help you find if you've](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=20.631499999999996) [got any of those. So when I run this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=22.466) [query, my storage subsystem is very, very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=24.96666666666666) [fast, and I don't have enough of a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=27.614285714285717) [workload to have generated a 15-second I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=29.995) [warning, and that's good. That's what you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=32.7475) [want to see. Hopefully if your server is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=33.94857142857144) [running properly and you've got a good I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=36.571) [subsystem, you're not going to see any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=39.280857142857144)[15-second I/O warnings. But if you do,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=41.778) [what you want to do is see if there's any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=44.12200000000001) [kind of a pattern in the results. It is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=47.2277) [always happening to the same files on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=49.81311111111112) [same drives? Is it always happening at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=52.06914285714286) [same time of day? Because that might tell](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=54.88133333333333) [you that it's being caused by some](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=57.330000000000005) [maintenance activities, such as running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=59.95380000000001) [DBCC CHECKDB, or doing index rebuilds, for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=63.3334) [example. But if it's no pattern and it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=66.05099999999997) [just all over the place with different](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=68.03744444444449)[files and different times of the day,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=69.97157142857144) [that's pretty good evidence that your I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=72.502) [subsystem is performing very, very poorly,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=74.379) [and it's much harder for a storage admin](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=77.543) [or a SAN admin to just blow off 15-second](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=80.372) [I/O warnings compared to high latency from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=83.861) [some of the previous queries we just looked at.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=9&mode=live&start=88.243)

[Module Summary](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live)

[So what have we covered in this module? In](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=1.686) [this module we've covered how to run and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=3.825888888888889) [analyze five useful storage-related](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=4.985) [instance level queries. I've talked about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=7.771) [how to interpret the results of these](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=10.457714285714285) [queries, so you can better understand what](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=11.950624999999999) [the results actually mean. We also covered](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=14.056666666666667) [some useful methods for alleviating many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=16.703142857142858) [common storage-related instance issues. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=18.994500000000002) [you can better apply what you've learned](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=21.29414285714286) [by running and interpreting these queries.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=23.5555) [In the next module, I'm going to cover how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=26.837) [to diagnose memory-related instance issues. So let's get going.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=68368d82-f15f-48f9-b98b-de3e33572dc8&clip=10&mode=live&start=28.707)

[Diagnosing Memory-related Instance Issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live)

[Introduction and System Memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live)

[Hi, my name is Glenn Berry from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=0) [sqlskills.com. This course is about using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=4.188625) [DMV queries to diagnose performance issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=6.104857142857144) [with SQL Server 2017. And in this module,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=8.539200000000001) [I'll be discussing how to diagnose](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=11.69) [memory-related instance issues. In this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=13.803) [module, I'm going to cover eight very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=18.08925) [useful queries for detecting and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=19.916) [diagnosing memory-related instance issues,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=21.651) [which you often see with many SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=25.049) [instances. I'll be discussing how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=28.5921111111111) [interpret the results of each query and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=29.756428571428575) [how that relates to other information you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=31.73375) [may have collected about your memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=33.886999999999986) [useful. I'll also cover some useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=36.71525)[methods for alleviating many common](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=38.627999999999986) [memory-related instance issues, so you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=40.75600000000001) [apply what you've learned by running and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=42.46585714285715) [interpreting these queries. We have a lot](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=45.15549999999999) [of cover in this module, so let's get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=47.31666666666667) [started. System memory. This query shows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=51.75583333333333) [you how much memory is in your system, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=54.26985714285714) [your system memory amount is a pretty good](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=57.474375) [indicator of the size of the system. You](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=59.006375) [know, it makes a big difference whether](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=60.998999999999995) [you have 16 gigs of RAM or 512 gigs of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=62.434) [RAM, for example. And this gives you a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=65.97854545454544) [quick idea of that. And you also are going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=68.03749999999998) [to find out whether or not Lock Pages In](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=70.44188888888885) [Memory is enabled with this query. And I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=72.68) [tend to advise people to enable Lock Pages](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=76.04025) [In Memory for SQL Server, and this will](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=77.65114285714286) [tell you whether that's been done or not.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=79.90200000000002) [The system memory state is also an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=81.639) [indicator of external memory pressure. So,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=84.268875) [if the operating system is under memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=87.04814285714286)[pressure, you'll find out from this query.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=89.62175) [What you're looking for for the system](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=92.889) [memory state is available physical memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=94.352) [is high. You want it to say that. If it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=96.488) [says any other value, you're under](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=98.73266666666667) [external memory pressure. So going further](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=100.80520000000001) [into this query, it's going to give you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=103.37200000000001) [the total and the available memory at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=105.65050000000001) [operating-system level. So this is not SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=108.419) [Server, it's what the operating system](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=110.73133333333335) [thinks about memory. And System Memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=112.47200000000001) [State shows whether the OS is under memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=115.18871428571428) [pressure or not. And that's just a flag](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=118.15899999999999) [that the OS can set to signal any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=120.53144444444442) [applications or services that are running,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=122.823) [that they should release some memory back](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=124.9487142857143) [to the operating system. And the desired](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=127.48814285714288) [state you want for system memory state,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=129.73774999999998) [again, is available physical memory is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=131.98833333333332) [high. There's several other messages you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=134.44066666666666) [might get and if you see those that means](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=136.19555555555556) [you're under memory pressure. If you do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=139.20233333333334) [see that and you are under memory pressure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=141.7235) [at the OS level, the quickest thing you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=143.8682) [can do to help alleviate that is reduce](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=146.45049999999998) [your max server memory value in SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=148.59657142857142) [Server, which means less memory is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=151.58000000000004) [available for the SQL Server buffer pool](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=153.79428571428568) [to use. And other things you might want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=156.1478571428572) [do is add more memory to the physical or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=158.53187499999999) [virtual machine or go in and do some query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=161.136) [tuning or index tuning to reduce how much](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=163.757) [memory that SQL Server is using. So those](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=166.54) [are all things that you can do, but you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=169.24611111111113) [just want to make sure that the operating](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=171.1698888888889) [system is not under memory pressure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=172.56966666666668) [because that could ultimately make the operating system crash.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=0&mode=live&start=174.8888)

[Demo: System Memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live)

[For this demonstration, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=1.517) [take a look at what's going on with our](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=2.6167142857142855) [operating system memory. So when I run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=4.914) [this query, it comes back and tells me](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=7.309444444444444) [that I've got 64 gigs of RAM in the system](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=9.421899999999997) [and I've got 49 gigs roughly available](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=12.257666666666665) [memory. It also talks about the page file,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=14.348714285714285) [which to be honest, is not that important](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=17.04877777777778) [for SQL Server. If you're using the page](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=19.25075) [file for SQL Server, you're going to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=21.738374999999998) [really unhappy with your performance. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=23.71699999999999) [if I scroll over to the right, it tells me](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=25.456) [the system memory state, and this is a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=28.378285714285713) [really important column from this query.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=30.824000000000005) [What you want to see is what you see here,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=32.496333333333325) [available physical memory is high. If you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=35.119) [see anything besides that, that means that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=38.349333333333334) [you're under external memory pressure, the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=41.045500000000004)[operating system is running low on memory,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=43.0942) [and that's something you really want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=45.72) [avoid. So this is a useful query that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=47.939) [shows you the operating system's view of memory.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=1&mode=live&start=49.75399999999999)

[Process Memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live)

[Process memory. This query tells you how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=1.98) [much physical memory is actually being](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=4.69) [used by the SQL Server process for the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=6.650285714285716) [instance that you're connected to, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=9.321125000000002) [it's also going to show you whether or not](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=11.588857142857146) [lock pages in memory is enabled. And it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=13.706000000000001) [also has a couple of columns that show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=16.51088888888889)[process memory flags for physical memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=19.197142857142858) [and for virtual memory. And to be honest,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=21.7076) [those aren't quite as useful as the other](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=24.214999999999996) [columns in this query. So going further](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=26.601000000000003) [into this query, it's going to show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=29.2645) [the actual SQL Server memory usage. Don't](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=31.324624999999997) [believe what you might see in Task](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=34.32966666666667)[Manager. What you see from this query is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=35.82533333333335) [the actual amount of memory that the SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=37.80144444444443) [Server process is using when you run the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=40.07585714285714) [query, and it's going to show you whether](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=42.72825000000002) [or not lock pages in memory is enabled. If](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=44.00377777777777) [you see a value above 0 for the lock pages](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=46.2682) [column, that means lock pages in memory is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=48.51757142857143) [enabled. And it's going to show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=51.354) [whether or not the SQL Server process is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=53.544375) [low on physical memory. It's a bit field](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=55.9546) [and 0 or 1. And also whether or not the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=58.9485) [SQL Server process is low on virtual](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=61.164999999999985) [memory. And to be honest, it's very, very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=63.22533333333333) [unusual to see either one of those come](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=65.67975)[back with a value of 1. There's other ways](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=68.46842857142857) [to look at internal memory pressure, like](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=71.1512857142857) [page life expectancy, that are much more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=73.474) [reliable, in my experience. But those columns are there.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=2&mode=live&start=76.03740000000002)

[Demo: Process Memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live)

[In this demonstration, we're going to take](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=1.959) [a look at SQL Server's memory usage. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=2.974) [we're looking at sys.dm\_os\_process\_memory.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=5.7905) [And when I run this query, it comes back](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=9.047) [and tells me that I'm using nearly 20](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=11.078666666666665) [gigabytes of memory. And you'll want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=13.3052) [believe this, not what you might see in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=15.909)[Windows Task Manager. The next column is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=18.749999999999996) [showing me that lock pages allocation in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=20.875499999999995) [megabytes is 0. And that tells me that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=23.633000000000003) [locked pages in memory is not enabled on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=26.108375000000006) [this instance. And if I scroll over to the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=29.292857142857134) [right, it also shows me large pages, 0, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=31.71437500000001) [that's not enabled, and then it shows me](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=35.568749999999994) [the page\_fault\_count and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=38.0012) [memory\_utilization\_percentage, and I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=39.954) [usually don't pay that much attention to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=42.598499999999994) [those. But what I'd really like to focus](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=44.074999999999996) [in on here is process\_physical\_memory\_low](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=46.252) [and process\_virtual\_memory\_low. Those](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=48.672) [should both be 0. And it's very rare to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=51.6142) [see them not be 0. That would be an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=54.48) [indicator that SQL Server thought it was](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=57.22200000000001) [low on memory, and there's other ways,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=59.71) [such as looking at page life expectancy,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=61.16149999999999)[that's more reliable, in my opinion. So if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=62.708) [you go back over here, this is the most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=65.15955555555557) [important thing is SQL Server's Memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=68.05275000000003) [Usage, that's how much the SQL Server buffer pool is using.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=3&mode=live&start=69.83228571428573)

[Total Buffer Usage by Database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live)

[Total buffer usage by database. This query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=1.4) [is going to give you the buffer usage for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=4.321777777777777) [each one of the databases on your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=6.085777777777778) [instance, and that's how much memory each](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=8.318) [one of the database is using in the SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=9.976) [Server buffer pool. Now, it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=12.242) [help you understand which databases are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=14.452) [using the most memory, which is really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=16.596) [important to understand if you're under](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=18.265) [general internal memory pressure. It's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=20.752) [going to help you evaluate the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=23.059142857142856)[effectiveness of any data compression or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=24.878) [columnstore indexes that you're using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=27.1035) [because both of those types of compression](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=28.646) [will reduce how much memory is being used](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=31.437) [in the buffer pool. And it's also going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=34.778) [help you evaluate the effectiveness of any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=36.903) [index tuning you might have done. So if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=39.595) [you go in and do something with a new](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=41.33279999999999) [index that reduces how much memory is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=43.27014285714286) [being used by that index, it can be very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=45.763333333333335) [effective to help reduce your memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=48.53575) [pressure. So going further into this query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=50.94625) [helps you determine the source of your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=53.54925) [internal memory pressure. It also helps](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=55.82716666666666) [you focus your index and query tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=57.792428571428566) [efforts in the right direction. So again,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=60.17874999999999) [if you are seeing low page life expectancy](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=62.53757142857143) [and other signs of memory pressure, then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=65.42742857142858) [you now know which database is causing it,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=68.22600000000001) [so then you can focus your tuning efforts](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=70.60187499999998) [on that particular database to try to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=72.82085714285714) [reduce the memory usage as much as](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=75.26342857142855) [possible. And also, this is going to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=77.91016666666668) [validate whether or not you've done a good](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=80.30375000000001) [job with your index and query tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=82.3013333333333) [because if you've been doing that,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=84.42928571428571) [hopefully your memory usage by that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=86.367) [database will be going down over time, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=88.524) [running this query multiple times as you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=91.08757142857142) [go through that effort will help validate](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=93.11228571428572) [what you're doing is the right thing. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=95.122375) [using data compression, so page data](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=97.78842857142858)[compression or row data compression, or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=100.245) [using columnstore indexes, also is very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=102.48185714285714) [useful for reducing how much memory is being used by SQL Server.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=4&mode=live&start=104.485)

[Demo: Total Buffer Usage by Database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live)

[For this demonstration, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=1.925) [take a look at what databases are using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=2.846428571428571) [the most memory on the current instance.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=4.812222222222221) [And it looks at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=7.224)[sys.dm\_os\_buffer\_descriptors. And when I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=9.7456) [run this query, it can take a few seconds](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=11.078299999999999) [on a busy instance, by the way, so it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=13.19388888888889) [comes back and tells me all my databases](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=15.55788888888889) [and how much memory they're using in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=18.297714285714285) [buffer pool, and it breaks down the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=20.6548) [percentage. So you can see that the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=22.442600000000013)[NoCompressionTest database is using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=24.45257142857144) [virtually all the memory that's being used](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=26.023857142857146) [right now on this instance. And the other](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=28.944000000000003) [ones trail off really quickly. And that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=31.98) [a fairly common scenario you're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=34.17157142857143) [see, but in case it's not quite so clear](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=35.9238) [as this, understanding which databases are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=38.36833333333333) [your big memory users is really useful,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=40.46900000000001) [especially if you see other signs of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=43.273) [memory pressure, now you'll know which database is the biggest culprit.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=5&mode=live&start=45.427249999999994)

[PLE by NUMA Node](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live)

[Page Life Expectancy by NUMA Node. This](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=1.92) [query tells you how long data stays in a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=5.0465) [SQL Server data buffer pool in seconds.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=7.713666666666667) [That's what the value is, it's a PerfMon](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=9.27) [counter. And it's going to return separate](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=11.477111111111117) [values for each NUMA node. And this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=13.815285714285718) [valid whether it's a virtual machine or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=16.662750000000003) [physical machine. And the PLE is a good](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=19.5015) [measure of your internal memory pressure.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=22.785999999999998) [I think it's one of the most reliable](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=25.185) [measures, in fact. You want to watch the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=26.507) [PLE trend over time. So don't just run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=29.48877777777778) [this query once and think that the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=31.249500000000005) [situation is good or bad, it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=33.505125) [fluctuate during the day and over time, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=36.41185714285714) [that's why you want to watch the trend](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=38.15700000000001) [over time. So diving further into this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=40.508599999999994) [query, higher PLE values are always better](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=43.262166666666666) [than lower PLE values. And if you read](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=45.71600000000001) [something old on the internet about 300](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=48.712) [being a threshold or a good PLE value,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=50.643) [that's not good guidance anymore. You want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=54.134) [to watch the trend on your server and just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=57.2845) [know that higher is always better than](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=59.429500000000004) [lower. And you're PLE is going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=61.535999999999994) [fluctuate based on your query workload and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=64.085) [what's happened most recently, a single,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=66.4536) [you know, clustered index scan of a large](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=68.35314285714284) [table can make your PLE go down to 0. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=71.2596) [you should know what your normal PLE range](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=74.86266666666667) [is for your most important databases. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=78.32050000000001) [just know that it's doing to vary based on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=81.6605) [what's happening to your server. And index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=84.11628571428572) [and query tuning, along with data](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=86.5045) [compression and using columnstore indexes,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=88.612) [can definitely have a positive effect on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=91.218) [your PLE. So you want to look into those](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=93.68333333333332) [things if you're PLE tends to be on the low range.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=6&mode=live&start=95.688)

[Demo: PLE by NUMA Node](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live)

[For this demonstration, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=1.4) [take a look at page life expectancy for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=2.5142857142857147) [each NUMA node in the current instance.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=4.9662500000000005) [And this looks at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=7.212)[sys.dm\_os\_performance\_counters, a few](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=8.683) [Windows performance counters are exposed,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=11.117666666666668) [so you can get to them through T-SQL. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=12.708) [when I run this query, it comes back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=15.975999999999999) [says 6518. If I run it again a few seconds](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=19.109333333333332) [later, it's gone up to 6523. And that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=21.743777777777765) [what you would expect to see on a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=24.44233333333333)[relatively idle instance. And you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=26.18975) [looking for higher values, higher is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=29.052666666666667) [better than lower values here, and you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=31.613714285714288) [want to pay attention to what the trend is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=34.03822222222222) [and what the range is. So don't just run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=36.400571428571425) [it once and think, oh it's really bad or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=39.13599999999999) [it's really good, you want to pay](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=41.54250000000002) [attention to how it changes as your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=43.510222222222225) [workload fluctuates throughout the day and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=45.6534) [throughout the week. And this is a really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=47.87949999999999) [good indicator of internal memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=50.15750000000001) [pressure, if you have persistent, low page](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=51.751) [life expectancy. And people always want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=55.580000000000005) [know, what is low? Well, you might see an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=57.943499999999986) [old figure of 300 as being the threshold,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=59.792777777777765) [and that's far too low for modern systems](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=63.353) [with lots and lots of memory. I like to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=66.101) [see in the tens of thousands if possible,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=68.83033333333334) [but it depends, again, on how much memory is in your system and your workload.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=7&mode=live&start=71.35066666666667)

[Memory Grants Pending](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live)

[Memory grants pending. This query exposes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=1.2) [a Windows PerfMon counter through a DMV](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=4.4905) [and it's going to show you the number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=6.995) [processes that are waiting on a memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=9.044249999999996) [grant. And the desired value here is zero.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=12.143) [If it's ever above zero, that's a sign of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=14.704) [extreme internal memory pressure. So going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=17.417) [a little bit deeper into this query,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=21.53) [memory grants pending is a very strong](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=22.746714285714287) [confirming indicator of internal memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=26.012) [pressure. And if the value is above zero](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=28.335749999999997) [for any extended period, it means that you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=30.848750000000003) [have processes that are waiting for memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=33.129999999999995) [grants, and that's really bad for SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=35.597) [Server. That's just an extreme measure of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=37.88628571428572) [memory pressure. And you're also going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=40.46714285714285) [see very low page life expectancy if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=42.813) [that's happening. And it's pretty unusual](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=45.41) [and really bad for performance to see this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=49.109) [value above zero for sustained period of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=51.56) [time. So normally, this is going to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=54.80712500000001) [your final confirming measure or indicator of internal memory pressure.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=8&mode=live&start=56.72311111111109)

[Demo: Memory Grants Pending](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live)

[In this demonstration, we're going to look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=1.751) [at memory grants pending, which is another](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=2.992) [Windows PerfMon counter that's exposed](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=5.163) [through T-SQL, by looking at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=7.916) [sys.dm\_os\_performance\_counters. And when I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=9.526) [run this query, what I want to see is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=12.430333333333335) [memory grants pending is 0. And you need](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=15.417625) [to run this multiple times. And most of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=18.351374999999997) [the time, unless you're extremely low on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=20.738) [memory and you're under several internal](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=23.03116666666667) [memory pressure, it's going to be 0, but](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=24.868666666666662) [if it's ever above 0, especially for any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=27.134555555555547) [sustained period, that's a very, very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=29.892714285714277) [strong indicator that you're under extreme](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=32.90566666666667) [internal memory pressure. And that's something you do not want to see.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=9&mode=live&start=35.386)

[Memory Clerk Usage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live)

[Memory clerk usage. This query shows which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=1.809) [memory clerks are using the most memory in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=4.496714285714286) [SQL Server. So if you're under memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=7.576285714285713) [pressure, this will help you understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=9.786666666666669) [what is using most of your memory. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=11.484749999999998) [it's going to help you understand your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=14.080374999999998) [overall memory usage, regardless of which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=16.294333333333334) [memory clerks are using it. It's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=18.293999999999997) [help you spot cache bloating issues, so if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=20.77266666666667) [you've got lots of ad hoc queries and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=23.542999999999996) [plan cache for that particular type of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=26.11311111111111) [plan is really getting large, you'll be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=28.1345) [able to see it with this query. Diving](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=29.739999999999995) [further into this,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=33.50125)[MEMORYCLERK\_SQLBUFFERPOOL, you want that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=34.687) [to be your top consumer of memory. That](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=36.7958) [was a new memory clerk they added in SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=39.36355555555556) [Server 2012. So any version of SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=41.03225) [newer than that, this what you want to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=43.512375000000006) [using most of your memory. But you might](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=46.01357142857143) [see, it's very common to see,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=48.31733333333333) [CACHESTORE\_SQLCP as a very high value. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=50.722) [again, that's ad hoc and prepared query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=55.21211111111111) [plans. And you can help control that with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=58.67088888888888) [optimize for ad hoc workloads. So that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=61.55987500000002) [an instance level setting in SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=63.95825000000001) [2017, they actually added it way back in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=66.23785714285715) [SQL Server 2008, that helps control that.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=69.16211111111112) [It also might be necessary, and I have a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=72.365) [lot of clients doing this, to run DBCC](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=73.535) [FREESYSTEMCACHE (SQL Plans) periodically](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=76.756) [to flush out that cache entirely because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=80.704) [just turning on optimize for ad hoc](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=83.932) [workloads will store the planned stub](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=85.259) [instead of the entire plan in the cache.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=88.949) [So you might have a lot of stubs in there](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=91.452) [that's still end up taking up a lot of memory when the numbers get very high.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=10&mode=live&start=93.949)

[Demo: Memory Clerk Usage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live)

[For this demonstration, I'm going to take](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=1.7) [a look at memory clerk usage for the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=3.058) [instance, and this tells us what's using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=5.059) [the most memory inside of the SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=7.083) [process. And when I run this, what I hope](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=10.57988888888889) [to see is that MEMORYCLERK\_SQLBUFFERPOOL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=12.813800000000004) [is my biggest consumer of memory. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=15.5178) [that's cached data inside of your SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=19.310142857142857) [Server buffer pool that's been read in off](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=21.84257142857143) [of your storage subsystem into memory. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=23.74225) [you want that to be your biggest memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=26.4145) [usage provider. But what you might see in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=28.441666666666666) [some cases is CACHESTORE\_SQLCP, row 8 in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=31.688999999999993) [this result set, and that is the planned](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=34.67471428571429) [cache for ad hoc and prepared queries. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=38.83524999999999) [quite often that can bloat up to be 4, 6,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=42.33144444444445) [8, I've seen it 24 gigabytes in some](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=45.75063636363637) [cases. And that's just cache query plans](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=49.36518181818183) [for ad hoc and prepared queries that quite](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=51.76925000000001) [often don't get reused, so that memory is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=54.80714285714285) [wasted. It could be better used to cache](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=57.921875000000014) [data. So the way you try to control that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=60.953375000000015) [is enable optimize for ad hoc workloads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=63.27944444444442) [for the instance, that's the first step,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=65.19699999999999) [and then you can run a command to flush](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=67.894) [that memory. So it's DBCC FREESYSTEMCACHE](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=71.509) [(SQL Plans) is the command, and it's in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=76.059) [the script and the comments, that exact](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=78.83588888888895) [command. So I have a lot of clients that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=81.8375714285714) [run that periodically with an agent job to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=83.73519999999999) [help keep that plan cache bloating under control.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=11&mode=live&start=85.83074999999998)

[Ad Hoc Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live)

[Ad hoc queries. This query is going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=1.674) [show you the cached single-use ad hoc and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=4.1) [prepared query plans. So you can see if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=6.803) [your developers are using a lot of ad hoc](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=9.423000000000002) [and prepared queries, and also you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=11.767624999999995) [figure out if they're actually using a lot](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=13.7315) [of memory. So these query plans tend to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=16.103)[waste memory that could be better used to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=18.330499999999997) [cache data in the SQL Server buffer pool](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=20.921749999999996) [rather than query plans that are very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=22.979249999999993) [unlikely to be reused. And what you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=25.689222222222217) [going to want to do to help control this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=27.791600000000003) [are just take the standard measures to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=29.15814285714286) [control plan cache bloating. So, that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=31.817) [going to include things like optimize for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=34.66157142857142) [ad hoc workloads is an instance-level](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=37.433) [setting you want to make sure is enabled.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=39.26916666666667) [This will help control this. And you want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=41.52137499999999) [to encourage your developers to use stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=44.38785714285715) [procedures or parameterized queries,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=47.024) [rather than ad hoc queries or prepared](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=48.67585714285715) [queries, and you also want to periodically](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=51.822714285714284) [in many cases run that command DBCC](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=54.60371428571428) [FREESYSTEMCACHE (SQL Plans) that only](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=57.23733333333333) [flushes this particular plan cache, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=60.004)[that even if you have optimize for ad hoc](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=63.169555555555554) [workloads enabled, it can still get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=65.18385714285714) [somewhat large over time. So this will](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=68.075) [help completely control it by running that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=70.304) [command. Finally, minimizing the plan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=72.92325) [cache bloating is always a good idea](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=75.09566666666669) [because it's going to help reduce your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=76.60111111111111) [internal memory pressure, and that's something you want to do.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=12&mode=live&start=78.37950000000001)

[Demo: Ad Hoc Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live)

[In this demonstration, we're going to look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=1.639) [for single use ad hoc and prepared](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=2.8) [queries. And so these are cached query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=5.7715000000000005) [plans that have only been used 1 time,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=8.0575) [they're use count is equal to 1. And they](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=10.426) [are going to be examples of ad hoc and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=14.002) [prepared queries that are wasting memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=16.383499999999998) [in your plan cache. So if you had a very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=19.207) [high value for SQLCP in the previous](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=22.654600000000006) [query, then you can run this query to try](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=24.657124999999994) [to find out what query plans are causing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=27.274222222222228) [that. So when I run this, this comes back](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=30.18075) [and shows me the database name for the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=32.18166666666666) [query, and it shows me the query text, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=34.463499999999996) [then it also shows me whether it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=36.99699999999999) [prepared query or an ad hoc query, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=39.18742857142858) [then the plan in kilobytes. And when you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=42.360000000000014) [run this on a busy production server,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=45.11066666666667)[quite often you'll see what appears to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=46.742) [the same query repeated multiple times.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=49.8615) [But if you look really closely, usually](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=53.28) [you'll find that it's just slightly](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=54.82857142857143) [different, it's not exactly identical, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=56.788) [each one of those nearly identical queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=59.714999999999996) [has its own cache query plan in the plan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=62.02455555555555) [cache. And that's wasting memory,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=65.46683333333333) [especially since they've only been used](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=66.616) [one time. So this helps you find those ad](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=69.598) [hoc and prepared queries that are wasting](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=72.41744444444443)[memory. And then you can use this to talk](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=75.29066666666664) [to your developers and other DBAs about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=77.36339999999998) [doing things, such as changing them to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=79.96066666666668) [parameterized queries or stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=82.283) [procedures, for example, so they're more likely to be reused.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=13&mode=live&start=84.32699999999998)

[Top Logical Reads Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live)

[Top logical reads queries. This query is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=2.126) [going to show you which queries have the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=4.6875) [most logical reads for the entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=7.2071250000000004) [instance, so this is across all your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=9.464625) [databases, and it's going to show queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=11.184) [and stored procedures that have plans in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=14.285) [the plan cache, and you can get the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=17.125) [metrics for those cached query plans. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=18.980999999999995) [it shows you which queries are actually](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=22.77725) [causing a lot of your memory pressure. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=24.718) [this is very useful if you are seeing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=27.45722222222222)[signs of internal memory pressure. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=28.859) [drilling further into this, it helps you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=31.974) [identify which queries are generating the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=34.123) [most logical reads. And a logical read is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=36.737) [when you find the data you're looking for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=39.129) [in the SQL Server buffer pool, but if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=41.92) [have something like a missing index or an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=43.394) [implicit conversion that causes it to do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=46.84257142857143) [more logical reads than it needs to, that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=49.150875) [helps indirectly generate internal memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=51.6702) [pressure. And this query is going to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=54.25071428571428) [you find opportunities for standard query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=57.54066666666667) [and index tuning across all your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=59.87166666666667) [databases, and you'll see which exact](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=62.285000000000004) [queries are causing the most memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=64.58385714285714) [pressure for the entire instance. Data](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=67.247) [compression can be very effective for help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=70.12049999999999) [reducing logical reads, and columnstore](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=72.41000000000001)[indexes can also be very effective for reducing logical reads.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=14&mode=live&start=74.65857142857143)

[Demo: Top Logical Reads Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live)

[For this demonstration we're going to take](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=1.5) [a look at the top total logical read](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=3.1) [queries for the entire instance. So this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=5.161) [is looking at all the databases on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=7.4702222222222225) [instance and this is, admittedly, a large](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=9.595833333333333) [query, so I'm going to scroll down a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=13.28888888888889) [little bit so you can see the entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=14.6693) [thing. But when I run this, it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=17.903699999999994) [look at all the databases on the instance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=20.7104) [and pull back the cache query plans that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=22.559749999999994) [have the highest amount of total logical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=25.70825) [reads, and usually when you run this in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=29.75733333333333) [production, you'll see the numbers drop](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=31.821) [off really quickly, just like you see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=34.19014285714285) [here. And so if you were under memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=36.58042857142856)[pressure, then we're going to now know](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=38.99987499999999) [which database has the largest queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=41.87575000000001) [that are causing the memory pressure, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=44.415000000000006) [then we'll actually have an idea about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=46.65433333333333) [those queries. And we get a lot of useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=48.891142857142874) [metrics about them, so the database name,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=50.854666666666674) [the total logical reads, the minimum](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=54.183)[logical reads, the average logical reads,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=57.605000000000004) [the max logical reads, and the minimum and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=61.703) [average worker time and max worker time,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=64.54028571428572) [and that's telling you how much CPU is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=67.17142857142858) [being used on those queries, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=69.62971428571429) [elapsed times. And the elapsed times,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=72.8368) [minimum, average, and max, those are on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=74.83533333333334)[microseconds, not milliseconds, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=77.67950000000002) [you can see the execution count, and we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=79.27114285714288) [have a has missing index column. So that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=81.69037499999997) [going to tell you if there's a missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=84.768) [index warning in the cache query plan. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=86.44885714285714) [then it shows you when the plan was](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=88.84666666666665) [cached, and then you get the complete](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=91.119) [query text, and then finally, on most of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=93.53033333333333) [them at least, you'll get the actual](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=97.61733333333335) [graphical execution plan, so you can go](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=99.328) [and take a quick look at what might be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=101.8844)[going on with those queries. So there's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=104.28537500000002) [lot of information that comes back from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=106.60300000000001) [this, but usually you want to focus on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=108.687) [top five results or so, and that's where](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=111.88724999999998) [you're going to get the most return on your tuning investment.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=15&mode=live&start=114.09449999999998)

[Module Summary](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live)

[So what have we covered in this module? In](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=2.001) [this module, we covered how to run and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=4.2043333333333335) [analyze eight memory-related instance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=5.911) [queries. I talked about how to interpret](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=8.8374) [the results of these queries so you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=10.601749999999997) [better understand what the results mean.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=12.664571428571426) [We also covered some useful methods for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=15.153)[alleviating many common memory-related](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=16.822) [instance issues so that you can better](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=19.444) [apply what you've learned by running and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=21.237) [properly interpreting these queries. In](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=23.545) [the next module, I'm going to cover how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=26.669999999999998) [diagnose CPU-related instance issues, so let's go.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=178a870e-2906-4efa-b772-2d73b6071beb&clip=16&mode=live&start=28.569)

[Diagnosing CPU-related Instance Issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live)

[Introduction and Processor Description](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live)

[Hi, my name is Glenn Berry from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=0) [sqlskills.com. This course is about using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=4.143125) [DMV queries to diagnose performance issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=5.965625000000001) [with SQL Server 2017. And in this module,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=8.327428571428571) [I'll be discussing how to diagnose](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=11.587999999999997) [CPU-related instance issues. In this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=14.540799999999999) [module, I'm going to cover six useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=17.661499999999997) [queries for detecting and diagnosing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=19.12783333333333) [CPU-related instance issues, which you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=21.427) [sometimes will see with many SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=24.772857142857145) [instances. I'll be discussing how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=27.745333333333335) [interpret the results of each query and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=29.28728571428572) [how that relates to other information that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=31.080000000000005) [you may have collected about your CPU](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=32.77357142857144) [usage. Also, I'll cover some useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=36.1728)[methods for alleviating many common](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=37.67385714285715) [CPU-related instance issues so you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=40.095749999999995) [apply what you've learned by running and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=42.168857142857135) [interpreting these queries. We've got a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=44.526333333333326) [lot to cover, so let's get started.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=47.14550000000001) [Process description. This query helps you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=51.245) [identify the exact processor model in your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=54.54414285714285) [host. It's very important to know this for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=58.22020000000001) [performance and licensing purposes. This](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=60.177) [query works for both physical machines and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=64.27642857142857) [virtual machines, which makes it very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=66.678875) [handy. You can find out a lot more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=69.63012499999996) [detailed information about your CPU online](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=71.51149999999997) [once you know the exact model number that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=73.14714285714288) [you're dealing with. So going a little bit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=75.45514285714283) [deeper into this query, it's really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=78.35062500000002) [important to understand what exact](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=80.91199999999999) [processor you have in your machine and how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=83.57685714285715) [old it is and what its relative](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=86.01133333333335) [performance is. And if you don't know the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=88.17833333333334) [exact model number, that's really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=90.09049999999998) [difficult to figure out. This is going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=92.27642857142858)[help you understand how old it is and how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=95.36199999999998) [well it performs and how it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=97.46355555555559) [scale compared to other processors. It's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=100.684) [going to help you determine how much](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=103.50075) [memory capacity your system can use](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=104.983) [because memory controllers are in modern](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=106.614) [processors. It's also going to let you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=111.14314285714289)[determine the generation of PCIe support](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=113.13549999999998) [that's available. So, all modern](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=115.74400000000003) [processors have PCIe version 3, but some](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=118.28928571428571) [older processors might have version 2 or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=121.2895714285714) [even version 1. So knowing the process](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=124.12299999999999) [model number, you can eventually find out what level of PCIe support that you have.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=0&mode=live&start=126.87566666666669)

[Demo: Processor Description](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live)

[For this demonstration, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=2.003) [pull back the processor description from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=2.9141428571428563) [the Windows registry. And it's really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=4.902666666666665) [important to know what processor you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=7.758) [working with with SQL Server has a huge](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=9.386) [effect on your performance and scalability](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=11.701) [and also your licensing costs. So when I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=14.099) [run this on my work station, it shows me](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=17.13233333333334) [that I've got an AMD Ryzen Threadripper](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=19.092000000000002) [1950X 16-Core Processor. And this is going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=21.583) [to work whether or not you're with a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=25.245555555555548) [virtual machine or a bare metal physical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=27.352875) [machine, it'll tell you what kind of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=29.516666666666666) [processor you're dealing with, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=31.4065) [you can look up online all the gory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=33.10533333333333) [details about that processor. But it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=35.144000000000005) [really important to understand that when you're looking at your performance.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=1&mode=live&start=37.08233333333334)

[CPU Utilization History](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live)

[CPU utilization history. This query shows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=1.902) [you the CPU utilization by the SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=5.4104285714285725) [process, and it's in 1 minute increments](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=8.226999999999999) [for the last 256 minutes, and then it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=10.989285714285716) [rolls off, so you only can go back that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=13.994100000000001) [far. It also shows you total other process](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=16.35025) [CPU utilization, so you can see not only](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=19.421142857142858) [what SQL Server's been doing, but anything](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=22.00775) [else that's running on your machine or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=24.079428571428572) [virtual machine. So going further into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=27.153499999999998) [this query, it shows you the CPU](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=29.68866666666667) [utilization history over the last 256](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=32.13171428571429) [minutes, so nearly 4 hours. And it gives](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=34.71977777777778) [you a quick impression of your normal CPU](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=38.03133333333332) [utilization range. What I often do is I'll](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=40.7555) [run this query and then copy the results](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=43.1814) [into an Excel spreadsheet and then go in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=45.53957142857144) [and have Excel calculate the average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=48.151749999999986) [across 256 minutes. So you get an idea of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=50.8395) [what the average CPU utilization is over](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=54.15859999999999) [the last 256 minutes. Now it gives you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=56.92928571428572) [confirmation that the other processes that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=60.04928571428571) [might be running, like antivirus or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=61.91) [management software, are not using too](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=64.4182) [much CPU on that machine. And it also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=67.47322222222225) [helps you understand if you're just seeing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=70.914125) [a recent spike in CPU activity over the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=73.02075) [last 5 minutes, let's say, or if it's been](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=76.39014285714286) [going on for the last 2 or 3 hours because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=78.43572727272726) [that tells you something completely](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=80.40914285714284) [different. And sometimes this query will](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=82.326) [give you inaccurate results, it seems to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=85.44799999999996) [happen mainly on systems with more than 64](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=88.0111666666667) [cores, and the ring buffers DMV that this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=92.00387499999998) [pulls from is undocumented and unsupported](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=94.96750000000002) [by Microsoft. So if this gives you crazy](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=97.83885714285712) [results, there's nothing I can do about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=101.68257142857139) [that. Most of the time it works really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=103.14414285714287) [well, but occasionally it gives you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=105.054625) [negative numbers or numbers above 100, but that's usually on very large systems.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=2&mode=live&start=107.20983333333336)

[Demo: CPU Utilization History](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live)

[In this demonstration, we're going to look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=1.167) [at CPU utilization history over the last](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=2.918) [256 minutes and this is 1 minute](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=5.3) [intervals. So it's not going to show all](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=8.660874999999999) [of your CPU utilization, just snapshots at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=10.60088888888889) [1 minute intervals. And it's pretty handy](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=12.861125) [to see this, so you can see what's been](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=15.276714285714286) [going on over the past nearly 4 hours, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=17.630750000000006) [whether you're just seeing a temporary](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=20.24514285714286) [spike in CPU or if it's been going on for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=21.5) [quite some time. So when you run this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=24.42375)[query, it comes back and shows you your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=27.65444444444444) [SQL Server Process Utilization in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=29.82542857142857) [first column, and then the Other Process](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=31.873399999999997) [CPU Utilization in the third column, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=34.38599999999999) [then it shows you the Event Time in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=36.34088888888888) [fourth column. And you can scroll down](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=39.25214285714286) [through these and see what's going on, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=41.617500000000014) [it's been mostly idle on my end since, but](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=44.20949999999999) [I put a few little peaks in there. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=46.94999999999998) [this is a pretty reliable way of looking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=50.519125) [at it over the last 4 hours, the only](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=52.388374999999996) [thing I will say is sometimes on very high](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=54.6955) [core count systems, the numbers will come](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=57.632999999999996) [back and be negative or over 100, and that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=60.266000000000005) [seems to be a bug in the ring buffer's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=63.120499999999986) [DMV. And Microsoft doesn't support that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=66.01320000000003) [DMV officially, so it's not likely they're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=68.22316666666664) [going to fix that, but for most systems](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=70.423) [this works pretty well and it's a reliable indicator you can easily look at.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=3&mode=live&start=72.843)

[CPU Utilization by Database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live)

[CPU utilization by database. This query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=1.904) [shows you how much CPU each one of your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=4.494777777777778) [databases is using on your entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=7.985333333333334) [instance. And it's a cumulative average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=11.02533333333333) [since the last SQL Server service start.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=12.332714285714284) [And it also shows you which databases are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=15.509) [using the most CPU, it's ordered by total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=18.444)[CPU utilization since SQL Server was last](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=20.591) [started. Going a little deeper into this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=24.574875) [query, it's going to help you focus your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=26.12285714285715) [analysis if your server is under CPU](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=28.631874999999987) [pressure. Now not that many SQL Servers](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=31.04385714285715) [are under CPU pressure, but it does happen](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=33.522000000000006) [fairly often and if you're seeing that,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=35.78800000000001) [you want to understand which database is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=37.642999999999994) [causing that. Knowing which database is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=40.19933333333334) [causing the most CPU pressure helps you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=42.66442857142857) [focus your tuning efforts. So more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=45.87649999999999) [detailed analysis, you can do that by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=48.47875) [running some of the queries that are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=50.474875) [coming up to focus on which queries are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=52.063) [generating the most worker time, both at a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=54.877) [query level and a stored procedure level.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=57.177) [Query and index tuning are often very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=60.526) [effective for reducing CPU utilization. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=62.966)[that's your best tool for trying to attack this problem if you run into it.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=4&mode=live&start=65.95587499999999)

[Demo: CPU Utilization by Database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live)

[The next query will be Get CPU utilization](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=1.883) [by database, and this is really handy if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=4.297) [you're seeing signs of CPU pressure, such](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=6.133) [as the staying high CPU utilization by SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=9.014999999999999) [Server or CPU-related wait types. You want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=12.727571428571428) [to find out what database is causing that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=15.829749999999999) [CPU pressure. So when I run this query,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=17.905)[this shows me the CPU rank and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=20.552000000000003) [database name and then it's ordered by CPU](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=23.722749999999998) [time in milliseconds, and that also shows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=26.191499999999994) [the CPU percent. So this is showing you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=28.435666666666666) [which databases are using the most CPU on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=30.917) [the instance, and then you can start](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=34.0515) [looking at those databases more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=36.309)[specifically to try to find the queries that are generating the most CPU.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=5&mode=live&start=38.604)

[Top Worker Time Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live)

[Top worker time queries. This query is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=1.859) [going to show you which queries across](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=4.16475) [your entire instance have the highest](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=6.2982000000000005) [cumulative worker time. And that's very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=9.474499999999999) [useful information. Worker time is tied to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=12.201400000000001) [CPU utilization, so if you're seeing signs](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=14.503285714285713) [of CPU pressure and with the earlier](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=17.101375) [queries you've identified which database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=19.121333333333325) [is the biggest culprit, this helps you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=20.983999999999998) [find the queries of the biggest culprit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=23.719428571428566) [for generating CPU pressure. Total worker](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=25.880666666666666)[time numbers from this query usually fall](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=28.356999999999996) [off really quickly. So what you want to do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=31.501125) [is look at the top five results from this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=34.307999999999986) [query and then see what you can do to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=36.772499999999994) [improve those queries, and if you do this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=39.27450000000001) [several times in an iterative fashion, you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=41.431000000000004) [will generally have really good results in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=43.68214285714285) [reducing your CPU utilization. Now going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=46.91557142857144) [further into this query, it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=50.382333333333335) [show you which queries across the entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=52.013875000000006) [instance are using the most CPU time, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=54.22685714285714) [this includes just regular queries and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=58.01899999999999) [stored procedures. You want to look for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=60.8995) [queries that also have a value of 1 in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=63.396250000000016) [Has Missing Index column, and what that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=66.1277) [means is that there's a missing index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=67.94149999999999) [warning for the cache query plan for that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=70.31637500000002) [query, and that can be an easy win if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=73.35399999999998) [can find a missing index that makes sense](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=75.7848888888889) [to add. And you can do more detailed](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=78.41980000000001) [analysis of each one of these queries by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=80.99525000000001) [looking at the graphical execution plan,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=82.90000000000003) [which shows up in this query. And finally,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=84.83428571428571) [query and index tuning are often your best tools for reducing CPU utilization.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=6&mode=live&start=88.55200000000002)

[Demo: Top Worker Time Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live)

[This diagnostic query is going to get the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=1.826) [top worker time queries for the entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=3.136) [instance. And worker time equates to CPU](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=6.070749999999999) [work or effort. So when I run this query,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=8.594666666666667) [it's going to show me the database name](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=11.154333333333328) [and then the total worker time as it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=13.40925) [ordered by, and you see the numbers fall](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=16.065714285714286) [off really quickly, that's a very typical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=18.077500000000008) [result pattern. It also shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=20.962571428571426) [minimum worker time and the average worker](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=23.750750000000004) [time, and max worker time, the minimum](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=26.024) [elapsed time, and then the average elapsed](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=30.0518) [time. And these elapsed times are in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=33.123333333333335) [microseconds, not milliseconds. It also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=34.62) [shows you the max elapsed time and then it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=37.329249999999995) [shows you minimum, average, and max](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=41.314857142857136) [logical reads, and then the execution](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=43.45257142857143) [count. And then this is a really important](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=45.75685714285714) [column, the Has Missing Index column, that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=48.154999999999994) [tells you whether or not there's a missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=50.63957142857143) [index warning in the cache query plan for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=53.170500000000004) [that particular query. And then it shows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=55.92085714285715) [you when it went in to the planned cache,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=58.04400000000001) [and then it gives you the complete query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=60.38737499999999) [text, and then finally on the far right](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=62.943857142857134) [you get the graphical execution plan for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=65.626) [that query. So if you were to click on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=68.09499999999998) [this, this comes up and shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=70.84037499999997) [graphical execution plan and then you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=72.61474999999999) [right-click and get the details about the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=75.24885714285712) [missing index warning that's showing up](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=77.95857142857143) [for this, and you can also see what it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=80.06728571428569)[doing, it's doing a clustered index scan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=82.46237499999997) [of a fairly large table, and that's pretty](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=84.44824999999999) [expensive and that's why it wants that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=87.212) [index to hopefully make that into a less](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=89.272) [expensive operation. So this is a really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=92.42433333333334) [useful diagnostic query if you're seeing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=96.51062499999998) [signs of CPU pressure. And, again, you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=99.37900000000002) [see the numbers fall off really quickly,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=102.28800000000001) [so you want to focus your efforts on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=104.102875) [top three, in this case, and if you were](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=106.39) [to look at all three of those and do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=108.59410000000003)[something to make them better, then that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=110.8003333333333) [going to have a nice effect on your CPU utilization.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=7&mode=live&start=112.7825)

[SP Worker Time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live)

[SP worker time. This query is going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=1.757) [show you which stored procedures in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=4.394) [current database are using the most worker](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=7.036) [time. And remember, worker time equates to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=9.617250000000002) [CPU effort. You want to make sure you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=12.905750000000001) [connected to the correct database when you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=14.488750000000001) [run this query. A lot of people](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=16.298249999999996)[accidentally will run this while they're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=18.278000000000006) [connected to the master database, which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=19.753571428571423) [usually is not that interesting compared](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=21.420333333333332) [to one of your user databases. Total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=23.73075) [worker time numbers from this query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=26.66857142857143) [usually fall off very quickly. So this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=28.46) [going to let you focus on the top 5 or top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=31.592699999999997) [10, just like in some of the other](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=33.74527272727272) [queries. And the average elapsed times](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=35.2915) [that come back from this query are in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=37.71557142857143) [microseconds, not milliseconds, so make](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=41.1398) [sure to keep that in mind. Now going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=43.056) [deeper into this query, it's going to show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=45.36533333333334) [you which stored procedures in the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=47.505428571428574) [database are using the most CPU time, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=50.41600000000001) [that's really, really useful to know](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=53.786249999999995) [because hopefully if you're under CPU](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=55.79699999999999) [pressure, you've identified which database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=58.18919999999999) [is the biggest culprit and now we're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=59.90033333333333) [trying to find the stored procedures in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=61.60371428571427) [this database that are causing the most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=63.50033333333333) [CPU pressure. You want to look for queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=66.56900000000003)[that have a value of 1 in the Has Missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=68.41200000000003) [Index column because, again, that means](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=70.92244444444445) [that they have a missing index warning in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=72.84466666666668) [the cache query plan for that stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=75.18212499999997) [procedure. You want to look for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=78.14671428571432) [AvgWorkerTime, and if you find ones from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=80.57550000000002) [this query that have a really high value](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=82.3506666666667) [there, that might be an easy win from a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=84.49083333333333) [tuning perspective. And you can do more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=88.17300000000006) [detailed analysis of each stored procedure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=90.18537500000002) [by looking at the graphical execution](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=91.70728571428572)[plan, which comes back with this query, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=93.73233333333334) [you can see where it's doing most of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=97.10077777777776) [work and things you might be able to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=99.7592222222222) [change to make it better by looking at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=101.47299999999998) [execution plan. And then finally, you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=104.23299999999999) [do query and index tuning, just like on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=106.99125) [all the other ones, to ultimately reduce](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=109.09637500000001) [the CPU utilization of each one of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=112.23266666666666) [queries that show up at the top of the results from this query.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=8&mode=live&start=114.76485714285717)

[Demo: SP Worker Time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live)

[This diagnostic query pulls back the top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=1.5) [cache stored procedures by total worker](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=3.905) [time. And, again, worker time relates to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=6.553571428571428) [CPU costs. The previous query was looking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=9.24425) [at all queries, and this is just looking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=11.381142857142853) [at stored procedures in the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=13.6145) [database. So when I run this, what we're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=16.087600000000002) [going to see is we've got three stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=18.775199999999998) [procedures right here that are much, much](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=21.21771428571429) [higher than the rest, and we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=23.867875000000005) [want to focus our efforts on those. And we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=25.917125) [get the TotalWorkerTime, which is what](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=29.052599999999998) [we're sorting by, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=31.1285) [AvgWorkerTime, and it shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=33.17242857142856) [execution\_count, and then the number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=35.218666666666664) [calls per minute, which is useful to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=36.98275) [understand. And then it's going to show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=38.85025) [you the average elapsed time in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=40.819) [microseconds. And then the Has Missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=44.75842857142855) [Index column, along with the Last](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=47.452142857142874) [Execution Time, and then the time that the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=49.35566666666666) [plan went into the plan cache, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=50.72933333333335) [also a link to the graphical execution](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=52.76844444444443) [plan. So usually, when you do this, you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=55.658750000000005) [can just focus on the top three or the top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=58.530111111111104) [five, and if you do that several times and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=61.39366666666665)[focus on tuning those queries, you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=63.87244444444445) [going to definitely start to have an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=65.94228571428573) [effect on your overall CPU utilization.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=67.95874999999998) [And remember, what you're doing here is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=70.747) [earlier you figured out which database was](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=73.488) [generating the most CPU, so then you run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=75.863) [this query against that database and you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=78.14271428571429) [know which stored procedures in that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=80.651) [database are using the most CPU. so then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=82.679) [we're focusing our tuning efforts on those specifically.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=9&mode=live&start=85.11942857142857)

[High Aggregate CPU Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live)

[High aggregate CPU queries. This query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=1.7) [requires that the Query Store feature is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=4.761428571428572) [enabled for this particular database that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=7.592333333333333) [you're connected to or else you won't get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=9.472999999999999) [any results back from this query. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=11.486) [that's really important. And this query is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=13.398) [database-specific, it's not instance wide.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=16.522) [And you want to make sure that Query Store](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=19.158) [is not in a read-only status, and that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=21.203) [happens when you have a very, very active](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=23.1315) [database that fills up the default space](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=25.822714285714284) [as allocated for Query Store, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=29.144571428571428) [sometimes on very active instances or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=31.442666666666668) [databases you have to make that larger.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=33.904500000000006) [So, once you've got this all set up and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=36.554) [running correctly, then it's going to show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=38.185) [you the highest aggregate CPU queries over](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=39.889) [the past 1 hour, so it's not cumulative](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=44.151)[since that query plan, it's a little bit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=47.386) [different. So it's going to give you a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=49.58066666666665) [different perspective than a lot of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=51.532375000000016) [DMV queries because, again, it's pulling](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=53.322999999999986) [from Query Store. Going further into this,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=55.79599999999999) [it's going to show you the queries that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=58.19500000000001) [have the most total CPU activity over the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=60.30799999999999) [past hour in the current database. That's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=63.39449999999999) [really important. And it shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=66.87919999999998) [query text so you can spot things that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=69.289) [might be happening to help cause that. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=71.7305)[bad coding practices, for example, that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=74.97099999999999) [might be generating more CPU work than is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=77.30785714285713) [necessary. It's also going to show you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=80.33059999999998) [query plan XML, so you can look at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=82.35222222222225) [graphical execution plan for the query, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=84.27875000000003) [that's also very handy. And it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=86.70599999999999) [show you the plan count for each plan, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=88.65266666666668) [if you've got a problem with plan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=90.46677777777776) [stability where you've got multiple plans](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=92.65366666666667) [and sometimes a plan is pretty good and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=94.57585714285716) [sometimes it's not so good, this helps you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=97.195) [identify that also. Finally, it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=100.21349999999998) [identify if any of your stored procedures](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=102.25849999999998) [have forced query plans, and that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=105.0165) [something you can do in Query Store. So if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=107.63962500000001) [you've got a plan stability issue, you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=109.82849999999999) [go and force a particular plan to be used,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=111.90049999999998) [and this will identify if somebody has done that already in this database.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=10&mode=live&start=114.48612500000002)

[Demo: High Aggregate CPU Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live)

[This diagnostic query is pulling from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=2.185) [Query Store to get the highest aggregate](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=3.9018571428571422) [CPU time queries over the last hour, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=6.392999999999998) [this is different from the previous DMV](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=8.99175) [queries that are looking at whatever is in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=11.931333333333333) [the plan cache. So this lets you focus on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=14.616099999999996) [more recent events perhaps, instead of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=17.707) [everything since it's been in the plan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=20.02733333333333) [cache. So this is a fairly large query and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=22.32266666666666) [I will scroll down so you can see the rest](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=25.159399999999994) [of it, but you have the script so you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=28.55880000000001)[look at it at your leisure. So here's the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=30.65639999999999) [entire query and we'll go ahead and run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=33.201625) [it. And this obviously won't work if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=35.43125) [don't have Query Store enabled for your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=38.18212500000001) [database. And Query Store is not enabled](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=40.296571428571426) [by default on new databases or databases](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=42.317999999999984) [that you restore from backups, unless it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=45.08542857142856) [was already in there before it was backed](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=47.28271428571429) [up. So anyways, make sure that Query Store](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=49.260428571428555) [is enabled. And then once you do that and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=52.54544444444443) [run this query, then you're going to see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=54.47200000000002) [the containing object if there is one, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=56.586) [the top three here are stored procedures](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=59.833375) [and then the fourth one is an ad hoc](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=61.306) [query, for example, and then you get the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=63.868300000000005) [query text for the entire query, and you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=66.77362500000001) [get the total CPU time in microseconds,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=70.3166666666667) [and that's what we're sorting by. And it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=73.219) [shows you how many plans are being used,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=75.86366666666666) [different query plans for that particular](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=77.74733333333333) [query, and whether or not it's a forced](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=79.50975) [plan or not. You have the ability to do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=81.569625) [forced plans using Query Store. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=84.07757142857143) [whether it's a parallel plan or not, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=86.998875) [whether it's a trivial plan or not, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=88.281875) [what kind of parameterization was used on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=90.52485714285714) [that, and what compatibility level was](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=93.073) [used for that particular query. And then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=95.371) [when it was compiled and the last time it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=97.9301111111111) [was executed. And then finally, you get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=100.50999999999999) [the graphical show plan that you can take](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=102.7) [a look at. So this is just another way of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=104.67666666666669) [looking at your top CPU consuming queries,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=107.48099999999995) [but it's filtered by just what's happened](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=110.932) [over the last hour. And you could easily](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=112.582) [change that to make it a shorter time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=114.523) [period, just by modifying this query slightly.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=11&mode=live&start=116.937)

[Module Summary](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live)

[So what have we covered in this module? In](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=1.543) [this module we covered how to run and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=4.2108888888888885) [analyze six CPU-related instance queries.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=5.346) [Now I've talked about how to interpret the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=9.621) [results of queries so you can better](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=10.9) [understand what the results actually mean.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=12.941) [We also covered some useful methods for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=16.305) [alleviating many common CPU-related](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=18.411) [instance issues. So you can better apply](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=21.385) [what you've learned by running and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=23.169) [properly interpreting these queries. We](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=24.513) [also talked about how to address some of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=27.269333333333332) [these CPU issues. In the next module,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=30.192) [we're going to cover how to diagnose](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=32.84) [activity-related database issues. So let's go.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=ecec8e89-4b27-4f76-88f5-b0c5460060b1&clip=12&mode=live&start=34.828)

[Diagnosing Activity-related Database Issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live)

[Introduction and Lock Waits](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live)

[Hi, my name is Glenn Berry from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=0) [sqlskills.com. This course is about using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=4.664625) [DMV queries to diagnosis performance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=6.486624999999998) [issues with SQL Server 2017. And in this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=8.0668) [module, I'll be discussing how to diagnose](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=11.571166666666668) [activity-related database issues. In this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=14.317) [module I'm going to cover 12 extremely](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=18.12925) [useful queries for detecting and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=19.6892) [diagnosing activity-related database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=22.32575) [issues, which you often see with many SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=24.269) [Server databases. I'll be discussing how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=27.968) [to interpret the results of each query and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=30.423714285714283) [how that relates to other information you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=32.321250000000006) [may have collected about your database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=34.527) [activity. I'll also cover some useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=37.88699999999999)[methods for alleviating many common](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=40.097428571428566) [activity-related database issues so you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=42.66524999999999) [can actually apply what you've learned by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=44.43157142857143) [running and interpreting these queries. We](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=46.59533333333332) [have a lot to cover in this module, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=49.448) [let's get started. Lock waits. This query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=51.48075) [shows you tables and indexes that have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=55.4852857142857) [lock waits. This is very useful if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=58.878333333333345) [have very high average task counts, which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=61.34766666666667) [is a symptom of lots of locking and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=63.440142857142845) [blocking. It's going to show you the row](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=67.56016666666666)[lock waits for the tables and indexes that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=69.65722222222226) [show up in the query, and also it's going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=71.14075000000001) [to show you the page lock waits for those](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=73.00677777777773) [same tables and indexes that show up. It's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=75.67899999999995) [going to be the cumulative waits since the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=79.145125) [last SQL Server restart, so make sure you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=80.772125) [know how long SQL Server has been running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=83.334625) [when you look at the results of this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=85.900625) [query. Index tuning can often reduce lock](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=87.63842857142858) [waits, that's the first thing I'm going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=91.17357142857144) [look at when I see lots of high lock](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=92.53399999999999) [waits. So going a little bit deeper into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=95.3965) [this query, look for tables that have very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=98.24412499999997) [high row and/or page lock waits because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=101.68100000000003) [that's a good indication that you've got](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=105.27628571428575) [an issue with that table or index that you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=107.10875) [might want to address with query tuning or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=109.32124999999998) [a change in the isolation level or index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=111.71699999999998) [tuning. You want to look for examples of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=115.95087500000002) [high lock waits on the clustered index of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=117.88399999999999) [the table in particular. Adding useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=120.71049999999998) [non-clustered indexes can often reduce the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=124.1436) [lock waits on the clustered index because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=126.78399999999996) [that avoids having to do a clustered index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=129.42833333333337) [scan, for example. Dropping any unused](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=132.29528571428565) [indexes can also help reduce lock waits](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=135.39283333333336) [because you won't have to update those](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=138.23557142857138) [indexes when you're updating data, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=139.84125000000006) [that's going to reduce the locking that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=141.52385714285717) [involved. The isolation level properties](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=145.42960000000002) [that you're working with also have a role](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=147.4496666666667) [in concurrency and locking and blocking.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=149.3672857142858)[So, for example, you can switch to read](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=151.6) [committed snapshot isolation to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=154.3) [alleviate many locking and blocking issues.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=0&mode=live&start=156.3)

[Demo: Lock Waits](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live)

[For this demonstration, we're going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=1.93) [take a look at lock waits for the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=3.2122857142857137) [database, and this keeps track of all the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=5.164) [times that the database engine has had to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=6.787) [wait on various kinds of lock waits. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=8.569) [this is not going to take into account](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=12.37588888888889) [memory optimized indexes, by the way. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=13.383) [when I run this query, it comes back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=16.2242) [tells me that I've had some row lock waits](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=18.341) [on the LoadGenerationLog table on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=21.798) [primary key clustered index, and also on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=24.94) [the product table on the primary key](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=26.807) [clustered index. And it shows me how many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=28.722) [row lock waits I've had and my total row](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=31.96) [lock wait time in milliseconds, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=34.368) [if I'd had any page lock waits it would](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=36.860000000000014) [show that, both in terms of the number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=39.95022222222223) [occurrences and the cumulative time, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=42.217) [then the total lock waits in milliseconds](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=45.44014285714286) [for this index. So this is really useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=47.949749999999995) [if you're seeing signs of blocking or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=51.32425) [excessive locking or even dead locks.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=54.159333333333336) [It'll give you an idea of which indexes on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=56.16649999999999) [which tables are part of the issue, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=59.44749999999999) [then you can go in and see what's going on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=61.60350000000001) [with the indexing strategy for those objects.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=1&mode=live&start=63.755874999999996)

[Scalar UDF Statistics](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live)

[Scalar UDF statistics. This query is going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=1.97) [to show you scalar UDF metrics for the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=5.326888888888888) [current database, not the entire instance,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=7.997399999999999) [and the results are ordered by total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=10.195000000000002) [worker time. So that's going to help you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=12.895666666666667) [find the most CPU-intensive scalar UDFs.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=14.794999999999998) [And that's kind of a handy way of looking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=19.089) [at it. Going further into this query,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=21.17863636363636) [scalar UDFs have known performance issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=23.302) [in SQL Server 2017 and earlier. They](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=26.137) [basically cause you to do row by row](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=29.303666666666665) [processing and they cause a lot of extra](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=31.741) [overhead, even if what you're doing in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=34.023) [UDF is very trivial. So you should try to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=35.89) [avoid UDFs if at all possible. And you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=39.9209090909091) [want to consider in-lining your scalar UDF](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=42.506) [code if you can, sometimes what you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=44.88633333333334) [doing is just too complicated to inline](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=46.74957142857143) [it, but that's the first thing you should](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=48.664142857142856) [try to do. Another thing you can try is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=51.30928571428571) [converting a scalar UDF into a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=54.347428571428566) [table-valued UDF that just returns one](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=56.41187500000001)[column and one row, so it basically](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=58.32357142857143) [behaves like a scalar UDF, but it doesn't](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=61.07812500000001) [have the performance overhead of a scalar](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=64.446) [UDF. Another alternative is to convert](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=67.86119999999998) [that scalar UDF code to a T-SQL stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=69.93183333333337) [procedure that your original query or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=73.86775) [other stored procedure calls, and you also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=75.97000000000001) [will avoid that overhead of the scalar UDF.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=2&mode=live&start=79.22700000000003)

[Demo: Scalar UDF Statistics](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live)

[For this demo, we're going to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=1.8) [scalar UDF execution statistics for the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=2.868) [current database. And scalar UDFs have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=5.483) [well known performance problems with SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=8.915) [Server, it's been a problem for many, many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=11.299) [versions, and you want to try to avoid](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=13.232888888888889) [using those, but this will help you find](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=16.4) [if people have already been using them in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=18.038222222222224) [the current database. So when I run this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=20.055124999999997) [query, it will come back and tell me the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=22.832) [name of the function, and it's a scalar](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=26.397) [UDF, table UDFs do not show up in this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=28.581) [query, and how many times it's been](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=31.268) [executed and your total worker time and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=33.021) [your total logical reads and total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=36.04971428571429) [physical reads. And then also the total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=37.518) [elapsed time, along with your averages for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=40.678) [worker time and elapsed time and logical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=43.648) [reads. And it shows you when the plan for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=46.358) [that UDF went into the plan cache. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=48.723625) [you'll notice here that this particular](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=51.848571428571425) [one is really not doing very much work,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=54.024) [and that's not really the normal issue](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=56.678) [with a scalar UDF, it's not the fact that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=59.022) [they're doing anything expensive, it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=60.728) [just the fact that it calls out to that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=62.89688888888889) [UDF on every row of a query that it's used](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=64.93377777777778) [that. So instead of doing a set based](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=68.187) [operation, it's a row by row operation,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=70.3725) [and so even if you're doing something very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=71.95771428571429) [trivial in UDF, it can have a big](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=74.4392) [performance impact on your query performance.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=3&mode=live&start=77.50000000000003)

[Input Buffer](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live)

[Input buffer. This query is a replacement](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=1.953) [for the old DBCC INPUTBUFFER command that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=4.118) [actually has a lot more flexibility. It](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=7.352571428571428) [shows the last query for each SPID that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=9.53725) [currently connected to the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=12.397333333333334) [database, in this case, and it returns](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=14.404) [some very useful performance metrics for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=16.747249999999998) [each one of those SPIDs. Going deeper into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=18.891166666666667) [this query, it's a lot more capable and is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=22.915125000000003) [a lot more flexible than DBCC INPUTBUFFER.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=25.394499999999997) [It doesn't truncate the number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=27.92) [characters like DBCC INPUTBUFFER did, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=29.534) [you don't have to enter in the SPID](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=32.75511111111111) [number, it just pulls everything back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=34.46) [you can filter out what you want to. It's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=36.980555555555554) [very useful for getting a quick overview](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=39.59914285714286) [of your current query workload to see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=41.9875) [what's going on with all your different](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=44.365750000000006)[connections real quickly. And you can add](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=46.268499999999996) [an ORDER BY clause to focus on one](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=48.94439999999999) [specific area. You can order by any one of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=51.438) [the columns that come back from this. It](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=53.50833333333334) [also helps you identify what resources are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=56.82228571428571) [involved and any long running queries that are still executing.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=4&mode=live&start=58.527)

[Demo: Input Buffer](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live)

[For this demo, we're going to look at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=1.977) [input buffer information for the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=2.861) [database. So this is going to show you any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=5.175285714285716) [queries that are currently or just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=7.3103333333333325) [recently executed for the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=9.504833333333332) [database. And this is a new DMV they added](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=12.1472) [in SQL Server 2016 and it's a replacement](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=13.998777777777772) [for the old DBCC INPUTBUFFER that really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=17.597) [is much more powerful and easier to use.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=20.469) [So when I run this, it comes back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=23.556) [tells me these four SPIDs have recent](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=26.068799999999996) [activity, and it shows the database name,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=29.73028571428572) [which is the current database, and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=32.116) [login time for that SPID, and then if we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=34.66628571428572) [scroll over, we've got the CPU time and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=37.91588888888888) [the logical reads and the memory usage,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=40.093625) [and then the status of the SPID, whether](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=42.44425) [it's sleeping or running, for example, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=45.25066666666666)[then the actual input buffer. And unlike](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=48.34125) [the old DBCC INPUTBUFFER, this does not](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=51.129666666666665) [truncate the command. So it shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=53.046) [complete query text and that's pretty](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=56.18737499999999) [handy to have that capability. And with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=58.39124999999999) [DBCC INPUTBUFFER, you had to type in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=60.661142857142856) [command and also give it a particular SPID](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=62.859333333333325) [number. So you're going to look at one at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=64.92866666666667) [a time. This gives you all the SPIDs that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=66.82880000000004) [are connected to this database. So it's pretty handy.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=5&mode=live&start=69.061625)

[Query Execution Counts](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live)

[Query execution counts. This query returns](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=1.819) [the most frequently executed queries for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=4.573) [the current database. And what you want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=7.637499999999999) [do when you get the results back from this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=10.5865) [is look for the Has Missing Index column,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=12.489499999999998) [first of all, because that's going to show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=14.71985714285714) [you any queries that have missing index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=17.331428571428567) [warnings in the planned cache, and that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=19.635666666666662) [can be an easy tuning win. You also want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=21.60174999999999) [to look at the graphical execution plan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=25.081625000000003) [for anything that shows up near the top of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=26.485) [this query to see if there's anything that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=28.992) [you might be able to do from a query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=30.924999999999997) [perspective. Going further into this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=33.586166666666664) [query, it's going to help you understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=35.3408) [your baseline query workload, and what I](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=37.493999999999986) [mean by that is, you know, what's the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=38.98457142857143) [typical rate of executions per minute or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=41.091374999999985) [per second? And knowing your baseline is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=44.74499999999998) [really useful in case something changes in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=47.30485714285714) [the future. Frequently executed queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=50.092285714285715) [might be good candidates to be cached in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=52.04299999999999) [the middle tier or on the client. If it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=54.90175) [static data and you're hitting the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=57.93925000000001) [database, you know, thousands of times a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=59.85985714285714)[minute to get the same data back, caching](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=61.644499999999994) [that might be a good idea. And very high](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=63.64649999999999) [execution counts might mean that there's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=68.44399999999999) [problem with the application. Maybe your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=71.83377777777775) [developers pushed out a new version of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=73.81485714285715) [application and there's a logic error in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=75.51299999999998) [there, so they're calling a query two or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=77.23949999999998)[three times instead of just one. I've seen](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=79.87466666666667) [that many times. And it's also going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=82.88400000000001) [help identify possible query and index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=85.98571428571427) [tuning opportunities, so they're just one](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=88.63400000000001) [way of looking at your workload from which queries are being executed the most often.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=6&mode=live&start=90.51242857142856)

[Demo: Query Execution Counts](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live)

[For this demo, we're going to look at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=1.817) [most frequently executed queries for this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=2.88) [database. And this is going to show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=6.060000000000001) [stored procedure executions and ad hoc](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=7.561249999999999) [query executions. And it gives us a lot of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=10.425714285714283) [useful statistics about those executions](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=12.911333333333335) [from whatever plans are in the plan cache.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=14.673000000000002)[So when I run this query, it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=17.972) [come back and show me the execution count,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=19.932) [it's sorted by that, and then it's also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=22.449) [going to show me total logical reads,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=24.062) [average logical reads, and then total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=26.915) [worker time and average worker time. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=28.784) [then if we scroll over to the right, we've](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=32.45077777777778) [got total elapsed time and average elapsed](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=34.579571428571434) [time, and then it has the has missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=36.735749999999996) [index column, which shows if there's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=39.29016666666667) [missing index warning in the plan cache](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=41.49057142857143) [for that particular query, and it shows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=43.81833333333334) [you when it went into the plan cache and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=46.33400000000001) [you get the complete query text, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=48.07557142857142) [finally, you get the query plan. So you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=50.684000000000005) [get the graphical execution plan for that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=53.47814285714287) [query. And the reason why this is a useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=56.06340000000001) [query is this shows you what's being](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=58.711999999999975)[called the most often in this database.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=60.7355) [And it may be that you can cache](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=63.558) [whatever's being called, if it's static](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=66.11977777777781) [data, so that's something to look out for,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=68.32083333333331) [and just being aware of the magnitude of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=70.142) [how often things are being called it can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=72.56555555555555) [be useful that'll show you if something](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=74.714) [has changed, it's a good baseline](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=77.08) [information, and it'll help you spot](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=79.095) [problems where maybe the developers have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=81.187) [made a mistake and they're calling the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=83.457) [same query multiple times instead of just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=84.82199999999995) [once when you're doing a particular task.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=87.90214285714288) [So it's just a useful query in a lot of different ways.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=7&mode=live&start=90.149)

[SP Execution Counts](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live)

[SP execution counts. This query shows you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=1.84) [the most frequently executed stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=4.9228571428571435) [procedures for the current database. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=6.8585714285714285) [you want to look for the missing index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=9.700000000000001) [column because that's going to show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=11.1) [any stored procedures where there's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=13.273499999999995) [missing index warning for the currently](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=14.864833333333335) [cached query plan for that stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=17.089333333333336) [procedure. And you also want to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=19.88966666666666) [the graphical execution plan because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=21.638000000000005) [that's going to give you more details](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=22.727285714285717)[about what is the most expensive part of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=24.61125) [the query and help you with your query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=26.837000000000003) [tuning efforts. If we go further into this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=29.275399999999998) [query, it's going to help you understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=32.34014285714286) [your baseline stored procedure workload.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=34.07628571428571) [So the previous query was looking at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=36.337) [regular non-stored procedure queries of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=38.464) [the stored procedures only for this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=41.23066666666667) [particular database that you're connected](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=43.552333333333344) [to. And frequently executed stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=45.6012) [procedures, again, might be candidates for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=47.697799999999994) [middle-tier or client-side caching. You](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=50.45099999999999) [also want to look for extremely high](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=53.952749999999995) [stored procedure counts in terms of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=55.043) [executions because maybe there's an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=57.541) [application logic issue that can be fixed.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=59.041) [And then finally, this is going to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=61.989) [you identify possible stored procedure and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=63.36766666666667) [index tuning opportunities, so the things](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=66.257) [that bubble up to the top of this query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=69.015) [might be good things to focus your tuning efforts on.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=8&mode=live&start=70.738)

[Demo: SP Execution Counts](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live)

[For this demo, we're going to take a look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=1.754) [at top cached stored procedures by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=3.1) [execution count. And this is also a very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=4.8) [useful way of judging your baseline](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=7.102) [activity and looking for possible caching](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=9.864) [opportunities and just other easy tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=12.077) [opportunities. And this only is focused on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=15.388999999999998) [stored procedures for the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=16.802428571428564) [database. And when I run this query, it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=19.322000000000006) [comes back and shows me the stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=21.37199999999999) [procedure name and then it's ordered by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=23.293714285714284)[execution count, and then you can see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=25.760285714285715) [calls per minute and average elapsed time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=28.074749999999995) [in microseconds, and then average worker](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=31.259333333333338) [time. And if we scroll over to the right,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=33.81620000000001) [then we have average logical reads and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=37.272) [then the has missing index column, which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=40.28542857142857) [is very useful for finding cached query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=41.83271428571428) [plans that have a missing index warning,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=44.56614285714286) [and then you see the last execution time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=46.52728571428571) [and the plan cached time, and then finally](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=48.205) [we've got the graphical execution plan. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=51.534) [if we look at the fourth row in the result](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=53.595000000000006) [set, we can go and actually click on that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=55.93833333333334) [query plan and it pulls up the graphical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=59.48885714285713)[execution plan and you can see there's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=61.710571428571434) [missing index warning right down there.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=63.60550000000001) [And it's showing that it wants an index on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=66.469) [the customer table on the first name](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=69.92422222222223) [column. And so now we know what missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=72.76077777777778) [index warning is associated with a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=75.80587500000004) [particular stored procedure and we know](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=77.4455) [it's one that's executed fairly](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=78.96800000000002) [frequently. So that might help us decide](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=81.05399999999999) [whether or not to create that index or not.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=9&mode=live&start=83.19333333333337)

[SP Average Elapsed Time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live)

[SP average elapsed time. This query is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=1.7) [going to return the cached stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=4.7725) [procedures that are ordered by their](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=6.256714285714286) [average execution time. And the execution](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=8.187) [time that comes back from this query is in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=10.813375) [microseconds, not milliseconds, so make](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=13.3354) [sure you remember that. And you're looking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=15.099500000000003) [for large differences between the minimum](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=17.716500000000003) [average elapsed time and the maximum](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=20.557500000000005) [average elapsed time, because that's going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=23.196500000000004) [to indicate possible plan stability](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=25.564500000000002) [issues. You also want to look for the has](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=27.551000000000002) [missing index column because, again, that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=29.233111111111103) [means that the query plan has a missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=32.182625) [index warning in it and that could be an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=34.16442857142857) [easy win if you find good candidates](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=36.520999999999994) [there. And then you also want to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=38.375142857142855) [the graphical execution plan to help you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=40.785) [figure out what parts of the stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=42.38499999999999) [procedure are most expensive and what, if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=44.187333333333335) [anything, you might be able to do about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=46.385999999999996) [them. So going into more detail about this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=48.352333333333334) [particular diagnostic query, it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=50.095) [help you identify possible easy tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=52.925) [opportunities because, again, if you've](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=55.997)[got a stored procedure that's taking 20,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=58.08616666666667) [30, 40 seconds, it might be easy to tune](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=60.3682857142857) [that and make it come back in less than a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=62.90033333333335) [second and that's a pretty dramatic](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=66.04090000000001) [improvement. And you're looking for wide](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=68.32316666666664) [variances in your execution times because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=70.57266666666669) [that might indicate a plan stability](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=72.60399999999997) [problem. So sometimes a stored procedure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=74.8024) [is really fast and sometimes it's much](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=76.74742857142854) [slower, and that could be because of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=79.45199999999998) [parameter sniffing, for example. And you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=81.96799999999996) [want to focus your initial tuning efforts](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=84.71375) [on the top five results that come back](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=86.20575) [from this diagnostic query because you'll](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=88.95466666666667) [find that the numbers trail off really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=91.46657142857143) [quickly and you can get the most benefit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=93.4255) [for your tuning time by focusing on the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=96.04249999999999) [top five initially. And dramatically](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=99.154) [reducing the elapsed time of a stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=101.23766666666667) [procedure is very noticeable and can be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=104.17842857142858) [very beneficial to your users and your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=106.39375000000001) [application. So this is something that can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=109.14766666666667)[make you look really good as a query tuner](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=111.16033333333331) [if you find an easy query to tune from this query.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=10&mode=live&start=113.67400000000004)

[Demo: SP Average Elapsed Time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live)

[For this demo, we're going to look at top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=1.671) [cached stored procedures by average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=3.347) [elapsed time for the current database. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=5.3853333333333335) [this helps you find possibly easy tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=8.239) [opportunities because you're going to see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=10.9352) [which stored procedures are taking the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=13.203428571428573) [longest time on average to execute. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=15.457142857142857)[when I run this query, this comes back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=18.854222222222223) [tells me the stored procedure name and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=22.48842857142857) [then the average elapsed time in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=27.062571428571427) [microseconds, and then we get the minimum](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=29.148) [elapsed time and the maximum elapsed time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=31.548) [and the last elapsed time. So if you see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=34.472) [wide variations between these times, you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=36.79357142857144)[might have a plan stability issue, for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=38.69642857142857) [example, so that's useful to know. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=41.46124999999999) [then if we scroll over to the right, on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=44.001777777777775) [the result sets, we get the total elapsed](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=46.416375) [time and then the execution count and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=48.98914285714286) [calls per minute and the average worker](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=52.850500000000004) [time and total worker time, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=54.873333333333335) [has missing index column, so that tells](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=57.9) [you there's a missing index warning, with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=59.801) [a cached query plan for this. And then we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=61.79475000000001) [get the last execution time and the plan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=65.39599999999999) [cached time and then the graphical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=67.63749999999999) [execution plan. If you clicked on one of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=70.012) [these links, you would get that. So this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=71.807) [is going to help you find that long](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=73.50919999999999) [running stored procedure that possibly you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=75.162) [can tune and have a noticeable impact that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=77.62) [your users will actually notice and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=80.346) [appreciate if you go in and take the time to tune that query or stored procedure.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=11&mode=live&start=83.174)

[Bad Nonclustered Indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live)

[Bad nonclustered indexes. This query is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=1.759) [going to return any nonclustered indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=4.913857142857143) [in the current database that have more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=6.7494000000000005) [writes than reads, and that means they're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=9.506714285714283) [sort of considered to be bad indexes. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=11.637428571428574) [you might consider dropping those indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=14.525374999999997) [after you do some more analysis of your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=16.95714285714286)[workload, but it's also really important](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=20.124000000000006) [to keep in mind how long has your instance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=21.377285714285716) [been running? Has it been only just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=24.19488888888889) [running for a few hours, for a few days,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=25.900777777777773) [or has it been running for many weeks or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=27.823888888888895) [months? And the important thing is to make](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=30.804500000000004) [sure that you've seen your complete](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=32.59462500000001) [business cycle so that there's not some](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=34.91766666666667) [reporting query, for example, that only](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=36.783000000000015) [gets run at the end of the month and you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=38.90871428571429) [have not run those reporting queries. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=41.48619999999998) [if you drop the indexes, then make that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=43.54677777777778) [query go fast, that's going to be bad news](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=45.257) [at the end of the month. So you need to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=47.779) [careful about that. So going further into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=50.428875000000005) [this, indexes with far more writes than](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=53.08239999999999) [reads are not really very useful for your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=55.74457142857141) [workload. You're paying the cost to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=57.96949999999999)[maintain those indexes as the data changes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=60.37542857142857) [and you're not getting very much benefit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=62.67575) [when you run select queries from those.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=64.634) [It's sort of a judgment thing, but you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=67.448) [need to think about starting to drop some](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=69.19377777777778) [of those indexes and have a lot more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=71.09375000000003) [writes than reads, and on many production](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=72.77950000000004) [servers you'll find a number of indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=75.79742857142854) [that have zero reads and hundreds of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=78.97425) [thousands or millions or hundreds of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=81.56628571428573) [millions of writes. So that's what you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=83.62485714285712) [want to be on the lookout for. And unused](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=85.29933333333335) [indexes make your database larger, they](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=88.23085714285713) [use up space inside of the data file, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=90.70757142857141) [they increase your maintenance workload](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=93.455625) [when you're doing index maintenance, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=94.96119999999999) [they make your backups take longer. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=96.6215) [there's lots of downsides to having these](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=99.051) [unused indexes. You also want to make](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=101.36533333333334) [sure, again, that you've seen your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=104.21028571428569) [complete workload before you start](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=107.16599999999998) [dropping indexes, and what I always do,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=109.3912) [after I do further research, is I'll](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=111.18411111111108) [script out the index before I drop it in case I need to add it back.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=12&mode=live&start=113.0942857142857)

[Demo: Bad Nonclustered Indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live)

[For this demo, we're going to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=1.6) [possible bad nonclustered indexes, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=3.099) [that just means we have more writes than](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=5.4232499999999995) [reads for the nonclustered index. And it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=7.5006666666666675) [really important when you run this query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=10.289285714285715) [that you understand how long SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=12.17242857142857) [has been running because if it's only been](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=14.096285714285715)[running for a few hours or even a few days](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=15.982625000000002) [perhaps, you might not have seen your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=18.358111111111103) [complete query workload. So as long as](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=20.782500000000002) [you're confident that you've been running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=23.123) [long enough that you've seen all the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=24.627428571428574) [queries you're typically going to see on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=26.191714285714284) [this current database, then this gives you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=28.458199999999998) [more reliable results. So when I run this,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=31.617428571428565) [it comes back and tells me the table name](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=34.258999999999986) [and the index name of indexes that have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=37.339444444444446) [more writes than reads. And it shows me](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=41.02571428571429) [the index id and whether or not the index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=44.2072) [has been disabled or not, whether it's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=46.47737500000001) [hypothetical index or not, whether it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=49.14685714285714) [filtered or not, what the fill factor is,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=51.3545) [and then the number of writes and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=53.719249999999995) [number of reads and the difference. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=56.13375) [what you're looking for here is indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=58.613375000000005)[that have lots and lots of writes and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=60.373) [either zero or low numbers of reads,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=62.544) [because you're not getting any benefit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=64.776) [from those indexes. And again, it's really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=66.87685714285713) [important that you've been running long](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=69.41566666666667) [enough so that you don't decide to delete](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=70.96242857142857) [an index that's only used on a reporting](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=73.38542857142855) [query once a month. And so make sure that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=76.27900000000001) [doesn't happen to you. So make sure you understand how long you've been running.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=13&mode=live&start=78.92166666666667)

[Missing Indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live)

[Missing indexes. This query shows all the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=1.6) [missing index requests for the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=4.639) [database. And SQL Server keeps track of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=7.348428571428571) [this, you know, whether you want it to or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=9.77914285714286) [not, and it's very useful, but it's very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=11.908111111111117) [easy to misinterpret. A lot of people will](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=14.488500000000005) [run this query and overreact and do some](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=17.188) [bad things based on the results of this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=19.528) [query. So I don't want you to do that. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=22.07644444444444) [you want to do some careful analysis of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=24.670749999999998) [your existing indexes and your workload](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=27.288857142857143) [before you start adding lots and lots of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=29.442) [new indexes based on the results of this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=31.683) [query. So I can't emphasize that enough,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=34.73366666666664) [think about what you're doing, don't just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=36.704) [automatically add every index that SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=39.35766666666667) [Server's asking for based on this query.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=41.87233333333333) [So going further into this, what you want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=44.768) [to do is look at all of the columns that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=47.013) [come back from this query, and I'll show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=49.299) [you more detail in the demo, but you also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=51.355) [need to know how long SQL Server has been](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=54.721) [running as you interpret the results of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=56.871) [this query, it's really important because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=58.826) [that's going to have a direct influence on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=61.329) [the magnitude of some of the numbers and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=64.125) [whether or not they're significant or not.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=66.423) [It makes a big, big difference whether](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=67.87566666666666) [you've been running for a few hours or a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=69.176) [few days versus many weeks or months, when](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=71.46060000000003) [you look at these numbers that come back.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=73.37249999999997) [And you want to pay very special attention](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=76.001) [to the last\_user\_seek column, that tells](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=78.437) [you the last time that SQL Server wanted](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=80.97525000000002) [that index that it's asked for. The](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=83.138) [user\_seek column tells you how many times](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=85.94071428571428) [it's wanted it, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=88.30924999999999) [avg\_total\_user\_costcolumns shows you how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=91.30449999999999) [expensive it is to not have that index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=93.77677777777778) [that it's asking for, so larger numbers](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=97.5282) [are much more significant, and you'll see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=100.14249999999998) [a very wide range of numbers come back.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=102.212) [And finally, you want to make sure you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=105.352) [look at your existing indexes and you want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=107.193) [to try to create fewer wider indexes, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=109.806) [indexes that have more columns rather than](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=113.71842857142857) [lots of narrow indexes. This diagnostic](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=115.8778) [query tends to recommend many, many narrow](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=118.40066666666668) [indexes to try to cover every possible](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=121.262875) [query, and you need to try to guard against that.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=14&mode=live&start=123.77525000000001)

[Demo: Missing Indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live)

[In this demo, we're going to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=1.535) [missing indexes for the current database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=2.5) [ordered by Index Advantage and, again,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=5.45) [this is filtered by only the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=7.622) [database, as opposed to earlier we looked](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=10.319) [at missing indexes across the entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=11.947) [instance. So when I run this query, it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=15.40814285714286) [comes back and shows me the index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=17.993999999999993) [advantage, which is a calculated column](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=19.950499999999995) [based on several of the other columns. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=21.861285714285717) [you also want to look very closely at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=25.307125)[last\_user\_seek column. So if that's just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=27.847) [from a few seconds ago or a few minutes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=29.758666666666667) [ago, and then you run this query again and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=31.618555555555552) [it updates, that means that whatever query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=34.479666666666674) [is triggering this missing index request,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=37.336333333333336) [is part of your normal workload and you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=40.619) [want to pay more attention to it. Then it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=42.05) [tells you the database and the schema and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=44.54675) [the table. And if we scroll over to the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=46.6585) [right, then it shows the equality\_columns](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=50.096749999999986) [in this proposed new index, the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=53.277) [inequality\_columns, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=56.0624) [included\_columns. And then if we scroll](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=57.724) [even further to the right, it shows us how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=60.186) [many compiles we've had and then how many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=63.029) [user\_seeks, which is really important,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=65.42500000000001) [that's how many times the query that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=67.395) [triggered this request has been executed.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=69.349) [And then you see the avg\_total\_user\_cost](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=72.106) [and that is a measurement of how expensive](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=75.149) [it is not to have this query. So generally](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=78.164) [speaking, larger tables that are doing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=80.43200000000002) [table scans or clustered index scans, for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=82.71885714285715) [example, will have a higher total user](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=85.09771428571429) [cost because it doesn't have the index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=87.86657142857143) [that it's asking for here. Then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=90.10357142857144) [avg\_user\_impact column, that's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=93.38600000000001) [percentage that the query optimizer thinks](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=95.08500000000001) [that the cost of the query that triggered](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=97.20671428571428) [would be reduced by. So larger numbers are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=100.09528571428574) [more significant. And then it shows the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=104.06433333333331) [table name and the number of rows in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=105.91655555555559) [table, and that's really important to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=108.16533333333334) [understand if you were thinking about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=109.77016666666667) [creating a index, especially if you're on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=110.805) [SQL Server Standard Edition, which does](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=113.10571428571428) [not have online index operations. So if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=115.77666666666666) [you're talking about more than a few](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=119.11555555555555) [million rows, you've got to be a lot more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=120.997) [careful about creating an index because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=123.213) [it's going to lock up the table while it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=125.348) [building the index and that would cause an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=126.838) [outage if you try to do it outside of a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=129.411) [scheduled outage. So by looking at all](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=132.768) [these, you can get a better idea of what](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=134.383) [indexes, if any, you might want to create.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=137.34914285714285) [And the worst thing you could possibly do](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=139.91) [after you run this particular diagnostic](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=142.48457142857146) [query is just decide to create every](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=144.49814285714288) [single one that it asks for, because](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=146.50300000000001) [you're going to have a lot of very similar](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=148.364) [index requests. And even if they're not](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=151.1925) [exactly similar, you're going to easily](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=154.46157142857146) [over index the database if you just create](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=156.187) [every single index that it asks for on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=158.00328571428568) [this diagnostic query. So make sure that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=160.57166666666663) [you're aware of that and use some good](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=162.735) [judgment before you start creating lots](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=165.2125714285714) [and lots of indexes based on this query alone.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=15&mode=live&start=167.298)

[Missing Index Warnings](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live)

[Missing index warnings. This is a very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=2) [useful query that finds missing index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=4.7185) [warnings in the plan cache. And this query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=6.736857142857143) [can take a long time, many minutes in some](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=10.031374999999997) [cases, to return the results. So just be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=12.978666666666669) [aware of that. It's not really causing a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=15.575499999999998) [problem for the instance, but it takes a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=17.655874999999995) [long time and sometimes you'll lose](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=19.877249999999997) [patience waiting on it to come back. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=21.901500000000002) [it's going to give you the object name,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=24.23233333333334) [which is going to be a stored procedure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=26.170111111111108)[name, and the graphical execution plan,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=28.18342857142857) [when it comes back, and it also will tell](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=30.104333333333336) [you how many times that stored procedure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=33.29099999999998) [wanted this index, how many times it was](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=35.444) [executed. So that's very useful. Now going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=38.30483333333332) [further into this, it's going to associate](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=40.91975000000001) [those missing index requests, like we got](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=43.0664) [in the previous query, with a specific](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=45.88914285714285) [stored procedure, and that's very, very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=48.4152) [useful in real life because that's going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=50.436) [to help you make a better judgment about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=51.91825) [whether or not you might want to create](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=54.064499999999995) [this new index or not. And the usercounts](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=56.52137500000001) [column shows you the number of times that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=59.90771428571429)[that stored procedure was executed, and so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=62.37824999999999) [that helps you judge how frequently it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=64.904) [being used and whether it's important or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=67.46314285714283) [not. And the execution plan that you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=69.90799999999997) [click on and get is going to actually have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=72.134) [the missing index detail. So it'll tell](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=74.87577777777774) [you exactly what index that it thinks that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=77.43262499999999)[it wants for that stored procedure, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=79.88737499999999) [that's really, really useful. And knowing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=82.43350000000001) [which stored replacement is generating](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=84.90100000000001) [that request helps you make a better](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=87.08619999999999) [decision about whether or not you want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=89.54899999999996) [create the new index or not. But again,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=91.5135) [you need to still go back and look at your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=93.35700000000003) [existing indexes and look at how volatile](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=96.0165) [the table is that you're thinking about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=98.32100000000003) [creating an index on. Don't just start](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=100.0667142857143) [blindly creating indexes based on this query.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=16&mode=live&start=102.95666666666668)

[Demo: Missing Index Warnings](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live)

[For this demo, we're going to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=2.031) [missing index warnings for cached query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=3.155) [plans in the current database. And this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=5.218) [can take a few seconds to come back, or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=8.619666666666665) [even longer in some cases on a busy](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=10.396555555555556) [instance with lots of cached plans in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=12.862857142857143) [plan cache. So when I run this, it'll come](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=16.291555555555554) [back in this case pretty quickly and it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=19.5155) [shows me the stored procedure name if this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=21.705000000000002) [is associated with a stored procedure, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=23.545714285714286) [then the fact that it's a procedure in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=25.066) [this case. And then use count is how many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=27.757000000000005) [times that stored procedure has been](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=30.38266666666666) [executed, and then you can see the size in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=32.7416) [bytes for the query plan. But the most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=34.64755555555558) [interesting part of this is the actual](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=37.02271428571428) [graphical execution plan, so now we know](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=39.093) [which stored procedures have a missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=42.53071428571428) [index warning associated with them and if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=45.101) [we click on the query plan for one of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=46.92044444444445) [these, it'll come back and show us the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=49.00000000000001) [graphical execution plan, along with the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=51.948) [requested index that the missing index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=54.565285714285714) [warning has generated. So, now you can tie](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=56.861399999999996) [these missing index warnings to particular](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=60.03949999999999)[stored procedures, and that's really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=62.56459999999999) [helpful when you're trying to decide](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=64.0755) [whether or not to create that new index or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=65.570375) [not, because you can judge and talk to the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=68.12300000000002) [developers and maybe find out, if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=71.07125000000002) [don't know, whether that's an important](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=73.275) [stored procedure or not that you might](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=75.14860000000002) [want to actually give a new index to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=76.88100000000003) [improve the performance of that stored procedure.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=17&mode=live&start=79.32275000000003)

[Overall Index Usage - Reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live)

[Overall index usage - reads. This query is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=2.024) [going to show you which indexes in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=4.880374999999999) [current database have the most reads. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=6.869999999999999) [those are the indexes that are actually](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=9.075875000000002) [giving the most usefulness for select](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=11.224714285714287) [queries. It's going to help you understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=13.548428571428571) [your workload and understand which indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=15.6172) [are the most valuable for you. Index reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=18.493) [are beneficial for select query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=21.658666666666665) [performance. There's no way around that.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=23.504142857142856) [And, again, running this query is very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=26.361) [useful when you're thinking about adding](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=28.898) [more indexes, for example, to understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=31.828) [your workload. So going further into this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=34.7085) [query, indexes with high reads may benefit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=37.47883333333334) [from data compression. So especially if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=40.86842857142855) [it's relatively static data and if you run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=43.427499999999995) [the SP estimated data compression savings](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=47.47575) [stored procedure and that comes back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=49.896) [tells you that the data is very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=52.18) [compressible, then it might make sense to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=55.095) [think about using data compression on that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=56.816) [index. You want to evaluate your data](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=58.715875000000004) [volatility and compressibility, just like](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=61.641) [I talked about, so by running this query,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=63.16850000000001) [it helps you understand how often you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=66.113) [reading from the index, and then running](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=68.405) [the SP estimated data compression savings](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=70.707) [stored procedure shows you how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=73.344) [compressible it is before you actually try](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=75.52066666666666) [compressing the index. Tables with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=78.13657142857143) [extremely high reads also might be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=81.00799999999998) [columnstore index candidates. So take a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=84.37971428571427) [look at that and see if that makes sense.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=86.62259999999999) [This is going to return the cumulative](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=88.661) [metrics for all the row-store indexes in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=90.66916666666667) [the current database. So it shows you,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=93.81500000000001) [again, which indexes have the most reads in the current database.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=18&mode=live&start=96.50500000000002)

[Demo: Overall Index Usage - Reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live)

[For this demo, we're going to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=1.932) [index read/write stats for all of the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=2.844) [tables in the current database ordered by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=5.009) [reads. And this is going to tell us which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=8.442499999999999) [indexes are the most helpful for select](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=9.93033333333333) [queries in this database. So when I run](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=12.332428571428576) [this, it comes back and shows me the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=15.389500000000002) [ObjectName, which is the table name, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=17.59025) [then the IndexName. And if we scroll over,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=20.26533333333333) [we can see index\_id and then if we go a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=23.686888888888888) [little bit further, we get Total Reads and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=26.747333333333337)[Total Writes, and then the reads are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=30.020571428571433) [broken down into user\_seeks and user\_scans](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=32.331375) [and user\_lookups. And then we can see the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=35.24400000000001) [Index Type, whether it's a clustered index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=37.85575) [or a nonclustered index, for example. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=39.21342857142857) [then the Fill Factor and whether or not](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=42.42066666666667) [there's a filtered index, whether this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=44.818) [a filtered index, and what the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=45.98262500000001) [filter\_definition is, and then it tells](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=47.516) [you the last time of a scan or a lookup or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=49.964000000000006) [a seek on this index. So this is going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=54.118363636363625)[help you judge which of your indexes are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=57.349) [the most useful for helping your select](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=60.506) [query performance. And understanding this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=62.988) [and understanding which tables are seeing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=66.13799999999999) [the most reads is going to help you with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=68.62285714285713) [your index tuning strategy and also with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=71.59725000000002) [your I/O subsystem tuning configuration](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=74.12357142857144)[strategy, assuming you have multiple file](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=76.91399999999999) [groups and multiple data files, you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=79.62083333333334) [decide what to do with certain objects](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=81.71142857142861) [that might be in a particular file. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=84.14899999999999) [this is a very useful query in judging your index effectiveness.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=19&mode=live&start=86.90844444444446)

[Overall Index Usage - Writes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live)

[Overall index usage for writes. This query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=1.782) [shows you which indexes in the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=5.0040000000000004) [database have the most writes, and this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=6.791833333333333) [also very useful when you're thinking](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=9.187625) [about making changes to your indexes. It's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=10.533857142857142) [going to help you understand your workload](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=13.370714285714286) [and it's going to help you figure out](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=15.297) [which tables are the most volatile and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=17.452714285714283) [which indexes are the most volatile. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=19.737250000000003) [any index writes you have to do are bad](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=23.054) [for INSERT/UPDATE query performance. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=26.615399999999998) [the more indexes you have on a table that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=28.619777777777777) [have to be updated when you do an insert](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=30.94288888888889) [or an update or delete, are going to hurt](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=32.44244444444445)[those operations. Going deeper into this,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=35.51433333333333) [you want to look for indexes that have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=38.802499999999995) [many more writes than reads because those](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=41.336499999999994) [are not benefiting you as much as they](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=44.01971428571429) [could and you're paying a price to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=46.42644444444445) [maintain those. So you also want to make](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=48.498) [sure that you know how long SQL Server has](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=51.2976)[been running and whether or not you've](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=53.69375000000001) [seen your complete business cycle before](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=55.145142857142844) [you start dropping indexes that have lots](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=56.852500000000006) [and lots of writes and very few reads. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=59.70850000000001) [don't just start blindly dropping indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=63.42475) [without doing some more analysis to make](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=65.86840000000001) [sure you don't drop some index that's only](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=67.80324999999999) [needed once a month, but it's really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=70.40037499999997) [important to some reporting queries, for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=73.007) [example. And this is going to give you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=75.79549999999998) [your cumulative metrics for all your row-store indexes in the current database.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=20&mode=live&start=77.80137499999998)

[Demo: Overall Index Usage - Writes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live)

[For this demo, we're going to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=1.812) [overall index usage ordered by writes, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=2.947) [the exact opposite of the previous query.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=5.316625) [When I run this, this will come back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=8.142) [tell me which objects and which indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=10.6205) [within those objects have the most writes.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=13.417) [And this is really useful, again, for your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=17.533) [index tuning strategy and also for your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=20.194285714285716) [storage subsystem strategy. So whether](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=23.220200000000002) [it's deciding what RAID level to use or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=24.91414285714286) [what kind of storage you might want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=27.325333333333337) [use, this can be helpful for that. But](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=28.927999999999997) [this shows us the name of the table and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=30.4284) [the name of the index, and then if we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=33.348) [scroll over to the right, the index\_id and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=35.312) [the total number of writes and total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=38.626) [number of reads and what kind of index it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=39.715375) [is, whether it's a clustered index or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=42.33233333333336) [nonclustered index. And then the fill](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=44.017) [factor and whether or not it's a filtered](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=46.223) [index and what the filter definition is.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=47.958) [And then the last user update. So you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=50.896) [see the last time that index was updated.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=53.08833333333334) [So this is another useful query for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=55.61642857142857) [judging the effectiveness of your indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=58.382000000000005) [and possibly finding indexes that you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=61.10933333333334) [might want to drop. But you want to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=63.62866666666667) [more careful with this one because this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=65.20733333333332) [not just going to show nonclustered](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=66.79133333333334) [indexes, it'll show clustered indexes that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=68.49) [you probably are not going to want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=70.98542857142859) [drop, even if they're not being read from very much.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=21&mode=live&start=73.07633333333335)

[Volatile Indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live)

[Volatile indexes. This diagnostic query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=1.76) [shows you which indexes and statistics in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=4.332) [the current database have the most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=6.816) [updates, so they're very volatile. This is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=9.341999999999999) [going to help you understand your write](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=12.05525) [workload, which is really important when](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=13.701333333333332) [you're thinking about doing index tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=15.587333333333333) [and it's important when you're doing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=17.513857142857145) [storage tuning and storage configuration.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=19.943) [This is going to help you design and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=23.114) [configure your storage because if you know](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=24.018) [you've got certain tables and indexes that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=27.518) [are extremely volatile, you might want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=30.231714285714286) [have them on their own file group that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=31.877555555555556) [on a certain kind of storage, configured a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=34.018) [certain way, for example. So diving deeper](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=37.318666666666665) [into this, you want to be a lot more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=40.21433333333333) [cautious about creating new indexes on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=42.671) [very volatile tables because then you're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=44.95366666666667) [going to be paying the price to update](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=47.469500000000004) [those indexes more frequently if the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=49.759) [tables are very volatile. And you also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=52.58266666666667) [want to be more cautious about using data](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=54.574999999999996) [compression or columnstore indexes on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=56.877) [volatile tables because then, again,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=59.52633333333333) [you're paying the price to maintain those](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=61.498000000000005) [data compressed or columnstore indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=64.3704) [because of the table volatility. And you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=66.725) [also want to think about possibly moving](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=70.0435) [these really volatile tables and indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=71.65833333333333) [to separate file groups that could be also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=74.26771428571429) [on a separate LUN with different](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=77.77775) [underlying storage with a different RAID](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=80.429) [level, for example. Consider using flash](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=82.476) [storage on a non-parity RAID level, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=85.376) [instead of RAID 5 or RAID 6 or RAID 50,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=88.43199999999999) [something like RAID 10 for very volatile](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=92.547) [data, so you're not paying that price for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=95.353) [the parity information and paying the write performance penalty of that.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=22&mode=live&start=99.25483333333332)

[Demo: Volatile Indexes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live)

[For this demo, we're going to look at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=1.608) [most frequently modified indexes and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=2.912) [statistics in the current database. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=4.938) [when I run this, this comes back and shows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=8.347) [me the Object Name, which is the table](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=10.52175) [name, and then the object\_id, and whether](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=12.701333333333334) [it's a table or a view, for example. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=15.393749999999999) [then the Statistics Name and the stats\_id,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=17.79214285714286) [and then it tells you whether or not](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=20.186124999999997) [no\_recompute isn't set for that particular](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=22.91285714285714) [statistic and whether there's an auto](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=25.260800000000003) [created statistic or not, if it's an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=27.43271428571429) [incremental statistic or not, a temporary](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=30.030571428571424) [statistic, and the modification\_counter,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=32.81) [that's what it's ordered by. And then how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=35.169) [many rows are in the table and how many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=37.24733333333333) [rows were sampled, and the last time it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=39.301) [was updated. So what this is useful for is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=41.76014285714284) [figuring out which of your objects and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=45.58455555555556) [which indexes within those objects have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=48.38114285714287) [the most volatility, which ones are seeing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=50.955333333333336) [the most updates. And if you have a really](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=53.64050000000001) [highly volatile table, you want to be more](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=57.00050000000001) [careful about adding more indexes to that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=59.756499999999996) [table and you want to be more careful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=61.618750000000006) [about using SQL Server data compression,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=63.636749999999985) [for example. So instead of just guessing,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=65.80080000000001) [this is one of the queries you can run to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=67.83525000000002) [figure out, oh yah, now I see that my](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=69.93777777777775) [customer table has quite a bit of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=73.31366666666663) [volatility in it, so I probably want to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=75.176625) [a little more careful about adding](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=76.7126666666667) [additional indexes and I probably want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=78.8134) [think twice about using data compression on any indexes in this table, for example.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=23&mode=live&start=81.58937499999996)

[Module Summary](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live)

[So what have we covered in this module? In](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=1.76) [this module, we covered how to run and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=4.352888888888889) [analyze 12 activity-related database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=6) [queries. Now I've talked about how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=9.599200000000002) [interpret the results of these queries so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=11.051749999999997) [you can better understand what the results](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=12.944749999999997) [actually mean. We also covered some useful](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=15.306666666666667)[methods for alleviating many common](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=17.502142857142857) [activity-related database issues, so you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=20.400499999999997) [can better apply what you've learned by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=22.315571428571435) [running and properly interpreting these](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=24.398857142857146) [queries. In the next module, I'm going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=27.08433333333333) [cover how to diagnose storage and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=29.396444444444437) [memory-related database issues. So let's go.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=dfc33324-9df7-4941-ae8c-143790182825&clip=24&mode=live&start=31.824799999999993)

[Diagnosing Storage and Memory-related Database Issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live)

[Introduction and Buffer Usage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live)

[Hi, my name is Glenn Berry from](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=0) [sqlskills.com. This course is about using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=4.332125) [DMV queries to diagnose performance issues](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=6.080285714285712) [with SQL Server 2017. And in this module,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=8.152000000000001) [I'll be discussing how to diagnose storage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=12.263) [and memory-related database issues. In](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=14.295) [this module I'm going to cover seven](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=18.841250000000002) [useful queries for detecting and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=19.781) [diagnosing storage and memory-related](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=22.506833333333333) [database issues, which are quite common](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=24.711000000000002) [with many SQL Server databases. I'll be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=27.699222222222225) [discussing how to interpret the results of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=30.45514285714286) [each query and how that relates to other](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=31.99375) [information you may have collected. I'll](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=34.44714285714285) [also cover some useful methods for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=36.959857142857146) [alleviating many common storage and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=39.119) [memory-related database issues, so you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=41.091) [apply what you've learned by running and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=43.318)[interpreting these queries. We have a lot](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=46.164) [to cover in this module, so let's get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=49.07444444444443) [started. Buffer usage. This query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=52.294000000000004) [identifies buffer usage by object for the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=55.054666666666655) [current database. And what that means is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=57.99885714285713) [which objects in your database are using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=60.41237499999998) [the most memory in the SQL Server buffer](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=62.52099999999999) [pool. It's going to show buffer counts and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=65.56933333333332) [memory usage. So you're looking for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=68.57700000000003) [objects that are using a lot of memory in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=70.00814285714287) [your buffer pool. It's also going to show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=72.95366666666666)[you the row counts for the tables that are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=75.18222222222222) [involved, and this is also going to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=77.5135) [you identify possible data compression](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=79.2201111111111) [opportunities. So going a little bit](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=82.16050000000001) [deeper into this query, it's going to show](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=83.66762500000002) [which tables and indexes are using the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=85.90275) [most memory in the SQL Server buffer pool.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=88.33399999999997) [And when you're looking for things that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=91.521) [are using many gigabytes of memory in most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=92.75300000000001) [cases because those possibly you can use](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=96.37) [data compression on to reduce their memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=98.987) [usage. You want to monitor those metrics](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=103.04962500000002) [after you make any index or data](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=105.061) [compression changes. So if you go in and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=107.36371428571428) [go from no compression to page data](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=109.7458) [compression, you want to see what the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=111.81037499999998) [result was after you actually made that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=114.08949999999999) [change. This query can help you identify](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=116.47028571428571) [possible data compression candidates. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=119.2012) [if you see a table that has many rows and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=121.84519999999999) [it's using a lot of memory in the buffer](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=125.28644444444446) [pool and if it's relatively static data,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=126.82228571428571) [it might be a good candidate for SQL](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=129.90855555555555) [Server data compression. This query can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=133.273) [take some time to complete, many minutes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=136.67475) [in some cases, on a large database. It's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=138.9297777777778) [also useful to help identify index and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=142.82057142857144) [query tuning opportunities because if you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=144.92416666666665) [see objects that have a lot of buffer pool](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=147.54288888888888) [usage, perhaps you can do some query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=150.18275) [tuning or index tuning to help reduce that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=153.1) [amount of SQL Server buffer pool usage by that object.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=0&mode=live&start=156.9)

[Demo: Buffer Usage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live)

[For this demo we're going to look at which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=0) [objects in the current database are using](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=3.1182857142857148) [the most memory in the SQL Server buffer](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=4.962499999999999) [pool. And when we run this query, which](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=7.678000000000001) [can take a few seconds, it can show us the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=9.378000000000002) [object name, which is usually going to be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=11.548222222222218) [a table name, and then the index id and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=13.46644444444444) [how much space in megabytes is being used](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=16.325333333333337) [by that index and the buffer pool, along](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=18.68925000000001) [with a buffer count and the row count for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=21.108750000000004) [the table and what kind of compression, if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=23.757999999999996) [any, is being used on that particular](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=26.406444444444443) [index. So what you're looking for here are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=29.05555555555555) [objects that are using a lot of space in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=31.075500000000005)[your buffer pool that are not compressed,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=33.42466666666667) [and then if it looks like it possibly](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=36.364) [might be a good data compression](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=37.88133333333334) [candidate, you can run SP estimated data](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=39.84433333333333) [compression savings on that index to see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=42.45928571428571) [whether or not it's compressible or not.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=44.848666666666645) [And you can also take a look at some of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=47.638) [the previous queries in this set to see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=49.470727272727295) [whether or not it's a volatile table or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=51.27975000000001) [not. So after you do all that, maybe you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=53.83425) [can find some good candidates for data](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=55.53577777777775) [compression that can have a huge effect on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=57.939) [both your I/O bottlenecks and your memory pressure.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=1&mode=live&start=61.06785714285714)

[SP Logical Reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live)

[SP logical reads. This diagnostic query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=1.5) [shows you the top cached stored procedures](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=4.791) [ordered by logical reads in the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=6.984) [database. And you want to look for the Has](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=10.175125000000003) [Missing Index column to look for any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=11.783000000000001) [stored procedures that have a missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=14.474428571428575) [index warning in their cache query plan.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=16.485666666666667) [You also want to look at the graphical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=19.594) [execution plan to get more details about](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=20.55) [what's going on with this query and how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=22.585) [you can possibly tune it to make it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=24.146) [better. So was we go further into this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=26.819777777777787) [diagnostic query, it's going to identify](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=28.639750000000006) [which cache stored procedures in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=30.882714285714286) [current database are causing memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=33.288999999999994) [pressure because they're having the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=35.12400000000001) [highest number of total logical reads. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=37.1515) [this is going to help you identify](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=40.458124999999995) [possibly easy query or index tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=42.825) [opportunities to help reduce the memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=45.038) [usage by those stored procedures. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=48.081) [again, you want to look at the graphical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=50.141)[execution plan to see what they're doing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=51.882333333333335) [and what you might be able to do to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=54.2855) [them run better. And the total logical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=57.16357142857143) [reads value that you're going to sort by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=59.66785714285715) [in this diagnostic query usually tapers](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=61.991874999999986) [off really quickly. So if you just look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=64.0085) [the top 5 or top 10, you can usually get](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=66.50850000000003) [your most return on your investment that you spent on tuning.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=2&mode=live&start=69.06499999999997)

[Demo: SP Logical Reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live)

[For this demo, we're going to look at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=1.952) [top cached stored procedures ordered by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=2.837) [total logical reads. And logical reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=4.747) [relate to memory pressure, so this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=7.827999999999999) [going to help you find which stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=9.511999999999999) [procedures in the current database are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=11.016999999999998) [generating the most memory pressure. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=13.321857142857143) [when I run this query, it comes back and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=16.387111111111114) [shows me the stored procedure name, along](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=17.73371428571429) [with the total logical reads, and that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=19.775333333333332) [what it's ordered by and it falls off](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=21.9505) [really quickly, that's a very typical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=23.782) [pattern when you run this query against a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=25.549714285714288) [production database. It also shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=28.33) [average logical read, so you get an idea](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=30.737571428571428) [of how expensive it is every time it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=33.357666666666674) [run, along with the execution count and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=35.652888888888874) [the calls per minute. And then if we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=37.996714285714276) [scroll over to the right further, we can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=40.38344444444446) [see the average elapsed time in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=42.168428571428564) [microseconds, along with the has missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=44.239285714285714) [index column, and the last execution time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=46.52) [and the plan cached time, and then finally](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=49.17928571428572) [at the far right, we see the query plan,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=52.48985714285713) [so we have a link to the graphical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=55.03549999999999) [execution plan. So when you're looking at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=57.5808) [this, you're trying to find stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=59.29850000000001) [procedures that are generating the most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=61.60600000000001) [memory pressure. So you want to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=63.133999999999986) [the top three or top five results and look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=64.78979999999999) [at the execution plans for those and see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=66.97649999999997) [if there's a missing index warning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=69.03112500000002) [associated with them, and then see what,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=70.79200000000002) [if anything, you can do from a query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=73.00311111111111) [tuning perspective to make that stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=75.20614285714285) [procedure less expensive from a memory perspective.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=3&mode=live&start=76.88700000000001)

[High Aggregate Logical Reads Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live)

[High aggregate logical read queries. This](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=1.4) [diagnostic query returns the highest](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=5.221833333333333) [aggregate logical read queries for the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=6.936) [current database over the past hour. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=9.128) [you have to have Query Store enabled for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=13.240124999999999) [this query to return any results, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=14.375142857142857) [using Query Store is a really good idea,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=16.29825) [by the way, if you're on SQL Server 2016](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=17.90222222222222) [or newer. So this is going to help you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=19.83888888888889) [identify the source of recent memory](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=22.833142857142857) [pressure because it's showing you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=25.492)[queries that have the highest aggregate](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=27.246) [logical reads over the past hour. So going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=28.666) [further into this diagnostic query, it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=32.93966666666666) [returns information from Query Store, so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=35.080000000000005) [you have to have Query Store enabled for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=37.974250000000005) [this database or else you won't get any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=39.868142857142864) [results back from this query. And you want](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=42.54637499999999) [to focus on the top five results first](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=44.642999999999994) [because the total logical reads usually](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=47.06133333333334) [decrease really rapidly when you look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=49.71333333333333) [the results of this query on most](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=52.23433333333334)[production systems. You want to make note](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=54.43666666666667) [of any queries you see that have parallel](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=56.80200000000001) [plans because quite often when you have a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=59.30199999999999) [parallel plan, maybe you have a missing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=62.32128571428571) [index, for example, and that might be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=64.68966666666668) [something you can easily tune. You also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=66.11099999999996) [want to just look at the graphical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=68.68099999999998)[execution plan in general for any of your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=69.465) [expensive queries to try to figure out why](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=71.727) [are they expensive and what, if anything, you might be able to do to tune them.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=4&mode=live&start=74.506)

[Demo: High Aggregate Logical Reads Queries](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live)

[For this demo, we're going to take a look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=1.5) [at the highest aggregate logical read](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=3.006) [queries over the last hour, and this query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=5.914) [depends on Query Store, so you have to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=7.829) [have Query Store enabled for the database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=10.057444444444448) [in question or you won't get any results](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=12.506285714285712) [back from this query. And this is a fairly](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=14.604) [large query, so I'll scroll down so you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=18.095857142857135) [can see the rest of it, but you have the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=20.0754) [script so you can look at it in your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=22.291599999999995) [leisure. So here's the query and when we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=24.78216666666666)[go ahead and run it, it's going to show us](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=26.896777777777782) [the queries in the current database that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=31.267888888888876) [have generated the highest numbers of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=33.22942857142857) [aggregate logical reads in the past hour.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=35.56850000000001) [And it's really easy to modify this to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=38.888) [change that time span. But I've got it set](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=41.057) [for an hour. So you can see the containing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=43.649249999999995) [object on these top three, and then it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=45.637285714285696) [gives you the complete query text. And if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=47.26862500000001) [we scroll over, it shows you the total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=50.821999999999996) [logical IO reads, and those numbers fall](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=52.92771428571429)[off really quickly, which is a typical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=55.63633333333333) [pattern. And you can see the number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=58.186666666666675) [plans associated with that query, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=59.980750000000015) [whether it's a forced plan, whether it's a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=63.14933333333333) [parallel plan, whether it's a trivial](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=65.23619999999998) [plan, and then you can see what kind of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=66.87150000000001) [parameterization you have going here, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=69.28285714285714) [the compatibility level that this used,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=71.39066666666666) [and then the compile start time, and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=73.72250000000003) [last execution time, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=77.08614285714283) [graphical execution plan. So this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=79.55849999999998)[useful because you're not going to lose](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=81.51737500000002) [your information if you restart SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=83.57542857142856) [like you would with a DMV, and you also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=85.843) [have the ability to easily filter how far](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=88.519) [back in time you go. But again, make sure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=90.666875) [you've Query Store enabled or else you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=93.54257142857142) [won't be able to use this particular query at all.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=5&mode=live&start=95.35566666666664)

[I/O Statistics by File](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live)

[I/O statistics by file. This diagnostic](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=1.3) [query returns the I/O statistics by file](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=4.402) [for the current database, so all your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=6.694499999999999) [database files, it shows separate](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=9.297666666666665)[statistics for each one of them. And it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=10.955499999999999) [going to show you the location and size on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=12.845888888888885) [disk for each database file, which is also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=15.776) [very handy to understand. So this returns](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=18.76611111111111) [your metrics about read and write](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=21.279142857142855) [activity. And the reason this is so](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=23.48975) [important is it helps you understand your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=25.918285714285716) [I/O workload and also helps you design and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=28.291714285714285) [configure your I/O subsystem. So going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=31.049333333333333) [further into this query, helps you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=33.64266666666666) [understand your I/O workload by file for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=36.335142857142856) [the current database, and depending on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=39.061) [your workload, you might see a very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=41.202400000000004) [different I/O kind of metric depending on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=43.30366666666665) [whether it's the data file or the log](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=45.54285714285714) [file, and which data file it is. So it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=47.683555555555564) [really valuable to have this kind of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=50.02100000000001) [information. It's very useful for your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=53.079750000000004) [design when you design your I/O subsystem,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=54.791875) [deciding whether to use magnetic storage](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=57.368) [or flash storage, for your configuration](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=59.113) [deciding what RAID level to use, and also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=61.622) [for tuning purposes because if you see](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=64.74866666666667) [that it's a very write heavy or a very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=67.01466666666666) [read heavy workload, that's going to have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=69.16499999999999) [an influence on your indexing strategy,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=71.03649999999999) [for example. This is cumulative since the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=73.7405) [last SQL Server service start. And then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=77.00771428571431) [finally, this includes all the activity](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=80.03171428571429) [against the database files, not just your](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=82.2842) [regular workload. So things like database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=85.1828) [backups, running DBCC CHECKDB, doing index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=87.77359999999997) [maintenance, any kind of HA activity you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=91.33642857142856) [have, like from transactional replication,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=94.06266666666667) [for example, that's all going to show up in these numbers, so be aware of that.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=6&mode=live&start=96.465)

[Demo: I/O Statistics by File](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live)

[For this demo, we're going to take a look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=1.2) [at the I/O statistics by file in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=2.977) [current database. This helps you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=5.768) [understand your workload from an I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=8.007)[perspective. So when I run this query, it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=10.75585714285714) [comes back and shows me all the files in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=13.326444444444444) [the current database, so it shows the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=15.565666666666663) [database name in the first column and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=17.725857142857137) [the logical name of the file, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=19.832500000000003) [file id, and then the type description](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=22.968999999999994) [tells you whether it's a data file or a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=24.94114285714286) [log file. And then if I scroll over, it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=28.02688888888889) [gives me the physical name for each one of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=29.893111111111107) [these files, and how big the file is on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=31.867749999999987) [disk, which it can be different for how](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=35.71022222222224) [much space is being used inside the file.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=37.62749999999999) [And then it shows you the number of reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=40.257) [and the number of writes for each one of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=41.97925) [those. So this helps us understand that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=44.578500000000005) [we've got four data files that are in a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=46.66525) [main file group and those are seeing lots](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=50.470666666666666) [and lots of reads and zero writes. And if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=53.2485) [we scroll further over to the right, this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=56.74444444444444) [also gets into I/O stall reads and I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=59.14822222222222) [stall writes and then it shows you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=62.126) [percentage of reads and writes, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=64.499) [it shows you the numbers of writes plus](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=66.88512499999997) [reads, along with the megabytes read and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=70.21499999999995) [the megabytes written, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=72.49000000000004) [percentages. So what this is breaking down](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=75.4446666666667) [to is helping you figure out, rather than](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=77.58533333333331) [guessing, helping you figure out, is this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=80.29516666666665) [more of an OLTP workload or more of a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=81.71400000000001) [reporting workload? And you can not just](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=84.9976666666667) [look at that for the entire database, but](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=86.70299999999997) [this lets you drill in to the individual](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=88.45700000000002) [files. So now we have a better](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=92.23779999999998)[understanding that this looks like more of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=94.23442857142854) [a reporting workload in this case against](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=96.01525000000004) [this particular database, that would have](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=98.21650000000001) [an impact on how we decided to index this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=100.22300000000001) [and also how we decided to set up the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=102.87344444444444) [storage subsystem and how we configured it.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=7&mode=live&start=106.333)

[SP Physical Reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live)

[SP physical reads. This diagnostic query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=1.7) [returns your top cache stored procedures](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=4.728) [ordered by physical reads. So physical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=7.96) [reads means that it's having to go out to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=10.124714285714285) [the I/O subsystem instead of finding it in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=12.577500000000002) [the SQL Server buffer pool, which would be](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=14.432) [a logical read. Again, you want to look](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=16.727857142857143)[for the Has Missing Index column in this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=18.799625000000006) [diagnostic query because that's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=21.5605) [show you stored procedures that have a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=23.348999999999993) [missing index warning in their cache query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=25.72283333333333) [plan. You also want to look at the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=29.08742857142857) [graphical execution plan, just to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=30.28700000000001) [understand what this stored procedure that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=31.953666666666663) [shows up in this query is actually doing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=33.80614285714285) [and how you might be able to tune it. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=36.15014285714285) [as we go further into this, it's going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=39.845285714285716) [identify which cached stored procedures in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=42.48142857142858) [the current database are causing read I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=44.37199999999999) [pressure, and they're actually having to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=48.29875) [go out to your storage subsystem instead](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=49.65562500000001) [of finding what they're looking for in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=51.59266666666667) [SQL Server buffer pool. And this is going](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=53.7475) [to help you identify possible query and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=55.52800000000002) [index tuning opportunities to help reduce](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=58.074999999999996) [your physical I/O usage. So for example,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=60.91866666666667) [if you've got a very large table and it's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=62.97955555555556) [doing a clustered index scan and you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=65.581125) [put a nonclustered index on there to avoid](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=68.01274999999998) [that clustered index scan, that can have a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=70.3557142857143) [huge effect on the numbers that show up in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=72.93150000000001) [this diagnostic query. You want to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=75.70575000000001) [the graphical query plan to understand](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=77.711625) [what the queries are doing and what part](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=80.01500000000003) [of them is most expensive and what you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=82.03)[might be able to do to tune them. Finally,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=83.64849999999997) [the total physical reads value that we're](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=86.81916666666666) [sorting by in this diagnostic query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=88.70900000000002) [usually tapers off very quickly for the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=90.57316666666667) [top consumer. So usually you can get away](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=93.8135) [with just looking at the top five, for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=95.18324999999997) [example, and actually get a really good return on your investment.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=8&mode=live&start=97.45028571428574)

[Demo: SP Physical Reads](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live)

[For this demo, we're going to look at top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=1.699) [cached stored procedures ordered by total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=3.069) [physical reads. So this is stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=5.424333333333333) [procedures that are having to go out and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=7.216714285714284) [find their data on the storage subsystem](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=9.1755) [instead of finding it in the SQL Server](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=11.409571428571429) [buffer pool. So when I run this, it comes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=13.698285714285712) [back and shows me the stored procedure](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=15.675799999999995) [name, along with total physical reads,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=18.173200000000005) [that's what it's ordered by, and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=20.513) [average physical reads, and the execution](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=22.733000000000004) [count, and then if we scroll over to the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=24.640142857142855) [right a little bit, we get the total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=26.930222222222223) [logical reads, along with the total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=29.592000000000006) [elapsed time in microseconds, and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=31.318857142857137) [average elapsed time in microseconds. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=33.244600000000005) [then the has missing index column, along](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=36.816857142857145) [with the last execution time and the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=39.599714285714285) [planned cache time, and then finally, the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=41.75457142857143) [graphical execution plan. So again, this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=44.7725) [is stored procedures in the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=47.108000000000004) [database that are having to go out and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=49.083999999999996) [find their data on the storage subsystem](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=51.56866666666667) [because they're not always finding it in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=53.644400000000005) [the SQL Server buffer pool. So this,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=55.98774999999999) [again, is useful for finding stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=58.44571428571429)[procedures that maybe you can go in and do some tuning on.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=9&mode=live&start=60.795500000000004)

[SP Logical Writes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live)

[SP logical writes. This diagnostic query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=1.72) [returns the top cached stored procedures](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=4.4) [ordered by logical writes for the current](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=8.054) [database. So that's going to show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=11.106875000000004) [which stored procedures are generating the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=12.666500000000003) [most logical write activity. You want to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=14.336333333333332) [look for the Has Missing Index column](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=17.284000000000002)[because, again, that's going to show you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=19.68650000000001) [any of these stored procedures that happen](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=21.426000000000005) [to have a missing index warning in their](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=23.066285714285723) [cached query plan, and that might be a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=25.93685714285715) [very easy tuning opportunity. You also](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=28.221777777777785) [want to look at the graphical execution](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=30.046285714285712) [plan to see what those queries are doing](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=32.57214285714286) [and what, if anything, you might be able](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=35.207285714285725) [to do to tune them. So going further into](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=36.54225000000002) [this diagnostic query, this is going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=39.9855) [identify which cached stored procedures in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=42.38128571428571) [the current database, not the entire](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=44.4725) [instance, are causing write I/O pressure.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=46.91942857142857) [This is going to help you identify](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=49.25725) [possible query and index tuning](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=51.85883333333334) [opportunities to reduce your logical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=53.928) [writes. You want to look at the graphical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=57.81966666666668) [query plan to see if there's anything you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=59.51675000000001) [can do to help tune these queries. So a](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=61.07687499999999) [lot of times, for example, when you do an](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=63.622571428571426) [update statement, you have to actually](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=65.98300000000003) [find the row you want to update. So maybe](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=67.31600000000002) [there's a missing index that's causing it](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=69.38728571428574) [to do more work than it needs to to find](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=71.72300000000001) [the row that it needs to update. And then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=74.36699999999998)[TotalLogicalWrites usually tapers off very](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=78.3344) [quickly for your top consumers, so usually](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=80.529) [looking at your top five that come back](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=83.13575) [from this diagnostic query is going to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=85.37042857142858) [give you a really good return on your tuning time.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=10&mode=live&start=87.63624999999999)

[Demo: SP Logical Writes](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live)

[For this demo, we're going to look at top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=1.689) [cached stored procedures ordered by total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=2.9211666666666667) [logical writes. And when I run this query,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=5.402333333333333) [it's going to come back and show me the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=7.809666666666668) [stored procedure name, then the total](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=9.830750000000002) [logical writes, which is what it's ordered](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=12.042) [by, and then we see average logical](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=13.937444444444447) [writes, so you can get an idea of how many](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=15.47875) [writes each time that it executes, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=18.014444444444436) [then the execution count and the number of](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=20.59414285714286) [calls per minute. And if we scroll over to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=23.817571428571423) [the right, we get the total elapsed time](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=26.148250000000008) [in microseconds, along with the average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=28.168285714285716) [elapsed time in microseconds, whether or](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=30.109) [not it has a missing index associated with](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=32.6925) [the plan in the plan cache. And then we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=34.750499999999995) [see the last execution time and the plan](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=37.365750000000006) [cache time, and then the graphical query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=40.163000000000004) [plan associated with this. And so if we](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=42.913333333333334) [scroll back over here, what this is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=46.182500000000005) [helping you figure out is which stored](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=47.703375) [procedures are generating the most write activity in the database.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=11&mode=live&start=49.46266666666667)

[Top I/O Statements](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live)

[Top I/O statements. This diagnostic query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=1.632) [identifies the statements within other](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=4.247) [queries and stored procedures that are](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=7.164) [generating the most total I/O in the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=8.831) [current database. So it's very handy if](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=11.722) [you're seeing signs of I/O bottlenecks.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=13.662) [This is going to help you isolate the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=16.698) [cause of those I/O bottlenecks, whatever](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=18.541) [is causing the pressure will show up in](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=20.86642857142857) [this query. And this is also going to help](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=23.316111111111113) [you identify possible easy query and index](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=25.954571428571427)[tuning candidates. So as we dive deeper](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=29.101) [into this diagnostic query, it returns you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=31.796625000000002) [the stored procedure name, the average](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=33.679285714285705) [I/O, the execution count, and the complete](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=36.502285714285705) [query text for the statement that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=39.957714285714296) [actually generating that average I/O. And](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=42.1576) [you want to focus your tuning efforts on](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=44.807500000000005) [the stored procedures with the highest](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=47.74099999999999) [average I/O if you see other signs of I/O](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=49.823375000000006) [bottlenecks. And you also want to look at](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=54.212199999999996) [the execution counts, so that helps you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=55.40877777777778) [understand, is this something, even though](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=57.58399999999999) [it's very expensive, maybe it's not called](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=59.065000000000005) [very often. Or perhaps it's called quite](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=61.954142857142855) [often and it's actually a big contributor](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=64.95033333333332) [to your I/O pressure. And then the query](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=66.7878571428571) [text column is the actual statement that's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=69.689625) [generating the high average I/O. So you](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=72.68) [don't have to guess, you have a big, large](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=75.15288888888888) [stored procedure and it'll show you the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=77.187) [exact text within that stored procedure that's generating the I/O.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=12&mode=live&start=79.6244285714286)

[Demo: Top I/O Statements](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live)

[For this demo, we're going to find the top](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=1.621) [statements within stored procedures that](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=3.4484000000000004) [are generating the most I/O activity. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=5.916285714285714) [when we run this, it comes back and shows](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=8.972777777777779) [us the stored procedure name and then the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=10.953375000000001) [average I/O for that stored procedure,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=13.513142857142856) [along with the execution count, and then](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=16.508) [the actual query text that's generating](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=18.584428571428575) [that I/O is shown. So you can copy this](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=20.5908) [and stick it in another query window, for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=23.168111111111106) [example, and then you'll understand what](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=25.585800000000006) [part of that stored procedure is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=27.495857142857144) [generating the most I/O in average, and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=30.12633333333334) [that's really useful when you're trying to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=32.687714285714286) [do some query tuning to reduce your I/O requirements.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=13&mode=live&start=34.46857142857142)

[Module and Course Summary](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live)

[And with this final module, you're now](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=1.661) [familiar with the complete set of DMV](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=3.1304285714285713) [performance queries. We just finished the](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=5.909999999999999) [storage and memory-related database](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=7.840333333333332) [queries. I've also talked about how to](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=9.821333333333332) [interpret the results of these queries.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=11.611428571428576) [And we've covered some useful methods for](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=14.437)[alleviating many common storage and](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=16.570166666666665) [memory-related database issues, so you can](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=18.141) [better apply what you've learned by](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=21.297375) [running and interpreting these queries. So](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=23.038833333333333) [we've finished the course, so what now?](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=27.11575) [Well let's summarize this course quickly.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=30.25) [Many SQL Server instances have performance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=32.259)[issues. Anybody who's been a DBA for any](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=35.10900000000001) [amount of time knows that very well. DMV](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=37.15374999999999) [queries can detect most performance](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=41.623428571428576) [issues. Proper tuning configuration is](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=44.29057142857144) [going give you better performance, there's](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=45.78266666666666) [just no way around it. And then finally,](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=47.617999999999995) [you want to use best practice](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=51.524) [configuration settings as a baseline for your instance and your databases.](https://app.pluralsight.com/player?course=sqlserver-2017-diagnosing-performance-issues-dmvs&author=glenn-berry&name=7085a50d-ef4b-4f9d-8c5f-69e0f5dcb981&clip=14&mode=live&start=53.341999999999985)