[Introduction](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live)

[Why Should You Understand Server Hardware?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live)

[This is Glenn Berry from SQLskills. com.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=1.886) [I'm recording this course from Pluralsight](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=5.266) [and this course is about Understanding](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=7.15) [Server Hardware. This is module 1, the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=9.581000000000001) [introduction. Why should you understand](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=13.556000000000003) [server hardware? What's the point of this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=15.262666666666668) [course? Well, if you're the person in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=17.952666666666662) [charge of picking out a server and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=20.036000000000005) [specifying the component choices, it's is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=21.950666666666667) [really important that you know what you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=23.47866666666666) [doing and you know a little bit about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=25.261333333333315)[server hardware. It's really important](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=28.331555555555546) [that you make sure that your hardware can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=30.072428571428567) [handle the kind of workload that's kind of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=32.56957142857142) [we're seeing. There's a lot of different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=35.148857142857146) [sorts of service out there such as web](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=37.091714285714296) [servers and application servers, database](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=39.148857142857175) [servers for example. And they all play as](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=41.246) [different demands on their hardware. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=44.825999999999986) [want to get the best performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=47.40188235294118) [scalability you can for you are given a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=49.65717647058823) [hardware budget. You also want to make](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=52.66423529411764)[sure that you have some component](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=54.78683333333333) [redundancy to avoid single points of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=56.43183333333332) [failure if you can. If you know what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=58.355999999999995) [you're doing, you can save a quite a bit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=60.980444444444444) [of money in this process, both on hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=63.91544444444444) [cost and more importantly, on software](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=67.19054545454546) [license cost. Many products out there such](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=70.47963636363636) [as Microsoft SQL Server and Oracle are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=73.42044444444444) [licensed by physical process or course. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=76.38600000000001) [how you specify your processors for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=79.777875) [example has a huge effect on the overall](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=82.24912499999996) [cost at your server when you include the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=85.54412499999992) [software licensing cost. It's really](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=89.35800000000003) [important as you're going through in doing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=91.44266666666667) [this know how old your existing hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=93.9069090909091) [is, whether it's six months old or five](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=96.73236363636366) [years old for example. It could be that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=99.52236363636365) [your existing hardware is a lot slower the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=102.57133333333334) [new hardware is. There's been a very large](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=105.94200000000004) [advance in performance of the last several](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=108.94349999999999) [years according to Moore's law. And so,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=111.56377777777779) [new hardware is going to be so much faster](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=114.13236363636364) [than hardware from three or four years](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=116.816) [ago. Having new hardware can just quickly](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=120.23724999999997) [alleviate a lot of performance scalability](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=123.35676923076923)[problems. Throwing the hardware at the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=125.98753846153846) [problem is not always a bad thing. A lot](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=127.89683333333335) [of times, it's less expensive than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=130.77199999999996) [spending months and months of development](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=133.21999999999989) [work in time trying to optimize an application.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=0&mode=live&start=135.6679999999998)

[Introduction](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live)

[What is a server? A PC-based server uses](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=1.776) [specialized fault-tolerant hardware that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=5.170444444444444) [design for sustained heavy workloads. That](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=7.614888888888887) [means that it has higher quality](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=11.581833333333332) [components and often redundant components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=13.836833333333328) [that are hot-swappable and it also usually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=15.716) [has multiple processors and much more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=18.95)[available RAM and much more IO capacity in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=21.721999999999998) [a typical desktop computer. There are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=25.939999999999998) [three main server form factors that you'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=28.877666666666666) [often run into. The most prevalent one is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=31.4735) [a rack mount sever. Next you'll find tower](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=34.61377777777779) [servers. They're usually more used in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=38.284) [entry level applications. There is quite](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=40.783500000000004) [often less expensive than rack mount](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=42.999) [servers. And then you have blade servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=45.04500000000001) [that let's you pack more server computing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=47.9102857142857) [capacity in less space. So, they're quite](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=50.85528571428568) [popular with IT departments. There are two](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=54.313142857142864) [main sever architectures and we're talking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=57.89885714285715) [about CPU and memory architecture. The](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=60.62457142857146)[older one is symmetric multiprocessing or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=63.476) [SMP. SMP is characterized by having a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=66.95599999999999) [common shared front side bus that all the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=70.30725000000004) [processors use to communicate with the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=74.00225000000009) [main server memory and that cause](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=76.556) [bottlenecks especially as you increased](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=79.00099999999999) [your processor socket count in the past.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=81.049) [So now a newer architecture is called](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=83.926) [NUMA, None-uniform memory access. And all](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=87.22236363636362) [servers that are using AMD or Intel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=89.91171428571428) [processors from the last two to three](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=92.73171428571429) [years were all using NUMA architecture and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=95.431) [we'll talk more about both of these](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=97.8285) [architectures later. When you're talking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=100.60933333333332) [about a server, you know it has similar](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=102.54725000000002) [components to a desktop computer. You have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=105.37725000000006) [a motherboard. You have one or more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=107.671) [processors. You've got memory, internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=109.62099999999998) [storage. You've got cooling funs. You've](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=112.24200000000002) [got power supplies and so it's very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=114.77711111111111) [similar to a desktop computer except these](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=117.58488888888886) [components were typically higher quality,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=120.46781818181815) [they're going to last longer, be more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=122.536) [reliable and again, they usually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=125.47600000000001) [hot-swappable and quite often, you can get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=127.57600000000002) [redundant components from any of these](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=130.49753846153843) [things. So finally, how are severs](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=132.99907692307684) [different in desktops? Once again, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=135.83474999999993) [know, you've got a higher quality](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=138.20907692307696)[components and they're designed to be more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=140.0552307692309) [reliable and they're quite often](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=142.4993333333333) [hot-swappable, so you can change your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=144.5215555555555) [components while the server is actually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=147.2051666666667) [running. Also, since you've got more than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=149.94016666666678) [one processor and much more memory and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=152.36188235294125) [much more IO capacity, servers are design](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=154.65541176470606)[to handle much higher workload than you see with the desktop computer.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=1&mode=live&start=158.966)

[What is a Server?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live)

[So getting into more detail here, a server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=1.896) [is going to be more durable and it has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=5.096) [something called RAS features which sounds](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=8.745090909090909) [reliability, availability, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=11.243272727272725) [serviceability and that's getting into](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=12.579636363636364) [things like having redundant components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=15.097818181818184) [that are hot-swappable without having to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=17.616) [take sever down to change out a component.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=20.491714285714295) [So, you have hot-swap capability and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=24.326) [hot-add capability. So, you can actually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=27.17600000000001) [put the memory into some servers while the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=29.566) [server is running. You could actually also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=32.446) [put a processor into some servers while](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=34.808666666666674) [the server is running. Although in real](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=37.05333333333335) [life, people don't typically do that very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=39.57690909090909) [often. What's more commonly done is it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=42.47236363636364) [something fails, you might replace it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=45.15099999999999) [while the server is running. But it's not](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=46.95933333333334) [that often that somebody actually adds a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=49.317818181818176) [processor without taking the server down](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=51.748727272727244) [to do it. So, servers are also designed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=54.002250000000004) [for sustained high-volume usage. Their](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=58.234888888888875) [components are higher quality, so they're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=61.11528571428572) [going to last longer and they're designed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=63.57100000000001) [to handle a higher load for over a higher](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=66.436) [period of time than desktop computer. So,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=70.41399999999994) [you've got more capable processors quite](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=73.55016666666667) [often with larger cache sizes. You've got](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=76.45516666666667) [much more memory, many more memory slots](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=79.56369230769232) [and you've got lots of internal drive bays](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=81.97061538461543) [plus you've got expansion slots so you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=84.98866666666669) [use external storage. So, this is one of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=88.27400000000006) [the main differences between a desktop](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=91.20933333333332) [computer and a server. The common server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=93.2533333333333) [types you're going to run into are things](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=95.71314285714287) [like web servers, application servers,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=98.63885714285719) [file servers, database servers and those](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=100.76100000000001) [are just, you know, a few of the most](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=103.83600000000003) [common types of servers and each one of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=107.20658823529412) [these has different kinds of workloads](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=109.31952941176472) [that places different sorts of stress on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=111.24266666666668) [the different parts of the hardware. But](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=114.27600000000004) [the one common thing about all the server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=117.19242857142858) [types is that many times, multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=119.72385714285717) [applications are running on the servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=121.71683333333333) [and many users are communicating with that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=124.1818333333333) [server over some sort of a network typically a TCP/IP Ethernet network.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=2&mode=live&start=128.236)

[Server Form Factors](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live)

[Now we're going to go a little more detail](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=0) [about server form factors. The most common](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=3.7841538461538464) [server form factor is a rack-mount server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=6.657000000000001) [Rack-mount servers have the standardized](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=9.436) [width and length that are designed to fit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=11.426909090909092) [four-post racks that you find in typical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=14.719636363636363) [data centers. Your typical chassis is 444](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=17.88236363636364) [millimeters wide and 684 millimeters long.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=21.617818181818183) [And so, when you-- rack-mount server sort](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=25.016) [of looks like an extra large pizza box](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=28.39155555555556) [that's rectangular in shape. There's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=33.118) [various standard vertical heights that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=35.986) [you'll see on rack-mount servers and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=37.785999999999994) [they're called rack units, they'll be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=40.109125) [called 1U, 2U or 4U and that just means](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=43.247875) [that they're getting taller vertically. A](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=47.956) [rack unit is 1. 75 inches or a little bit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=51.987875) [more than 44 millimeters tall. Rack-mount](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=56.506625000000014) [servers will have mounting rails, so that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=59.202) [you can slide them into the rails and pull](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=62.254) [them in and out of the rack while the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=65.7985) [server is running as long as you got your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=68.01475000000003) [cable setup correctly with enough slot,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=70.32822222222224) [that way, it's a lot easier to work on a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=71.9515555555556) [server while it's still running 'cause you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=74.87457142857143) [can do things like hot-add or hot-swap](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=77.52957142857143) [components that'd be pull it out of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=80.10236363636365) [rack. So, after rack-mount servers, you've](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=82.80781818181823) [got tower servers. And tower servers are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=85.69600000000003) [very similar to a tower desktop PC that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=88.85044444444446) [you might have and it's going to be a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=92.09933333333339) [large vertical tower with lot more space](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=95.724) [inside for the internal components. Tower](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=98.49600000000001) [servers are typically more commonly use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=101.016) [for entry-level servers. You can actually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=104.25600000000004) [mount some tower servers with mounting](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=106.89600000000002)[rails and put them into a rack, but that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=108.93600000000004) [not very commonly done because it weighs](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=111.93866666666668) [quite a bit of vertical space. It's more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=114.11800000000004) [common to see tower servers in closets or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=116.83711111111113) [onto somebody's desk 'cause usually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=120.2169090909091) [they're used by smaller organizations who](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=122.22145454545458) [don't have a regular data center with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=124.725) [racks inside. Then you also have blade](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=128.21799999999996) [servers. And blade servers let's you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=131.09933333333333) [more density, more servers packed into a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=134.1085) [smaller space in a rack. And so, you'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=137.42099999999996) [have shared rack-mount chassis that has a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=141.06242857142854) [lot of common components and then you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=143.87742857142848) [actually have multiple blades inside of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=146.71599999999998) [that rack-mount chassis. And so, you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=149.17599999999996) [get a lot more computing capacity and less](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=151.92907692307693) [space. So you get increased server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=154.9752307692308) [density, but the problem is with that is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=156.85600000000005)[that sometimes you can run in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=159.256) [bottlenecks due to shared chassis and it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=161.28016666666662) [also a single point of failure. So, if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=163.06349999999998) [something goes wrong with that chassis,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=164.9017142857143) [all the blades can be affected. So,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=167.37885714285719) [they're not recommended for really mission critical workloads at least in my opinion.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=3&mode=live&start=170.856)

[Typical Server Form Factors](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live)

[Okay, let's go on a little more detail](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=0) [about typical server architectures as far](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=3.323999999999999) [as processor and memory go. The first one](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=5.906) [is symmetrical multiprocessing or SMP. SMP](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=9.972250000000003) [uses a single shared system bus from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=13.402000000000001) [memory access. So, all of the processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=16.804000000000006) [should share one system bus to get out to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=19.310375000000008) [main memory. And this becomes a big](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=22.07225000000002) [problem as you add more and more processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=24.39776470588236) [to a server especially as you go from say](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=27.136588235294134) [four processor to eight processors or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=30.852666666666675) [eight to sixteen processors. This is an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=33.668666666666674) [older architecture that Intel was still](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=36.63799999999999) [using up until the Nehalem processors was](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=38.821999999999974) [introduced in 2008. So if you have an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=42.15266666666668) [Intel Xeon that's older than in a Xeon](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=45.62766666666667) [5500 or Xeon 7500 series, you're still](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=48.81433333333334) [using SMP architecture. A new architecture](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=52.298) [that all modern servers were using now is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=55.98061538461539) [called NUMA or non-uniform memory access.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=59.832923076923095) [NUMA divides your available memory into a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=64.036) [NUMA nodes and each NUMA node is localized](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=68.24377777777777) [to one of your processors. So, each](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=72.1296363636364) [processor has really fast direct access to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=75.17830769230768) [its local NUMA node. And then if it has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=78.02138461538458) [access memory outside of that NUMA node,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=81.35433333333334) [it's going to be a little bit slower to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=83.746) [remote NUMA done. So, all Intel and AMD](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=86.79100000000004)[processors since about 2008 have NUMA](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=90.80599999999997) [support. If you have a server especially](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=94.40599999999993) [from Intel that's older than that, again](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=96.76199999999997) [you're going to have SMP instead of NUMA](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=98.8106666666666) [for you architecture. NUMA gives you much](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=102.35600000000004) [better scalability because it doesn't have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=105.52000000000002) [that shared front-side bus that SMP had.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=108.046)[But even with NUMA, you're not going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=111.936) [see completely linear scalability as you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=114.93866666666665) [go from one processor to two processors to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=117.19066666666663) [four processors and eight processors, it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=120.40683333333334) [doesn't double each time what you would](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=122.73516666666667) [expect even with NUMA. But the story is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=124.82933333333332) [quite a bit better with NUMA and it was with SMP.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=4&mode=live&start=130.026)

[Major Server Components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live)

[As you talk about major server components,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=0) [you need to think about the motherboard](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=3.148133333333334) [first. The motherboard is really the home](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=6.296266666666669) [to all the other components in a server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=8.387428571428572) [Motherboards can have processor sockets](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=10.576) [and the chipsets that go with the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=12.718307692307695) [processor. You're also going to have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=15.717538461538467) [memory slots and expansion slots that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=17.840999999999994) [control how much memory will fit in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=19.816000000000003) [server and how many expansion cards you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=22.05600000000001) [can also put in the sever. And finally,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=23.94099999999999) [you've got integrated components that are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=26.355230769230772) [integrated right on the motherboard.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=28.78292307692309) [Examples of this are things like your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=30.806) [video card and your going to have a number](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=32.525375) [of integrated network cards or network](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=34.736) [ports right on the motherboard on all](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=37.472000000000016) [modern servers. You've also got one or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=40.66400000000004)[more processors in the server. And when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=43.406) [you talk about processors in the server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=45.85999999999999) [world especially, you've got to talk about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=48.043999999999976) [physical sockets and then physical cores](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=50.507999999999996) [within each processor and then logical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=54.05999999999999) [cores within each processor. So, the way](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=57.22028571428571) [this work is that a socket is where you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=60.104333333333344) [actually put an actual physical processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=63.21933333333337) [and then that processor might have one of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=65.296) [more physical cores. In fact, all modern](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=68.62690909090914) [server processors have at least four](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=71.52933333333331) [physical cores and right now, you can go](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=74.00933333333327) [up to six teen physical cores in a server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=77.05676923076923) [processor. And then if you're dealing with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=79.99907692307696) [an Intel processor, you can divide those](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=82.08999999999997) [physical cores and of logical cores using](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=84.14799999999995) [Intel hyper-threading. And all this is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=87.30028571428572) [really important when it comes down to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=89.51457142857143)[software in licensing. So you need to pay](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=91.59457142857144) [attention to that as you're specifying the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=94.22349999999999) [components for your server. Next, you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=96.65599999999996) [memory. And servers typically have a lot](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=99.68100000000001) [more memory than a desktop machine and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=102.30599999999998) [they also have special fault-tolerant ECC,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=104.96907692307691) [error-correcting code memory that allows](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=108.46753846153841) [it to deal with random errors that might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=111.38292307692299) [be caused by solar flares or cosmic rays](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=114.94099999999997) [or slight voltage variations. So, it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=118.72028571428572) [much more reliable than your average](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=121.86999999999999) [desktop memory. You also have internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=124.70199999999996) [storage in a sever, and depending on how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=126.90849999999999) [large that server is, whether it's a 1U](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=129.43350000000004) [sever or 2U server or 4U server for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=132.29292307692307) [example, you're going to have a different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=135.48676923076923) [number internal drive bays and this might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=138.43600000000006) [be 2-12 inch drive bays or 3-1/2 inch](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=141.16482352941176)[drive bays and this is going to control](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=143.90835294117647) [how many drives you can fit in that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=146.47044444444447) [server, so that's going to have an affect](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=148.4882222222223) [on how much storage bays you have and more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=150.506) [importantly how much IO capacity you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=153.5986666666667) [that's using you internal drive bays. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=156.47800000000012) [finally, you've got other components that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=159.27666666666667) [are going to be inside the typical server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=161.2606666666667) [So, this means things like the cooling](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=163.906) [fans, and hopefully dual power supplies](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=166.74369230769224) [and any other integrated components that are going to be inside of that server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=5&mode=live&start=169.176)

[How are Servers Different than Desktops?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live)

[How are servers different than desktops?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=2.016) [Well, first of all, we have redundant](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=4.936) [components in servers. The components such](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=7.155000000000001) [a power supplies are usually redundant and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=9.359333333333332) [you've also got redundant embedded network](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=12.390444444444444) [interface cards. You've also got more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=15.537111111111113) [internal drive bays that are typically in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=17.953999999999994)[a RAID array, so you've got redundancy](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=20.370444444444445) [there. You've also got hot-swappable](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=22.921555555555557) [components in a server, things like power](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=24.805999999999997) [supplies or hot-swappable, the internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=27.46599999999999) [drives or hot-swappable, your fans or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=30.173272727272728) [hot-swappable. You've also got things like](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=33.66418181818182) [memory and processors that are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=35.78349999999999) [hot-swappable on some servers. You've also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=37.79600000000001) [got more durable components on servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=40.84266666666667) [which is higher quality, more expensive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=43.442666666666696) [components in servers. So for example,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=46.168000000000006) [you're going to have enterprise-grade](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=49.04933333333334) [components such as Single-Level Cell](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=51.37155555555557) [solid-state drives instead of multilevel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=53.544571428571416) [cell solid-state dives like you see on a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=55.80433333333334) [consumer SSD. You've also got more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=59.717666666666695) [expansion capability in a server. You've](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=62.1671111111111) [got more PCI-E expansion slots, so you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=64.44433333333333)[have more IO capacity and you got more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=67.37446153846153) [memory slots. So you have more memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=69.3436923076923) [capacity also. And you have more internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=71.65742857142857) [drive bays. So, can have more drive space](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=74.1002857142857) [and more IO capacity internal to the server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=6&mode=live&start=80.786)

[Summary](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live)

[To summarize this module, servers use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=1.666) [durable, more reliable, more expensive,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=4.546) [specialized hardware. You've got three](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=7.851) [different form factors for severs. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=10.683499999999999) [have rack-mount, tower, and blade form](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=12.82725) [factors. You also have symmetrical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=16.01475) [multiprocessing or NUMA architectures. All](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=18.556000000000004) [modern servers are using NUMA architecture](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=21.153499999999998) [now. Servers have multiple redundant](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=24.67849999999999) [components. So, you have single](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=27.874000000000002) [motherboard. You've got one or more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=30.045999999999996)[processors and you've got a large number](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=32.159333333333336) [of memory slots with a higher memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=34.585999999999984) [density than haven't desktop PC. You have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=36.790444444444454) [internal storage for drive bays and you've](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=39.24138461538461) [got dual power supplies that are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=42.72523076923074) [hot-swappable and then you have integrated](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=45.36327272727272) [components for things such as your video](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=47.305090909090886)[card and network interface cards that are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=49.573777777777785) [integrated on the motherboard itself.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=52.13314285714286) [Severs are different form desktop machines](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=54.476) [again because of this redundant components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=56.801000000000016) [that more reliable than desktop PC](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=59.126) [components. Overall, you've got greater](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=62.35742857142858) [scalability and expansion capacity in a server than you do in a desktop PC.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=7&mode=live&start=64.60099999999998)

[Course Structure](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live)

[Now you've seen module 1, Introduction to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=1.976) [Server Hardware. I'll quickly go over the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=4.954888888888888) [course structure for the rest of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=7.305999999999999) [modules. Module 2 is going to about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=9.406000000000002) [hardware identification. How to identify](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=11.648500000000002) [exactly what sort of server you have and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=13.436000000000002) [what components you have. Module 3 will be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=16.476000000000006) [about hardware evaluation. How to run](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=19.98457142857143) [benchmarks both at the application level](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=22.461384615384617) [and the component level to see how your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=24.432153846153852) [sever compares to other servers you might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=27.31171428571428) [be considering purchasing. Module 4 is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=30.05171428571427) [going to go into detail about how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=32.342666666666666) [select all the components for particular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=35.320444444444426) [server. Module 5 will be talking about how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=37.553777777777746) [to maintain your hardware overtime. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=40.32933333333334) [then module 6 will be talking about severs](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=42.361294117647056) [in the real world including things about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=44.883647058823506) [how to justify the purchase of new a server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m1-intro&clip=8&mode=live&start=47.0907058823529)

[Hardware Identification](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live)

[Introduction](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live)

[Hi, this is Glenn Berry from SQLskills.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=1.946) [com. I'm recording this course for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=4.938500000000001) [Pluralsight. This course is about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=7.282666666666668) [Understanding Server Hardware, and this is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=9.317428571428568) [Module 2: Hardware Identification. In this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=13.011714285714287) [module, we're going to be talking about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=16.931000000000004) [how to gather information about your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=19.188500000000015) [hardware. It's really important that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=21.123500000000025) [know exactly what components you have, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=22.912666666666667) [how they're configured and what their](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=24.965999999999998) [current status is, whether they're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=26.956000000000003)[operating correctly or not. There's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=28.806000000000008) [several easy to use hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=30.761000000000003) [identification tools that we're showing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=33.13600000000001) [here including msinfo32 and CPU-Z. We'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=35.766000000000005)[also talk about some of the server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=39.001000000000005) [management tools that the major server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=42.04600000000002) [vendors offer such as Dell and HP. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=44.95963636363635) [we'll also talk about how to understand](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=48.86266666666667) [server model numbers so you can look at a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=51.149333333333345) [server model and understand the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=54.07236363636364) [capabilities of the server. And we're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=55.66327272727274) [going to do some detail about how Dell and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=57.72822222222222) [HP actually use their server model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=61.29322222222222) [numbers. And then, we'll get into actually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=63.669888888888885) [how do you identify Intel and AMD](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=66.17885714285711)[processors, because that's extremely](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=68.64385714285707) [important when you're specking out a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=70.36099999999999) [server? And then we will talk about how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=73.09099999999998) [understand your server's limits, both](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=77.31666666666668) [licensing limits and physical limits of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=79.67333333333335) [how much memory and how many expansion](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=82.05933333333333) [slots that you might have at particular server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=0&mode=live&start=84.58516666666665)

[Gathering Information About Your Hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live)

[Gathering information about your hardware,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=1.816) [one of the most important things you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=3.262666666666667) [needed to do when you're looking at](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=5.288000000000001) [servers is find out exactly what brand and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=7.542666666666666) [model of server that you actually have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=10.316000000000006) [right now. Is it a Dell server? It is an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=12.795999999999998) [HP server? Is it an IBM server? And what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=15.389999999999999) [model server is it? This is extremely](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=17.862666666666666) [important information to know. It lets you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=20.746) [determine how many processor sockets are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=24.086999999999996) [supported. Is it one socket server, a two](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=26.048999999999985) [socket server, or a four socket server, or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=28.598499999999994) [larger? It lets you determine a number of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=31.138499999999986) [memory and PCI-E Expansion slots. It also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=35.09600000000002) [lets you determine the number of internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=38.23418181818181) [drive bays that were supported by that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=40.11781818181815) [model of server. How can you know the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=42.75600000000001) [model or server? You need to find out](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=45.3035) [exactly what processor is installed in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=47.86061538461537) [that server. And you might have multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=50.00215384615382) [processors in a server because that's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=52.682666666666655) [really important measure of your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=55.43599999999997) [performance and scalability. There's a big](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=57.647999999999996) [difference between different processors.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=60.53742857142857) [And this is a really important detail to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=62.326) [know. And nonetheless, it's important for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=65.24155555555555) [performance and scalability measurements.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=67.99488888888887) [It's also really important for software](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=69.906) [licensing purposes. Example, you know,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=73.04850000000005) [some software such as Oracle or SQL Server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=75.56599999999999) [are licensed by the physical processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=79.309) [core. So, it makes a lot of difference](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=81.89499999999998) [whether you have say, four processor cores](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=83.75781818181817) [or 16 processor cores. That can make a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=86.21314285714284) [huge difference in your overall cost. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=89.74) [then finally, you want to figure out what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=92.17963636363636) [expansion cards if any are installed in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=95.56872727272726) [your server. Depending on the model of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=98.30885714285716) [your server, you might have anywhere from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=100.28907692307693) [two or three PCI-E Expansion slots to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=102.00138461538464) [perhaps seven or eight PCI-E Expansion](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=105.39830769230765) [slots. And there can be different types of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=108.55061538461531) [slots, whether they're PCI-E 1. 0, 2. 0,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=111.73599999999996) [or 3. 0. And once you know how many slots](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=114.77599999999993) [you have available, it's important to know](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=118.33800000000002) [what's actually in there because you might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=120.28369230769229) [have things like RAID controllers, or Host](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=121.8721538461538) [Bus Adapters, or additional Network](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=125.06885714285717) [Interface Cards beyond the ones that are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=127.37242857142859) [embedded on the motherboard. So, this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=130.18742857142854)[information ultimately determines how much](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=132.69963636363633) [input-output capability you have for the server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=1&mode=live&start=134.95872727272717)

[Hardware Identification Tools](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live)

[Hardware identification tools, I'm going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=1.916) [to talk about some of the built-in tools](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=3.5426666666666673) [that come with Windows that you can use to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=6.145333333333332) [get some information about your hardware.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=8.949846153846156) [And mostly, we're going to talk about our](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=10.796) [free tool that you can download to get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=12.315999999999995) [even more information about your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=14.233999999999998)[processors and memory. First that I'm](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=16.178999999999995) [going to talk about here is just the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=18.35) [Windows system properties dialog. This is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=21.02733333333334) [included with all recent versions of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=23.140285714285717) [Windows whether it's a server version of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=25.46314285714287) [the operating system or a client version](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=28.066000000000003) [of the operating system. And if you open](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=30.02600000000001) [up this dialog, you'll get information](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=32.56028571428571) [about your processor type and its rated](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=34.68171428571428) [base clock speed, any amount of physical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=37.306000000000004) [RAM that's in your server. You also will](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=40.129333333333356) [find out exactly what version and in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=43.01830769230769) [addition of Windows that you're running](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=45.05369230769229) [which is very useful to know. Next, we'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=47.076) [be talking about msinfo32 which is also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=50.315999999999995) [included with all recent versions of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=53.60599999999999) [Windows. And when you run this utility,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=56.009333333333345) [you get information about the system](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=58.88369230769233)[manufacturer, and the model of the server,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=61.371384615384656) [and the main BIOS version. And you also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=64.02236363636365) [get more information about the processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=66.91199999999999) [model and its rated clock speed and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=68.96399999999998) [amount of physical RAM in the server. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=71.49822222222222) [you also will get some information about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=73.69054545454546) [your expansion slots. Finally, CPU-Z is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=77.22236363636361)[pretty well-known tool that's been out for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=80.3817142857143) [at least four or five years that's very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=83.2617142857143) [popular in the hardware enthusiast](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=86.39145454545452) [community and also among server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=88.28690909090905) [administrators. You can use this to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=90.51400000000001) [identify exactly what processor model you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=93.47183333333334) [have and a memory details for your server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=96.46683333333334) [And even more useful, that shows you the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=99.666) [current processor clock speed and it will](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=103.1993333333333) [be changing dynamically. And so, this is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=106.366) [good information to know when you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=108.86028571428572) [looking at a server. It's available from www. cpuid. com.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=2&mode=live&start=110.5017142857143)

[Demo: Windows System Properies Dialog](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live)

[In this demo, I want to show you how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=1.566) [use the Windows system properties dialog.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=5.15975) [I'm running Windows 7 Enterprise Edition](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=7.316) [on my workstation here. This will work on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=9.488) [all recent versions of Windows. So first](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=12.540444444444447) [of all, you want to go to the Start menu,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=15.0885) [and go to Computer, and right click, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=17.80099999999999)[choose Properties. And this will open up](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=20.866000000000003) [the Windows system properties dialog. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=23.561000000000007) [in my case, it shows that I'm running](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=25.643692307692305) [Windows 7 Enterprise Edition with Service](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=28.66523076923076) [Pack 1. From a hardware perspective, it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=31.426) [shows that I'm running an Intel Core i7](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=35.176) [3770K processor. It's greater than 3. 5](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=39.176)[gigahertz. It also shows that I have 32](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=42.58433333333335) [gigabytes of RAM and I'm running a 64-bit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=45.41877777777776) [version of Windows. And then it tells me](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=48.10766666666663) [the name of my computer. So, this is all useful information to know.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=3&mode=live&start=50.656)

[Demo: msinfo32](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live)

[In this demo, I'm going to show you how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=1.886) [use msinfo32. This is a built-in utility](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=4.069333333333333) [that's in all recent versions of Windows.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=6.506000000000002) [In order to start, you just go to the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=9.306) [Start menu, and then type in msinfo32, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=13.96705263157895) [hit Enter. And this opens up the System](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=18.110210526315793) [Information dialog. If I maximize that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=21.771) [window and move some things around here,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=24.03) [we can see that it tells me a lot of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=26.452) [useful information about my operating](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=29.912363636363636) [system and about my hardware. In this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=31.644181818181824)[case, it shows me I'm running Windows 7](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=34.15725) [Enterprise Edition with Service Pack 1. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=37.28225) [tells me the net BIOS name of my computer,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=39.966) [and it tells me that I'm running a 64-bit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=43.026) [version of Windows 7. It also tells me the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=46.023692307692315) [exact model of my processor which in my](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=48.96099999999999) [case is an Intel Core i7 3770K processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=52.178941176470595)[that's running at 3. 5 gigahertz. It has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=56.48011764705884) [four physical cores and eight Logical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=60.57676923076923) [Processors since I have hyper-threading.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=63.18907692307691) [It also tells me the version and date of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=65.366) [my main system BIOS. It tells me what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=68.39830769230764) [Windows is installed. And then it tells me](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=71.3117142857143) [I've got 32 gigabytes of RAM and also some](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=74.08933333333334) [information about my Page File, how large](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=76.97533333333335) [it is and where it's located? One other](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=79.44100000000002) [thing you can do besides just looking at](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=82.13266666666667) [this dialog, let's go to the File menu and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=84.31933333333339) [choose Export, and then you can export](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=86.94742857142857) [this information to a text file. So, I can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=90.03742857142859) [just type in something like Glenn and then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=93.61975000000001) [save in to my Desktop. And it's going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=96.10975000000002) [collect all these information that this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=99.58600000000001) [utility detects and save it in the text](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=103.06054545454546) [file. This will take a few seconds](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=109.27872727272731) [depending on how much stuff is installed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=111.86349999999997) [on your system. So, if we take a look](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=113.97224999999995) [there and just open up this text file, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=116.93100000000001) [can see there's a lot of information here](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=120.01350000000002)[that you can scroll down through and take a look at, at your leisure.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=4&mode=live&start=124.726)

[Demo: CPU-Z](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live)

[In this demo I'm going to talk about the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=0) [CPU-Z Processor Identification Utility.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=4.663384615384617) [You can download this utility for free](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=6.736) [from cpuid. com. It doesn't require any](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=10.088999999999997) [installation. You just can copy the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=12.95) [executable out of the zip file to your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=14.988142857142858) [desktop. So once you've done that, you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=17.679571428571425) [double click on this and it'll take a few](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=19.754947368421043) [I guess seconds to scan your system to see](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=21.990736842105242) [what kind of processor and memory you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=24.647428571428566) [have. So when it first opens up, you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=26.87742857142856)[see it's on a CPU tab. And this tells me](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=29.321714285714283) [the name of my processor including the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=32.596000000000004) [rated clock speed down here. It also--](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=35.536000000000016) [this tells me that I have an Ivy Bridge](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=38.106) [processor and the Maximum Thermal Design](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=40.221) [Power which is 77 Watts. It tells me that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=42.775999999999996) [I have a Socket 1155 for this motherboard.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=47.039333333333325) [And the manufacturing process Technology](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=50.926) [is 22 nanometers. The core voltage is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=53.4635) [jumping around right there. And then here,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=56.361) [you can see that it shows me the exact](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=58.642923076923076) [steeping and revision of this particular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=61.36369230769231) [processor. And then here's all the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=63.541) [supported instructions for this processor.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=65.63599999999997) [And down here, it tells me what core zero](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=67.356) [of Processor one is running at the actual](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=71.32885714285716) [clock speed, and you can see it jumping](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=74.32100000000001) [around. And the multiplier will change too](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=76.41433333333337) [as it changes clock speed. And over here,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=79.07600000000004) [it tells me how large my L1 Data cache is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=82.17433333333332) [and my L1 instruction cache. And then,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=85.83544444444442) [here's my Level 2 cache which is a little](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=88.17523076923078) [bit larger, and then finally, the shared](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=90.4667692307693) [Level 3 cache. And then right down here,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=92.80099999999997) [it shows me that I have four physical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=95.67100000000002) [cores in this single processor and then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=98.51100000000005) [eight Threads which means I have Intel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=101.03885714285714) [hyper-threading. If we go to the next tab,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=103.57385714285714) [it gives me more information about the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=106.07683333333338) [caches exactly how large they are and what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=108.29266666666666) [type of cache they are. Then the next tab](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=111.03933333333333) [tells me the manufacturer of my main board](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=114.16350000000003) [and the Model number of my motherboard](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=116.97850000000008) [including the Chipset that it's using and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=119.47) [then the Version and Date of the main](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=121.99933333333334) [BIOS, and what kind of PCI-E Express slot](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=124.94070588235293) [I have for the Graphics card. And the next](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=127.96658823529408) [slot shows me that I have 32 gigabytes of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=131.4643333333333) [DDR3 Memory and Duel channel mode, and how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=135.14933333333317) [fast it's running, and the various ratings](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=138.32933333333335) [for the memory. And the next tab, the SPD,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=140.8610000000001) [the Serial Presence Detect tab will show](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=144.44349999999994) [me more details about each memory stick](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=147.35724999999988) [that is in each of my four slots on this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=150.24350000000004) [particular system. So, these are eight](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=154.33725000000015) [gigabytes, six memory. Then, it tells me](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=157.3388571428572) [what graphics card that I'm running. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=160.14800000000002) [then the About tab tells you the version](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=162.20433333333335) [of the utility. And down here, you've got](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=164.59100000000012) [a tool that let you save a report of this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=166.8293333333333) [to either a Text file or an HTML file. So,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=169.516) [if I click on Save Report HTML and save it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=173.19126315789472) [to my desktop, it saves an HTML page that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=177.24389473684195) [I can open up in my browser and take a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=180.74814285714285) [look at it. So then, I can scroll down](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=183.36957142857148) [through this and see a lot more detailed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=186.324) [information about my system when I took](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=189.2146666666667) [that snapshot. So, you can see there's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=191.77350000000004) [lot of good information here about your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=195.22314285714285) [system. And one of the most important](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=198.39314285714283) [things that you can use this for, as we go](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=200.83742857142852) [back to the CPU tab, you want to take a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=204.15647619047604) [look at the actual Core Speed right now](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=207.55211111111115) [versus the rated clock speed. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=210.32988888888897)[depending on what processor you're running](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=212.36305882352943) [in your server, this can be running at a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=214.14541176470598) [lower or a higher speed than the rated](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=216.81894117647082) [clock speed. And that has to do again with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=219.8226666666666) [the model of the processor and also the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=222.47822222222217) [Windows power plan that you're using and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=224.62933333333322) [your BIOS settings. So, that's something](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=226.97314285714285)[I'll talk more about later. We just keep](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=228.86100000000002) [that in mind. That's one of the most](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=231.04299999999998) [important things to look at when you're running this utility.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=5&mode=live&start=237)

[Server Management Tools](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live)

[Server-management tools, the hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=1.776) [vendors all have their own proprietary](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=3.9160000000000004) [server-management tools. These are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=7.126) [combination of the built-in hardware cards](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=9.910285714285713) [and let you do certain things and then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=11.933142857142851) [software that they offer for their](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=14.687666666666665) [particular brand of server. For example,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=16.882666666666665) [Dell has something called the Open Server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=19.324461538461538) [Management Administrator or OMSA. OMSA is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=22.74907692307692) [a software program that you have to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=25.411333333333335) [actually install on the host server. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=27.88000000000001)[once you do that, it has a browser](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=30.37336842105263) [interface that lets you go in and scan the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=33.39231578947367) [server and see its current status and go](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=36.78863157894734) [in and make changes to certain parts of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=39.88963636363637) [the server configuration. So for example](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=43.46885714285713) [with Dell OMSA, you can see what memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=45.847428571428566) [slots are populated, what size DIMM](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=48.144571428571396) [modules. You can also see what expansion](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=50.8585) [slots are populated with what devices. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=53.52600000000001) [you can see details about the logical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=55.921625) [drives that are managed by your RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=58.34099999999999) [controllers, and you can also go on and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=60.760374999999975) [change those details. So, you going in and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=63.22699999999998) [a hot spare or change the caching policy](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=66.1418823529412) [of your RAID controller. You can also see](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=69.35129411764711) [your BIOS and firmware versions and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=72.21753846153847) [service code for your Dell server, from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=74.42523076923078) [Dell OMSA. And you can also monitor their](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=77.72742857142858) [current temperature of all the different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=80.5636923076923) [components in your motherboard and see](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=82.33138461538461) [whether you have any failed components. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=84.15781818181821) [for example, if one of your power supplies](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=86.31236363636363) [was unplugged or it failed, they would](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=88.84327272727269) [show up in Dell OMSA. Hewlett-Packard has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=91.71600000000004) [something called Integrated Lights-Out or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=94.88100000000001) [iLO. And that is a card that lets you do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=97.19350000000004) [things from remote location such as reboot](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=101.61599999999999) [a server. It has a separate network](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=104.69599999999997) [connection and an IP address. So, even](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=107.766) [though the server isn't really booted on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=110.5089411764706) [running window is you can communicate with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=112.44423529411769) [it and do certain activities like reset](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=114.37952941176478) [the server or power up the server. ( Pause )](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=6&mode=live&start=116.89907692307696)

[Understanding Dell Server Model Numbers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live)

[Understanding Dell server model numbers,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=1.556) [if you're working in a Dell shop or just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=3.2726666666666664) [dealing with Dell servers in general, it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=6.3626666666666685) [really important you understand how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=8.538727272727273) [decode Dell server model numbers. When](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=10.599333333333334) [you're looking at a Dell server model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=13.570666666666666) [number, the first character is the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=15.703333333333328) [form-factor. That's going to be either an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=17.531333333333325) [R for Rack-mounted, a T for a Tower server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=20.00933333333333) [or an M for a Blade server. The second](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=23.546769230769225) [character is position in a server lineup.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=27.192666666666668) [Higher numbers are higher end server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=29.946) [models. A third character is a server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=32.89457142857143) [generation. So for example, 1 is 11th](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=37.826000000000015) [generation, and 2 is 12th generation. The](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=42.005999999999986) [fourth character indicates processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=46.00933333333333) [vendor. A 0 is Intel, while a 5 is AMD. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=48.26266666666666) [for example, if you have a Dell PowerEdge](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=54.134125) [R720 server, the R means it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=58.439125000000004) [Rack-mounted, the seven means that it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=61.66787500000001) [relatively high in the overall server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=64.64349999999999) [lineup, the two means it's a 12th](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=67.56849999999997) [generation server, and the zero means it's an Intel-based server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=7&mode=live&start=74.056)

[Understanding HP Server Model Numbers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live)

[Understanding HP server model numbers, if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=1.916) [you're working in an HP shop or just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=4.028) [dealing with HP servers, you need to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=6.844000000000002) [understand how HP does their server model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=9.540285714285712) [numbering. The first two characters are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=12.275285714285708) [the form-factor and the product line. So,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=14.911454545454546) [DL means Rack-mounted, ML means Tower, BL](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=18.203142857142858)[means Blade, and SL means Specialized. The](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=22.38314285714285) [third character is a number of sockets.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=26.4585) [So, 1 is 1 socket, 3 means 2 sockets, 5](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=29.906) [means 4 sockets, and 9 means 8 sockets.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=35.233777777777796) [The fourth character is a position in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=39.496) [family lineup. So, a higher number means a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=43.080000000000005) [higher position or a higher end server for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=45.7806153846154) [that particular server family. The fifth](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=48.49) [character indicates processor vendor. So a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=51.89933333333334) [0 is Intel, and 5 is AMD. So of example,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=54.90377777777778) [if you have an HP DL580 G7 server, that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=60.08933333333334) [means DL is a Rack-mounted server, the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=64.95933333333336) [five means it's a four socket server, the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=68.56671428571428) [eight means it's fairly high in their](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=71.45242857142853) [family lineup, and the zero means it's an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=74.09266666666667) [Intel-based server, and then the G7 means it's a 7th generation of the DL 580.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=8&mode=live&start=77.43933333333337)

[Identifying Your Processor(s)](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live)

[Identifying your processors, it's really](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=1.666) [important when you're looking in an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=3.904888888888888) [existing server or when you're looking at](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=6.3175384615384615) [a perspective new server to understand](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=8.492923076923077) [exactly what sort of processor you have,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=10.561333333333334) [the exact model of the processor. So, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=13.45) [can use msinfo32 or the Windows system](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=16.886)[properties, or CPU-Z to identify the exact](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=20.246000000000002) [processor vendor and the exact model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=24.293692307692304) [number. It's really important that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=27.86138461538461) [know this. Quite often, when I talk to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=29.86314285714285) [people who are system administrators and I](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=31.85541176470588) [ask them what sort of processor they have,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=33.5230588235294) [I get some vague answer, "Well, I think](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=35.97011764705883) [it's an Intel Xeon. " But they don't know](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=38.958352941176486) [anything else about it. And that's a big](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=41.65099999999999) [mistake. The details really do matter when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=45.25999999999999) [you're evaluating the processor so you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=47.88800000000002) [tell how old it is and how well it's going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=50.1802105263158) [to preform compared to other processors.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=53.52757894736845) [So when you do this in the Windows world,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=55.536) [its kind to either be an Intel processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=57.926) [or an AMD processor. And once you know](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=62.212666666666635) [vendor and the model number, then you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=65.8665882352941) [go to the vendor's website. So for Intel,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=68.88776470588232) [it's going to be the Intel Ark Database,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=71.99541176470588) [and there's a URL for it. Or for AMD, they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=75.24717647058823) [have a list of Opteron processor numbers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=79.78028571428572) [at that URL. Or you can use this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=83.44528571428573) [information to find all the exact details about that particular model.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=9&mode=live&start=90.016)

[Decoding Intel E3-E7 Processor Numbers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live)

[Decoding Intel Xeon E3, E5, and E7](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=2.806) [processor numbers. We were looking at an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=7.776) [Intel processor, it's really important](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=10.511) [that you understand how their model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=11.826) [numbering works. For example, if you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=14.173499999999997) [an Intel Xeon E5-2690, what is that mean?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=17.22523076923077) [How good of a processor is that? Well, the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=20.856) [first two characters and the model number](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=24.77138461538462) [identifies the product line. So, you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=27.97523076923078) [going to have an E3 which is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=30.453777777777777) [single-socket processor and E5 which is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=33.044888888888885)[dual or quad-socket processor, or an E7](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=35.3121111111111) [which can be used in two socket, four](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=38.6) [socket, or eight or more socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=42.552) [processors. The third character on the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=45.85433333333334) [model number is the "wayness". Wayness](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=48.166000000000004) [means how many CPUs can be in a node which](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=50.285999999999994) [basically means a host? And that can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=53.98599999999997) [either 1, 2, 4, or 8. The fourth character](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=57.26199999999999) [is a socket type. And then the fifth and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=61.00171428571428) [sixth character are the processor SKU or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=64.821) [Stock-Keeping Unit. Higher numbers mean a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=68.216) [higher position in the product line. So, a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=70.82199999999997) [90 in this E5-2690 is very high in their](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=74.21292307692308) [product line. There's an optional seventh](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=78.42907692307693) [character which can be an L. And that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=80.54999999999998) [means it's a low-power processor, meaning,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=83.15742857142857) [it uses a less electrical power. You're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=85.65171428571429) [also going to see a V2 or a V3 suffix in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=88.53671428571428) [the future. So for example right now, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=92.83457142857138) [can get an Intel Xeon E3-1290V2 which is the Ivy Bridge version of the E3-1290.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=10&mode=live&start=97.22599999999997)

[Intel Xeon E3-E7 Processor Number Examples](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live)

[Intel Xeon E3 through E7 processor number](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=1.926) [examples. Let's go through a few examples](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=6.493499999999999) [of Intel processor number so we can better](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=8.999999999999998) [understand how this system works. The](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=11.800444444444448) [first example is that Xeon E3-1290V2.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=14.374571428571429) [That's a single-socket, 22 nanometer Ivy](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=18.086) [Bridge processor. The next example is the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=22.413500000000006) [Xeon E5-2648L. That's a two-socket, E5](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=28.24885714285715) [processor which happens to be a 32](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=32.043142857142854) [nanometer Sandy Bridge-EP, and the L means](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=35.60814285714287) [it's a low-power version meaning, it uses](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=38.618857142857145) [less electrical power. Next example is the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=41.213857142857144) [Xeon E5-4650. That means that processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=45.172666666666665) [can use-- be used in a four-socket server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=48.07933333333334) [It's a 32 nanometer Sandy Bridge-EP](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=51.046) [processor. Then you have Xeon E7-2870.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=55.44314285714285) [That processor can be used in a two-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=59.856) [server and it's a 32 nanometer Westmere-EX](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=63.51822222222223) [processor. So, it's one generation older](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=67.33600000000001) [than the Sandy Bridge line. Next, we have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=70.68100000000001) [the Xeon E7-4830 which is a processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=74.81225) [that's used in a four-socket server and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=77.95350000000003) [it's also a 32 nanometer Westmere](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=81.10725) [EX-processor. But notice, it is a 4830](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=83.87475000000003) [which means that it's going to be lower in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=86.36742857142856) [their line for the Westmere-EX. It'll have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=89.59766666666667) [a lower clock speed and perhaps fewer](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=93.09400000000001) [cores or a smaller L3 cache. Next example](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=96.20200000000003) [is the Xeon E7-8870. And that's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=100.006) [processor that can be used in an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=103.171) [eight-socket server, and it's also a 32](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=105.23600000000002) [nanometer Westmere -EX. But notice, it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=107.61975) [an 8870 which means it's higher in their product line than that 4830 was.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=11&mode=live&start=111.696)

[Decoding Intel Legacy Processor Numbers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live)

[Decoding Intel Xeon Legacy processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=2.586) [numbers, if you have an older Xeon](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=4.696714285714286) [processor meaning, one made before 2011,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=7.651714285714286) [they used a different processor numbering](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=10.405090909090907) [system. So for example, you might have an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=13.268727272727267) [Intel Xeon X5570 processor. In this case,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=17.201454545454546) [the first character is a processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=20.838)[description. X means a performance, E is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=24.162000000000013) [the mainstream line, and L is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=27.542666666666662) [power-optimized line which is less](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=30.661454545454543) [electrical power. The second character is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=32.79327272727273) [the product family. You're going to have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=34.794571428571416) [either a 3, a 5, or a 7 there. Three is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=37.083692307692296) [for processor use in single-processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=41.125230769230775) [servers, 5 is for processor use in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=43.198307692307715) [two-socket servers, and 7 is for processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=46.116) [use in multi-processor server. It's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=49.126) [usually, meaning, four or more sockets.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=51.440285714285714) [The third character is a processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=55.006) [generation, a higher number with a newer](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=57.59885714285714) [generation. It also has something to do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=60.62385714285714) [with the product family. So for example,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=63.35400000000001) [you might have a Xeon 5400 series, a 5500](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=66.12292307692307) [series or 5600series, each one of those](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=69.8336923076923) [getting newer. The fourth and the fifth](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=74.12349999999996) [character indicate that processor SKU or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=77.62369230769228) [Stock-Keeping Unit. Higher numbers mean a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=80.27292307692302) [higher position in the product line. So, a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=82.57999999999998) [5570 would be higher in their line than a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=85.77433333333333) [5550. Higher numbers usually mean higher performance.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=12&mode=live&start=90.53683333333335)

[Intel Xeon Legacy Processor Number Examples](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live)

[Intel Xeon Legacy Processor number](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=2.016) [examples, now that we understand how the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=4.916) [older processor numbering system works,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=7.219636363636363) [let's go through a few examples. For](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=8.656) [example, you might have an Intel Xeon](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=12.039333333333333) [X3480. That's a one-socket performance, 45](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=14.932666666666671) [nanometer Lynnfield processor. That's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=19.208500000000004) [fairly high in the product line. Next, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=21.900285714285715) [might have Xeon E5440. That's a two-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=25.059333333333335) [mainstream processor, that's a 45](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=29.226000000000003) [nanometer Harpertown processor. Next, we](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=33.126000000000005) [have Xeon X5570. That's a two-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=36.598000000000006) [performance server which is 45 nanometer](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=40.2435) [in Nehalem-EP processor. Now, we have Xeon](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=44.13849999999999) [L5640. That's a two-socket,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=48.14200000000001) [power-optimized, 32 nanometer Westmere-EP](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=51.92224999999999) [processor. Next, we have Xeon X7460.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=56.27724999999998) [That's a four-socket performance, 45](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=60.586) [nanometer Dunnington processor. Then, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=65.21724999999998) [have Xeon X7560. That's a four-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=69.24) [performance, 45nanometer Nehalem-EX](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=74.16599999999998)[processor. Now for all of these](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=77.22599999999997) [processors, if you want to find out all](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=79.31952941176472) [the details about it, you need to go look](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=81.03717647058828) [it up in the Intel online Ark processor database.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=13&mode=live&start=86.896)

[References for Intel Xeon Processor Information](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live)

[Now, we have some references for Intel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=2.186) [Xeon Processor Information. If you want](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=4.733999999999999) [more information about how their processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=6.875999999999999) [numbering works or if you want more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=8.975999999999997) [information about the Ark Database, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=11.032250000000001) [can go to this URL to get a good](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=12.659750000000003) [explanation of Xeon processor numbering.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=16.091555555555555) [Then in the Intel Ark Database, Xeon E7](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=18.686) [family, there's a link for that. The Xeon](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=22.508857142857146) [E5 family has its own link. And the Xeon](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=26.351000000000003) [E3 family has its own link. And we'll have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=30.582666666666668) [a demo later on that shows how this Ark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=33.933142857142855) [Database works. It's a really good](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=36.144571428571425) [resource that gives you all the glory details of all the Intel processors.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=14&mode=live&start=40.636)

[Demo: Intel Ark Database](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live)

[In this demo, I'm going to show you how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=1.856) [use the Intel Ark product database. I'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=5.418500000000002) [start at my browser and I've got the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=7.890285714285715) [database set as my homepage. This takes me](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=10.56457142857143) [to ark. intel. com. And we're concerned](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=13.611714285714285) [with server products here. So, we go down](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=16.616) [to where it says SERVER PRODUCTS. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=19.055999999999994) [then, we're some sort of interested in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=20.643272727272727) [processors right now. We'll click on that.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=22.514181818181807) [And this shows all the different sever](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=24.746) [processors that Intel has offered now and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=27.257250000000003) [in the past. And we're interested in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=29.936) [Xeon processor E5 family. So, we click on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=33.16266666666667) [that. This will show us all the different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=35.976) [Xeon E5 processors. And what's nice about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=39.233999999999995) [this is you can see some of the specs](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=41.834) [right here and the price of it. And then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=44.82200000000001) [you can click on one of this that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=47.486000000000004) [might be interested in. So, let's find the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=49.01600000000002) [E5-2690 and click on that. And this gives](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=51.43822222222221) [us even more details about that particular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=54.72327272727272) [processor. It shows us that it's been](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=57.30690909090907) [launched in Q1 of 2012, and how many Cores](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=59.77247058823531) [it has, how many Threads it has, the basic](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=62.91717647058827) [Clock Speed, the Max Turbo Frequency, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=66.44225000000002) [so on. So as you scroll through this, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=69.26850000000003) [can get a lot of really detailed accurate](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=71.29781818181816) [information about this processor. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=73.996) [that's what I do rather than try to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=76.29933333333332) [memorize the specs for each processor. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=78.72599999999994) [can just find it here and get the actual](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=80.87963636363637) [details. And you can go back and forth and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=83.88236363636359) [find different processors you might be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=86.39200000000004) [interested. And so, here's another one,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=88.02400000000007) [that E5-2643. And it's one that I](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=90.90314285714287) [recommend in some cases to save on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=93.34145454545455) [licensing cost 'cause it only has four](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=95.40314285714287) [cores and then eight with hyper-threading.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=98.1131428571429) [And it cost quite a bit less money and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=100.436) [saves some money on software licensing cost in some cases.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=15&mode=live&start=102.78350000000005)

[Decoding AMD Opteron Processor Numbers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live)

[Decoding AMD Opteron Processor numbers,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=1.806) [when you look at modern AMD Opteron](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=4.102153846153846) [processor, you need to be able to figure](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=7.316769230769233) [out what that processor number is telling](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=9.764000000000005) [you. We're talking about three different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=11.75200000000001) [series. The first one is the 3000 series.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=14.010999999999997) [That's for entry-level, single-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=16.986)[servers. Next, we have the 4000 series.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=19.737999999999996) [That's for mid-range, one and two-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=22.836) [servers. Finally, we have the 6000 series.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=26.324571428571424) [That's for their high-performance line](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=29.686) [that's used in two, four, and higher](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=31.581000000000007) [numbers of sockets servers. So, you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=34.379333333333335) [going to have AMD Opteron 3000, 4000, or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=36.97975) [6000 as the basic model number. Then at](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=40.154750000000014) [the end of the processor number, you might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=43.49457142857143) [have a two-character suffix. The first one](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=47.32885714285716) [is SE which means it's a performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=50.37509090909091) [optimized and uses more electrical power,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=53.00963636363635) [HE means it uses less electrical power and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=55.866000000000014) [then EE, this means the lowest amount of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=59.83400000000003)[electrical power. So for example, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=63.121) [might have AMD Opteron 6284 SE, the 6000](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=66.33000000000001) [series means that's their high performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=70.7671111111111) [line. And the two actually has something](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=73.08044444444444) [to do with the generation of it. And then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=75.45523076923074) [the SE tells it's a performance optimized, high-power processor.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=16&mode=live&start=79.776)

[AMD Opteron Processor Number Examples](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live)

[Now that we understand a little bit better](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=0) [how AMD Opteron processor numbering works,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=3.4262857142857146) [let's go through a few examples. First, we](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=5.996) [have an Opteron 6284 SE. So, that's their](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=9.764571428571427) [high performance line. The two tells us](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=13.575999999999997) [that it's an Interlagos processor and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=16.20523076923077) [84 SKU which means it's fairly high in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=18.811384615384622) [their line then the SE means its](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=21.634823529411772) [performance processor uses more electrical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=24.06011764705884) [power. Next, we have an Opteron 6262 HE.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=27.166) [And that means it's a low-power processor,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=32.676) [it's a 32 nanometer Interlagos processor.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=35.66984615384613) [That's what the two is telling us. And the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=38.236) [62 means it's relatively lower in their](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=40.603647058823526)[line than that 84 we just talked about.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=43.46541176470586) [Next is an older Opteron 6174. And that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=46.736) [a 45 nanometer Magny-Cours processor. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=51.71028571428571) [doesn't have a suffix so it's just regular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=54.58333333333333) [as far as power usage goes. Next is an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=56.481999999999985) [Opteron 4256 EE. And that is in their](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=60.296) [mid-range line. It's a 32 nanometer](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=65.236) [Valencia processor, and the EE means that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=68.2893333333333) [it's lowest electrical power usage. Next,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=71.151) [we have an Opteron 4184 and that's an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=73.49054545454545) [older processor because of the one instead](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=77.44690909090913)[of a two in the second digit. It's a 45](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=80.09849999999999) [nanometer Lisbon processor. Next, we have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=84.326) [an Opteron 3260 HE. And that's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=87.86742857142858) [low-power, 32 nanometer Zurich processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=91.77984615384615) [that's used in single-socket servers. The HE is telling us that it's low-power.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=17&mode=live&start=94.65292307692307)

[Understanding Your Server's License Limits](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live)

[Understanding your server's license](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=1.836) [limits. When you're looking at specking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=4.1) [out a brand new server, you need to keep](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=5.787875000000001) [in mind that there's certain license](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=7.807250000000003) [limits you have to worry about. First of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=9.520000000000003) [all, it's the Windows license limits.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=12.050999999999998) [That's going to be tied to the version and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=13.956) [edition of Windows that you're going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=16.910999999999998) [run on the server. So, that's going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=18.676000000000002) [affect things such as the maximum amount](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=20.858500000000003) [of RAM or physical memory that you can put](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=23.31287500000001)[in the server and have Windows recognize](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=26.195999999999994) [it. It's also going to have something to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=28.173499999999986) [do with how many processor sockets are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=30.35999999999999) [supported by that version and edition of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=32.26399999999998) [Windows. And also, it'll have something to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=34.721714285714285) [do with the maximum number of logical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=37.26600000000002) [processor cores that you can run with that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=39.80933333333338) [version and edition of Windows on a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=43.18885714285713) [server. Next, you have to worry about the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=46.283857142857116) [application license limits. Depending on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=49.071000000000005) [what application you're running on a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=50.74400000000001) [server, you might have license limits](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=52.748000000000026) [there that can be tied to the version and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=54.752000000000045) [the edition of your application. That's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=57.35061538461541) [going to limit how much RAM you can have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=59.192470588235295) [in some cases, how many processor sockets,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=63.03070588235297) [and the number of processor cores that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=66.016) [going to have. So, you need to stay aware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=69.2014545454545) [of these license limits as you size your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=72.32800000000002) [hardware. You don't want to make the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=74.90400000000004) [mistake of over sizing your hardware above](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=77.01849999999999)[the license limits for Windows or the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=79.10974999999998) [application that you're going to run. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=81.33399999999997) [for example, if you know that you're going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=83.5971111111111) [to be running Windows Server 2008 R2](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=85.766) [Standard Edition, that has a maximum](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=88.88333333333337) [memory limit of 32 gigabytes of RAM so you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=91.5553333333334) [wouldn't want to go out and buy a server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=94.49073684210525) [with 128 gigabytes of RAM because Windows](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=97.11968421052629) [can only recognize 32 gigabytes of memory,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=99.50872727272726) [and you would be wasting quite a bit of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=102.156) [money on that extra memory. Another](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=104.81100000000002) [example is you don't want to undersize](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=106.656) [your hardware based on your license](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=109.24600000000004) [limits. So, if you've gone ahead and will](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=111.46600000000007) [be spending the extra money to have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=114.31070588235298) [higher edition of Windows or a particular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=117.13894117647067) [application, you want to take advantage of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=119.49984615384618) [that. So, an example on this case is if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=121.81523076923082) [you're running SQL Server 2012 Enterprise](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=125.17) [Edition, it would be a mistake in most](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=127.438) [cases to only have 16 gigabytes of RAM on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=130.09099999999992) [the server because RAM is quite](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=133.01599999999982) [inexpensive. And SQL Server in particular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=135.84200000000004) [really likes to have more memory and only](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=137.82037500000004) [having 16 gigabytes of RAM would really](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=140.1153750000001) [throttle a performance of that serve in that case.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=18&mode=live&start=144.976)

[Understanding Your Server's Physical Limits](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live)

[It's really important that you have a good](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=1.906) [understanding of your server's physical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=3.8348888888888886) [limits beyond the license limits we just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=5.632923076923077) [talked about. There're physical limits on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=8.35753846153846) [several key items you have to keep in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=10.459076923076925) [mind. First one is how many physical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=13.105230769230776) [processor sockets does a server have, is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=15.735999999999997) [it 1, 2, 4, 8? That's going to have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=18.419333333333327) [direct effect on your ultimate performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=22.71781818181818) [and scalability for the entire server. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=25.576) [also limits how much memory can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=28.877666666666666)[installed on the server because all modern](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=30.709333333333333) [processors have memory controllers in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=33.23199999999999) [processor. So if you have a two-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=36.183999999999976) [server with only one processor in it, the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=38.360615384615386) [amount of RAM you can install is going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=40.68266666666667) [be half of the maximum for the server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=43.89266666666669) [Next, you need to keep in mind how many](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=46.746)[memory slots does the server have. Modern](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=49.530000000000015) [servers have increasing memory density](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=51.76446153846154) [over servers from a few years ago. So, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=53.65676923076922) [can have a lot more memory in a one or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=56.76599999999999) [two-socket server than you could a few](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=59.111) [years ago. But that's going to limit how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=61.03599999999999) [much memory can be installed ultimately.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=64.37100000000002) [Next, how many PCI-E Expansion slots does](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=67.156) [a server have? Again, the number of PCI-E](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=70.55800000000004) [Expansion slots has been going up in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=73.49100000000001) [last few years. So, it's a lot higher than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=75.85100000000003) [it used to be, but that's going to limit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=78.39705263157894) [the total I/O capacity that you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=80.88863157894735) [available for the server. More PCI-E](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=82.67742857142855)[Expansion slots are better. They're used](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=84.55266666666667) [for Network Interface Cards, they're used](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=87.40028571428572) [for Host Bus Adapters for SANs, they're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=90.14314285714285) [used for RAID controllers, and also for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=93.30975) [PCI-E storage devices such as fusion I/O](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=96.27599999999998) [cards. Next, how many internal drive bays](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=99.24224999999997) [does a server have? Because having more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=101.90400000000002) [internal drive bays lets you run more of a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=104.62369230769232) [load and have more storage space available](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=108.30676923076929) [just using the internal drive bays. Next,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=111.986) [you can think about how much electrical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=115.59523076923077) [power does a server require? It used to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=117.96984615384613) [very common a few years ago that if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=120.89647619047616) [filled up a 42U rack with 1U servers, all](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=123.66504761904754) [those servers should use more power than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=126.44475) [the data center could supply to 1 rack in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=128.67599999999996) [terms electrical power and also cooling](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=131.686) [capacity. But modern servers have more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=134.44600000000005) [energy efficient components so the power](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=136.67028571428574) [usage is going down quite rapidly on modern servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=19&mode=live&start=138.78742857142862)

[Summary](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live)

[Now, it's time to summarize what we've](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=2.216) [talked about in this module. It's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=4.082666666666666) [extremely important that you understand](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=5.766714285714286) [how to identify hardware both when you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=7.520285714285716) [looking at your current hardware and when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=9.975285714285718) [you're evaluating new hardware. It really](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=12.911999999999995) [helps you understand your current](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=15.732363636363637) [capacity, scalability and performance.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=18.47327272727272) [Modern servers are so much better than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=20.666) [server from three or four, five years ago.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=23.120666666666658) [And when you're looking at existing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=25.926)[servers, understanding exactly what you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=28.15457142857142) [have helps you decide whether it makes any](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=29.926000000000005) [sense to upgrade any of your components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=32.72600000000001) [such as getting more memory for an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=35.27885714285715) [existing server, for example. Next, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=37.96885714285717) [want to think about and be aware of how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=40.086) [identify your server vendor and the exact](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=42.98599999999999)[model of your server. That's really](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=45.07600000000001) [important to help you understand how old](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=47.15155555555556) [that server is and what capabilities it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=50.076) [has. So when you're looking at that, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=53.58474999999999) [need to think about how many processors do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=56.054235294117646) [you have and what exact model of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=58.30364705882353) [processor is installed. You also want to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=61.652666666666676) [know the exact amount and type of RAM that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=64.46915789473684) [you have installed on the server. You want](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=67.67126315789474) [to know the number and type of PCI-E](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=70.47933333333334) [Expansion slots and what's installed in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=73.17266666666673) [those slots or you have any empty slots](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=75.2135) [available, for example. You also want to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=78.07350000000001) [know the number and type of internal drive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=80.52199999999998) [bays, you know, you might have some empty](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=83.27399999999993) [internal drive bays, you could add more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=85.631) [drives too to have more storage bays for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=87.486) [more storage performance. Finally, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=91.22933333333337) [really want to know exactly what processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=93.57466666666666) [vendor whether it's Intel or AMD and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=96.15999999999997) [exact model of the processor. It's not](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=99.09028571428573) [good enough to know that it's an Intel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=101.49333333333334) [Xeon or an AMD Opteron. You need to know](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=103.96266666666668) [that model number. This is going to give](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=106.51742857142855) [you a lot of insight into the ultimate](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=108.9135) [performance and scalability of that server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=111.5335) [compared to a brand new server, for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=113.58509090909092) [example. And it's also very important for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=116.0796363636364) [software licensing purposes. More and more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=119.22266666666664) [software vendors are charging for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=122.13957142857144) [processor licenses or processor core](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=124.67885714285718) [licenses. And knowing how old your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=127.21814285714292)[processor is can be really good ammunition](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=129.9468333333333) [to help you justify buying a brand new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=133.056) [server that's going to be much more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=136.35482352941173) [performing compared to the existing server that you have right now.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=20&mode=live&start=139.241294117647)

[What is Next?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live)

[So, what's going to be on the next module?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=2.186) [Module 3 is going to cover hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=4.686) [evaluation. This will include](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=7.564749999999999) [understanding your workload whether it's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=9.143272727272727) [web server or a file server or a database](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=11.47781818181818) [server. Next, we'll be talking about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=14.898499999999997) [application level benchmarks and how you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=17.101000000000006) [use them to evaluate your hardware. We'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=19.276) [also be talking about component benchmarks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=21.722666666666665) [and how to use them to evaluate individual](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=23.442666666666657) [components on your server. And we will be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=26.401714285714288) [talking about how to understand hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=29.759076923076925) [tradeoffs you have to make when you have a limited budget.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m2-identification&clip=21&mode=live&start=31.743692307692314)

[Hardware Evaluation](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live)

[Introduction](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live)

[This is Glen Berry with SQLskills. com.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=2.006) [I'm recording this course for Pluralsight.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=5.086) [This is Understanding Server Hardware:](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=7.076) [Module 3 Hardware Evaluation. Here's what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=9.687111111111111) [we'll be talking about in this module.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=12.904888888888888) [First, we'll be talking about how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=16.856) [understand your workload. Different types](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=19.515999999999995) [of servers will place different demands on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=21.294666666666664) [a different components in your server so](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=23.529999999999994) [it's important that you know your workload](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=25.696833333333334) [type as you're picking out the components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=27.452666666666662) [for the server. Next, we'll be talking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=29.840999999999998) [about application benchmarks such as TPC-E](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=33.074) [and TPC-H and also SPEC Java Benchmark.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=35.846)[And now we're getting into component](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=40.616) [benchmarks that stress different parts of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=43.663142857142844) [your server. And we're talking about disk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=46.71028571428569) [benchmarks like CrystalDiskMark, HDTune](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=50.595230769230774) [Pro, ATTO and SQLIO. And we'll also be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=52.890615384615394) [talking about processor benchmarks. Some](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=57.07599999999999) [examples are Geekbench and the SPECCPU2006](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=59.632000000000005) [benchmark and Cinebench. Finally, we'll be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=63.627999999999986) [talking about memory benchmarks. There's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=66.84314285714285) [memory component of Geekbench and there's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=69.3013846153846) [also a SiSoft Sandra 2012. And then we'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=71.80753846153844) [finally, we'll be talking about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=75.23509090909093) [understanding hardware tradeoffs. It could](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=77.46690909090914) [be that you don't an unlimited for your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=79.45830769230768) [server and also as you're picking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=82.06753846153843) [different components, that can sometimes](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=84.036) [affect the other components and affect the overall performance of your server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=0&mode=live&start=85.68599999999999)

[Understanding Your Workload](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live)

[Understanding your workload. Different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=1.446) [types of workloads are going to place](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=4.562153846153846) [different demands on your hardware.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=6.915230769230768) [Different components are going to be under](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=8.596) [stress depending on the workload type. The](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=10.749846153846159) [four main components we're concerned with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=13.048307692307691) [here are the CPU, your memory, your I/O](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=15.76215384615384) [subsystem, and the network subsystem. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=19.941714285714284) [for CPU-intensive workloads, that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=24.06957142857143) [typically going to be application servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=25.923857142857138) [and web servers that place a lot of stress](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=28.7052857142857) [on their CPU. For memory-intensive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=32.40266666666666) [workloads, that's usually going to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=34.709999999999994) [database servers and caching servers, it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=38.17199999999998) [place a lot of stress on their memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=41.10138461538461) [subsystem. For I/O-intensive workloads,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=44.65215384615383) [you're going to have database servers can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=47.208) [be extremely I/O intense and file servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=51.528500000000015) [And then for network intensive workloads,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=55.606) [you have file servers and web servers. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=58.389076923076935) [as you think about this and look at this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=61.938500000000005) [list, this will have some influence on how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=64.661) [you decide to provision your server. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=67.156) [for example, if you know that you're going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=69.46814285714285) [to have a CPU-intensive workload with an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=71.64528571428568) [application server, you're going to pay](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=73.59188235294118) [more attention to what sort of CPU you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=75.34952941176473) [buy. And you might buy a more expensive,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=77.69305882352947) [more capable CPU to handle that. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=80.23676923076927) [that's the same work for these other types](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=82.45327272727272) [of workloads. A database server is going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=84.7514545454545) [to be more concerned with memory and I/O in most cases.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=1&mode=live&start=90.326)

[Application Benchmarks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live)

[Application benchmarks. Application](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=1.596) [benchmark use real applications to measure](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=3.811) [the actual performance of a system while](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=6.660999999999998) [you're running a particular application.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=9.841555555555553) [This measures the entire system not just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=12.036) [individual components. Component](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=15.02266666666666) [benchmarks focus on one component and try](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=16.332)[to stress that component with the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=19.523999999999997) [synthetic workload. So application](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=22.516) [benchmarks are more realistic for the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=24.592000000000002) [entire system. Application benchmarks are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=27.700000000000006) [very useful for comparing different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=30.05266666666667) [systems. You can use it to compare an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=32.24711111111112) [existing system to a new system and you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=34.992315789473686) [can also use it to compare multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=37.6281052631579) [candidates for a new system that you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=40.446) [thinking about purchasing. This can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=43.946) [really helpful for sizing and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=46.937) [consolidation calculations. So for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=49.422) [example, you might have several database](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=51.166) [servers, you were thinking about replacing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=53.416) [and consolidating them on to a brand new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=55.666) [server. In using application benchmarks,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=58.83933333333334) [you might be able to figure out that this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=60.34799999999999) [new system could possibly have five times](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=63.31242857142857) [the capacity of one of your existing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=66.3374285714286) [systems so this give you more confidence](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=68.87599999999999) [that you'd be able to successfully](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=70.76599999999996) [consolidate this workload on a single server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=2&mode=live&start=73.846)

[TPC TPC-E OLTP Benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live)

[The first application benchmark we're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=1.836) [going to talk about is the TPC, TPC-E,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=4.529333333333334) [OLTP benchmark. TPC stands for the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=8.838666666666667) [Transaction Processing Performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=11.916) [Council. In this particular benchmark is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=13.416) [an OLTP, Online Transaction Processing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=16.874333333333333) [database benchmark, it was first](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=19.832666666666658) [introduced in February 2007, it simulates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=22.4785) [the OLTP workload of a brokerage firm and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=25.403500000000005) [it uses a realistic data model and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=29.293333333333333) [realistic data from the year 2000 census.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=32.63466666666667)[It requires fault-tolerant storage so you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=35.976) [can't use grade zero for your data storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=38.6802857142857) [and then enforces referential integrity.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=42.286) [It has a lot less reliance on unrealistic](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=45.096) [extremely expensive storage subsystem. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=50.216) [this benchmark is CPU-limited if you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=53.194) [adequate I/O performance to drive the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=56.12)[workload. So because of this, it's a good](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=58.62799999999999) [benchmark for comparing processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=62.69183333333335) [performance. It's especially relevant for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=64.77516666666668) [OLTP workloads but it's also useful even](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=66.87418181818181) [if it's going to be a non-database](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=69.636) [workload. So far, there's only results](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=73.20600000000003) [that had been submitted for Microsoft SQL](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=75.66215384615381) [Server, none of the other database fenders](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=78.38676923076916) [have had any results submitted to this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=80.60872727272731) [benchmark as in time of this recording.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=82.92711111111112) [The TPC-E benchmark results website, is at this URL.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=3&mode=live&start=85.696)

[TPC TPC-H Decision Support Benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live)

[The second application benchmark we're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=2.136) [going to discus is the TPC, TPC-H decision](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=3.767818181818181) [support benchmark. This is a decision](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=7.401000000000001) [support database benchmark that's quite a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=10.366) [bit different in TPC-E that we just talked](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=12.300999999999998) [about. This is a suit business-oriented,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=15.397428571428575) [ad hoc queries. It's designed to examine](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=18.28725)[large volumes of data so it's going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=20.703999999999997) [read a lot of data of your disk I/O](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=22.55999999999999) [subsystem. Designed to execute complex,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=26.256) [long-running queries so this is going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=28.616) [place stress on your memory. And it has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=31.191000000000003) [separate result categories for different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=34.297000000000004) [database sizes. So there are some of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=36.73200000000001) [database sizes that are used for this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=39.66600000000001) [particular benchmark. And the scores for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=41.95266666666669) [different database sizes should not be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=43.888857142857155) [compared with each other. And so this is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=45.813142857142886)[going to place quite a bit different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=48.21364705882353) [demands on your hardware than TPC-E. TPC-E](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=50.16952941176472) [isn't really a CPU benchmark that a reward](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=52.35466666666667) [single threaded performance on your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=56.42400000000003) [processor. This particular benchmark is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=58.96733333333338) [going to reward very good memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=60.627999999999986) [performance and good I/O performance. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=62.94599999999999)[it's also going to reward systems that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=65.29753846153847) [have lots of physicals course so this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=67.54830769230773) [large queries can be run in parallel. The](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=69.94044444444444) [TPC-H benchmark results website as right](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=73.19000000000001) [at this URL and you can go there and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=76.21400000000004) [compare different systems. And the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=79.37933333333334) [usefulness of this benchmark and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=80.84599999999999) [previous benchmark is that you can look at](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=82.76599999999995) [a perspective system and compare to what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=85.326) [you have and compare a different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=87.56599999999995) [perspective systems, and get an idea how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=89.43423529411767) [they will run with a sort of a workload](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=91.58364705882359) [and use that to help you figure out which](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=94.30753846153844) [sort of a system to buy and how to configure it.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=4&mode=live&start=96.95215384615376)

[SPEC SPECjbb2005 Java Server Benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live)

[Next, we'll talk about the SPEC,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=1.706) [SPECjbb2005 Java server benchmark. This](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=5.780000000000001) [benchmark is put up by the Standard](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=8.869076923076923) [Performance Evaluation Corporation or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=11.480615384615382) [SPEC. And this is a Java server benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=12.972923076923072) [that's going to measure your middle-tier](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=15.803777777777777) [application server performance. The](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=18.700285714285712) [client-tier is replaced by driver threads](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=20.712666666666667) [so this is similar to load testing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=22.91266666666667) [software that does the same kind of thing.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=25.47933333333334) [And then the data-tier is replaced by](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=27.306)[binary tree of objects so you don't have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=29.50145454545454) [real database that you're dealing with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=31.835166666666662) [here. So what it's going to really do is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=33.130166666666675) [exercise the Java Virtual machine and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=36.276) [compiler and place a lot of stress on your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=38.83975000000001) [processor and memory performance. So this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=41.67933333333336) [is a good application benchmark to measure](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=43.65314285714285) [your CPU and memory performance. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=46.23314285714285) [there's an information page, we can read](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=48.367333333333335) [more about this and look at results for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=50.40666666666667) [different systems right there at that URL.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=52.811) [And really, the point of this three](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=55.366) [application benchmarks that I've discussed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=57.66099999999999) [is that, they place different sorts of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=59.30028571428569)[workload stress on a server. And so, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=61.73600000000001) [want to find one that's close to the sort](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=64.19541176470588) [of workload that you're going to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=66.23364705882346) [dealing with in your environment. Now](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=67.98885714285716) [ideally, you can actually be able to run](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=69.88350000000001) [your own application and have your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=72.58350000000006) [developers write some sort of a load test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=74.36099999999999) [harness to run your own application in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=76.40099999999995) [your own environment. But not everybody](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=78.536) [has the resources to do that, so picking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=80.29266666666668) [one of the standardized application](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=82.76054545454546)[benchmarks can be useful. Another reason](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=84.84690909090912) [why they're useful is that, they are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=87.17225) [completely standardized and you can use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=89.469125) [this to measure how well they run on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=91.437875) [different server systems that you're considering for purchase.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=5&mode=live&start=98.766)

[Component Benchmarks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live)

[So after talking about some of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=2.626) [application benchmarks, let's talk about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=4.640444444444444) [component benchmarks. Component benchmarks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=6.902000000000001) [focus on one or more components in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=8.807666666666666) [server using that synthetic workload to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=11.934333333333331) [purposely stress that component. So you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=15.045999999999998) [have different source of component](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=17.9935)[benchmarks. Some examples are disk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=19.53725) [benchmarks that focus on I/O performance.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=21.865999999999996) [And so with the disk benchmark, you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=24.896) [going to be measuring your input/output](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=26.68975000000001) [operations per second or IOPS. You're also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=29.075999999999993) [going to be measuring your sequential](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=31.78822222222222) [throughput in either megabytes per second](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=33.5348888888889)[or hopefully gigabytes per second. So this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=35.630999999999986) [is important, for example if you have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=37.931555555555555) [database server that really places lot of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=39.913777777777774) [stress on your I/O subsystem, you'd want](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=41.648222222222216) [to run disk benchmarks on that particular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=44.04742857142858) [system. Now the next source of component](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=46.557428571428595) [benchmarks is processor benchmarks that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=49.50199999999998) [measures CPU performance. So those are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=51.7535) [going to focus on your floating point](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=54.226) [performance and your integer performance.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=56.30266666666667) [And again, this would be important if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=57.786) [are running something like an application](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=59.80733333333336) [server or a web server that places a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=61.32333333333338) [premium on processor performance. Next,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=64.6178181818182) [you have memory benchmarks that measure](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=66.72830769230768) [memory performance and this is going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=68.9621538461538) [measure things like your read and write](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=71.47676923076924)[sequential performance on your memory and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=73.4421538461539) [your memory stream performance. And this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=75.3) [again, this is going to be important for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=77.65066666666668) [database servers and caching servers and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=79.7893333333334) [in some cases, application servers. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=81.59766666666667) [again, depending on what sort of workload](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=84.24781818181819) [you're dealing with, you would pick a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=86.2905454545455)[particular sort of component benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=88.32099999999997) [that stresses a part of the system that you use the most heavily by your workload.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=6&mode=live&start=89.76474999999994)

[Disk Benchmarks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=7&mode=live)

[Next, we'll be talking about disk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=7&mode=live&start=1.886) [benchmarks. We'll be discussing four](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=7&mode=live&start=4.140285714285715) [particular benchmarks in this case. First](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=7&mode=live&start=6.040444444444445) [would be CrystalDiskMark and we'll talk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=7&mode=live&start=8.358142857142857) [about HD Tune Pro and we'll talk about the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=7&mode=live&start=10.831000000000001) [older Atto Disk Benchmark and finally,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=7&mode=live&start=14.525230769230769) [we'll be talking about SQLIO which despite](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=7&mode=live&start=16.95292307692307) [the name has really nothing to do with SQL server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=7&mode=live&start=20.976)

[CrystalDiskMark 3.0.1c](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live)

[The first disk benchmark I'm going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=1.986) [about is CrystalDiskMark 3. 0. 1c which is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=5.507538461538462) [the most current version as the time of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=9.021) [this recording. That this particular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=11.001000000000005) [benchmark is very easy to use and there's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=12.679333333333332) [no complicated configuration required. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=16.399333333333335) [can choose the file size that you want to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=19.34266666666667) [use for the test runs. You have several](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=21.472666666666683) [different choices here. And you can also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=23.696) [choose the file type that's going to use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=25.811000000000003) [for the test runs. It's going to either be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=27.96100000000001) [random data or non-random data. And the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=31.001000000000005) [reason why that's important is that some](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=33.59742857142857) [SSD controllers use compression to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=36.35600000000001) [increase your performance. So if you use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=39.306000000000026) [random data with one of those controllers,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=42.21099999999999) [that data is not going to be very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=44.197249999999976) [compressible and they're not going to do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=46.34073684210527)[very well on that particular test so you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=48.03178947368424) [need to think about whether the kind of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=49.964421052631636) [data that your server is going to deal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=51.78877777777777) [with is random or not and decide which way](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=53.59766666666664) [to do it for this test. You can also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=55.83599999999999) [choose the number of test runs anywhere](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=58.423500000000004) [between one to nine test runs that is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=60.82100000000001) [going to go through as it runs this test.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=63.51054545454546) [So once you start running the test, it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=66.366) [going to pretty quickly measure your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=68.96100000000003) [sequential read and write performance in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=70.90725000000005)[your random I/O read and write](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=73.05054545454546) [performance. So it's going to measure](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=75.29236363636365) [sequential reads and writes in megabytes](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=77.60446153846152) [per second. And then it's going to go](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=79.93061538461535) [through ad measure large and small random](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=82.5745714285714) [reads and writes, a different queue depth.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=84.75457142857135) [And the reason why that is important is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=87.736) [that servers typically have a higher queue](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=89.226) [depths than desktop systems. And that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=92.01327272727268) [going to be measured in megabytes per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=94.27724999999998) [second and also input operations per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=96.62662499999993) [second. And this utility is a free](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=98.64037499999989) [download that you can get from this URL.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=102.156) [So after you run this, it will take](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=106.396) [probably five minutes to run. This is an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=109.1283076923077) [example what the output looks like. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=111.75933333333332) [looking here, you can see that we had 474](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=114.07) [megabytes per second for reads and 420](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=118.24599999999998) [megabytes per second for writes. And then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=121.54599999999999) [going down you can see four random reads](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=124.64894117647059) [and writes and then smaller random reads](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=127.26070588235295) [and writes and then 4K reads and writes at](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=129.546) [a queue depth of 32. And the bottom part](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=133.10100000000008) [of this shows where you can type in what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=136.09850000000003) [sort of disk or disk array that you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=138.3991250000001) [testing. So that's what the output for this particular benchmark looks like.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=8&mode=live&start=141.20766666666665)

[Demo: CrystalDiskMark 3.0.1c](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live)

[In this demo, I want to show how to use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=2.266) [CrystalDiskMark. I've already downloaded](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=5.138727272727271) [the executable and started it up right](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=6.5638571428571435) [here on my desktop. And I also went in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=9.218857142857145) [ahead and typed in the information about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=12.105444444444446) [the disk and when a test. You can use this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=14.02266666666667) [utility to test logical disk or single](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=17.179333333333336) [disk like I have in my desktop right here.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=19.827666666666673) [And what you can see is right here is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=22.056) [where you choose how many test runs to do.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=24.861000000000008) [So I'm going to just do one test runs that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=27.666) [will run quicker for this demo. Right here](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=30.015999999999995) [is where you choose how big of a file size](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=31.911882352941173) [you use for the test. And the default is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=34.34129411764705) [1000 megabytes. So I'm going to go ahead](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=37.20266666666667) [and leave it on that for this test. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=39.08885714285713) [right here is where you would pick any of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=40.76676923076923) [the available disks that Windows can see](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=43.113692307692276)[as a logical disk. So in my case, I just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=45.34599999999999) [have a C drive here. It happens to be a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=48.10509090909091) [256 gigabyte OCZ Vertex 4 SSD that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=51.33766666666667) [plugged into a SATA 3 port. And when I](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=54.33600000000001) [press this button right here, the task is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=57.73599999999999) [going to go ahead and kick off and what it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=59.9493333333333) [has to do is write out a 1000 megabyte](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=62.63830769230769) [file and then start reading and writing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=64.89523076923078) [from it. And it's going to run the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=66.87099999999997) [sequential read test first. So on a few](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=69.57600000000002) [seconds, we're going to see the results](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=72.0271111111111) [pop up right here, for how long, or what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=73.83155555555552) [kind of sequential throughput it gets. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=76.2635) [you can see on that first test run, it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=78.40044444444445) [came back with 457 megabytes per second](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=80.79907692307692) [which is not too bad. If you have a SATA 2](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=83.34061538461535) [interface, you're going to be limited to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=87.1226666666667) [about 300 megabytes per second. So we get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=89.41711111111118) [457 on reads and then 420 megabytes per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=92.45810526315788) [second on write on a 1000 megabyte file.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=96.19705263157888) [So next, it goes into the random read test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=99.936) [of a 512 kilobyte file. So it came back](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=103.21457142857143) [there with 306 megabytes per second on the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=106.76215384615386) [reads and then now the write test is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=110.21446153846159) [running and that should finish up in a few](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=112.25600000000003) [seconds right here. So we got a little bit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=114.32600000000006) [better write performance there with 392](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=117.12000000000002) [megabytes per second on the random writes](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=119.22400000000003) [of a 512 kilobyte file. So now let's move](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=122.16044444444445) [on to the random reads of a four kilobyte](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=125.85028571428573) [file. And this is quite a bit lower. It's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=128.8524285714286) [31 megabytes per second, but if you hover](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=131.56418181818182) [over this, it gives you a little tool tip](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=134.50963636363642) [that tells you your IOPS. So in this case,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=137.44516666666667) [it's 7600 IOPS for the reads and we get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=140.26799999999994) [quite a bit better on the writes, 18437](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=143.08499999999984)[IOPS on the writes for 4K random read and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=145.786) [write and that's on a queue depth of one.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=150.37599999999992) [So now what it's doing and moving on to a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=154.966) [queue depth of thirty two for the same](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=157.64600000000002) [file size for random reads and writes. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=160.15599999999995) [we went ahead and finish there and it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=163.29676923076923) [295 megabytes per second and then you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=166.5829230769231) [see the IOPS is about 7200. And then a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=169.54200000000003) [little bit slower for the writes here. So,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=172.33199999999997) [just in a few seconds, you can run this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=174.55073684210527) [with one test run and get your sequential](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=177.38336842105275) [performance and then your random](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=179.90126315789496) [performance with different file sizes and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=181.76061538461533) [different queue depths. And you have to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=184.07753846153832) [type in this information down here. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=186.428) [that's how you use this utility. One last](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=188.53028571428572) [thing I want to show you is, you can come](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=190.93028571428573) [in here, this is where you change your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=193.5017142857144)[test data. The default is for random data.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=195.77099999999993) [And if you want, you can change it to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=198.716) [all zeros or all ones. And again, the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=201.46266666666662) [reason why that's important is that, some](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=204.1774285714286) [SSD controllers use compression when they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=207.30742857142866) [write data out to the SSD and so that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=209.78433333333334) [going to affect how well those controllers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=212.88183333333333) [will work with this test on whether you have random data or non-random data.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=9&mode=live&start=215.5114545454545)

[HD Tune Pro 5.0](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live)

[A second disk benchmark program we're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=1.866) [going to look at is HD Tune Pro 5. 0, this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=4.086) [is a disk utility and a benchmark program.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=8.152666666666667) [You can use as a measure to sequential](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=11.086) [transfer rate of a drive or an entire](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=13.738307692307687) [drive array that shows up the logical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=16.309636363636365) [drive. You can measure the access time and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=18.441454545454548) [the burst rate and a CPU usage during the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=21.23717647058823) [test and you can run a read or write test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=24.440117647058816) [again with the logical drive or an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=27.598857142857142) [individual stand alone drive. So this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=30.275999999999996) [makes it really useful to evaluate the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=33.12475) [performance of logical drives so you've](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=35.255375) [got to read 5 array or read 10 arrays for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=37.081625) [example. This shows up as a logical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=40.328999999999986) [driving in Windows, you can measure the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=42.28933333333335) [performance of that using this utility.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=44.558) [It's also useful for determining disk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=46.736) [information about single stand alone](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=49.67600000000001) [drives so you get the exact model and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=52.12600000000002) [health status of an individual drive. It's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=55.281384615384624) [free for 15-day evaluation period. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=58.01766666666667) [after that, you need to pay 34. 95 to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=60.61652631578948) [purchase it as of the time of this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=63.681263157894755) [recording. The HD Tune website is at this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=66.40547368421055) [URL. And this is what the output looks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=69.39724999999997) [like when you run this test. At the top,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=72.20984615384619) [it shows you the model of an individual](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=75.20849999999999) [drive and then the benchmark tab shows you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=77.64183333333327) [the read sequential performance in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=81.49266666666662) [megabytes per second on the left hand](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=84.02599999999993) [vertical scale and then the access time in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=87.18599999999999) [milliseconds on the right hand vertical scale.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=10&mode=live&start=90.46599999999997)

[Demo: HD Tune Pro 5.0](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live)

[In this demo, I'm going to show you how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=2.476) [use HD Tune Pro. I've all ready started](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=5.311714285714284) [the program here and it's pointing at my](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=7.696) [OCZ Vertex 4 SSD. And all you have to do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=10.196) [to do the sequential read test is click on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=13.596000000000004) [the Start button. And then what you'll see](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=16.821000000000012) [is, as the test runs on a conventional](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=19.73933333333333)[hard drive, it starts on the outer tracks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=22.68866666666666) [of the drive and then it goes into the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=25.063999999999997) [inner tracks of the drives that reads](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=27.520999999999994) [across from left to right. And so, what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=29.566) [you'll normally see with a conventional](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=31.865999999999996) [hard drive is the performance is higher on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=33.40457142857142) [the out tracks and then it goes downhill](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=35.90742857142855) [like this as it gets to the inner tracks.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=38.4852857142857) [Well, you won't see that with an SSD, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=41.436) [cannot see fairly stable performance. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=44.251714285714264) [what this is showing right now is that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=46.16466666666667) [it's reading at anywhere from 211 to 277](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=48.954) [megabytes per second for sequential reads.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=52.171) [And this will go ahead and continue to run](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=55.546) [across here for the next few minutes. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=57.829749999999976) [while that's running, we can click on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=59.879636363636365) [somebody's other tabs and see what else](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=61.79509090909091) [it's shown in this program. On the Info](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=63.33155555555557) [tab, you can see a lot of information](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=65.28600000000002) [about the serial number, the drive and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=68.11266666666673) [firmware version and the capacity of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=71.06600000000002) [drive. And, you know, the fact that it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=73.76100000000005) [got SATA 3 support for example. The](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=76.10600000000001) [rotation speed is zero since it's an SSD.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=78.06488888888889) [And you can also see how large your drive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=80.296) [is and how much space it has in the file](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=83.84200000000006) [system that's on it. If you're going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=86.05676923076929) [Health tab, you can see a lot of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=88.0136923076923) [information about how many times you've](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=90.30907692307689) [had power cycles on and off for the drive.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=92.53171428571432) [The disk monitor shows you some other](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=96.016) [information about what's going on with the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=98.21145454545454) [drive during normal operation. So going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=100.64885714285714) [back to the benchmark, you can see it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=102.70885714285714) [about half way done. And again, with an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=104.64028571428571) [SSD, this is going to be pretty steady](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=106.85849999999999) [across the entire span of the drive so](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=109.36349999999999) [it's just not rotating like a conventional](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=111.84457142857141) [magnetic hard drive. And when this test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=113.99457142857136) [was done, it's going to give us an average](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=116.36711111111111) [rate and also access time in milliseconds](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=119.63211111111113) [and then the burst rate in megabytes per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=122.14028571428571) [second and a CPU usage during the test.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=125.12509090909093) [Some drives in the past especially would](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=128.456) [drive up CPU usage quite a bit while they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=131.14224999999993) [were being tested so we want this to come](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=134.11509090909084) [at a fairly low rate. And while waiting](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=136.95145454545457) [for this test to finish up, there's other](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=139.31600000000003) [test you can run if you want. You can go](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=141.4760000000001) [to the random access folder and the run a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=144.3606153846154) [series of random I/O test using different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=147.3444615384615) [transfer sizes and that's really useful to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=150.94600000000008) [look at for SSDs. And there's a whole](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=153.5026666666666) [suite of extra test that you can run to.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=156.04523076923073) [So this is a pretty comprehensive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=159.126) [benchmark utility, and it's almost done](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=162.47215384615393) [here. So as this continues to run, you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=165.81830769230785) [see the performance is fairly steady with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=168.3874285714285) [an SSD which is what we expect. And with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=170.1685) [the conventional hard drive, this should](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=172.77781818181816) [be going downhills, it went to the inner](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=174.88327272727267) [tracks of the drive. And also, what you'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=177.3304444444445) [notice here is that the sequential](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=179.86350000000002) [transfer rate is pretty high compared to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=181.98975000000004) [conventional hard drive, it would](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=184.411) [probably-- conventional hard drive would](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=185.88599999999994) [be picking out and maybe 150 megabytes per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=187.36099999999988) [second during this test. So the test is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=190.8904444444445) [nearly done here. And one interesting](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=194.9202857142857) [thing about this particular utility is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=197.36999999999998) [lot of hardware review sites like they use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=199.73599999999993) [it when they review new hard drives and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=202.12984615384613) [new SSDs so you can compare your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=204.00676923076918) [performance to what they're getting for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=206.31061538461543) [other drives that you're considering](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=208.51215384615395) [purchasing. All right, so that finished](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=210.941) [and that shows again the performance for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=213.15242857142852) [sequential reads, it was pretty steady](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=215.45742857142844) [across the entire span of the SSD. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=217.37054545454546) [then down here, these little yellow dots,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=219.98742857142858) [these are access time in milliseconds. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=222.93742857142863) [that's one of the fortes of an SSD that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=225.75711111111113) [their access time is extremely low and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=228.37711111111122) [that's because there's no moving parts](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=230.41488888888907) [like there are in a conventional hard](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=232.23292307692304) [drive. So you don't have to worry about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=234.37061538461532) [seek time. So that's one of the main advantages of SSDs.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=11&mode=live&start=237.11044444444454)

[ATTO Disk Benchmark v2.48](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live)

[Now, we're going to talk about another](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=2.496) [disk benchmark which is ATTO disk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=4.4093333333333335) [benchmark version 2. 48. This program is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=6.791000000000001) [little bit older but it's still very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=9.397428571428572) [popular with hardware enthusiast sites. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=11.616000000000001) [only measures sequential I/O performance.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=14.109333333333334) [It is very quick and easy to run. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=16.326) [really not to do very much configuration](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=18.894) [at all. And it can measure logical disk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=20.699999999999992) [performance, so if you have a RAID array](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=23.069333333333326) [or an individual disk, you can measure the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=25.540444444444425)[sequential performance of that disk. It's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=28.447111111111116) [a free download from this URL. And this is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=31.000285714285717) [what your output looks like when you run](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=34.87061538461538) [this program. You can type in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=37.762923076923045) [description of the disk that you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=39.95364705882354) [testing and then you can choose to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=41.714823529411795) [transfer size and the total length and a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=43.76433333333333) [queue depth and you click on the Start](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=46.071000000000005) [button and it takes three or four minutes](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=48.37766666666668) [to run with different transfer sizes and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=51.293692307692325) [you can see the results down there on the right for writes and reads.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=12&mode=live&start=54.546)

[Demo: ATTO Disk Benchmark v2.48](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live)

[In this demo, I'm going to show you how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=2.956) [use the ATTO disk benchmark. This](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=6.002666666666668) [benchmark, it's a stand alone executable,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=7.9185) [it doesn't require any installation. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=10.2735) [I've gone ahead and started it up and you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=12.503058823529413) [can see the user interface right here.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=14.906588235294123) [Right here is where you want to type in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=16.776) [the description of the single disk or the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=19.026) [disk array that you're testing. Appears](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=21.168857142857146) [where you choose the logical drive which](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=23.059) [you're going to test, on my case, it's a C](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=25.04000000000001) [drive. In here you can choose the transfer](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=28.06822222222221) [size range that you want to test and this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=30.148105263157888) [is in kilobytes so it starts at a very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=32.42652631578946) [small size and goes all the way up to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=35.124) [eight megabytes in this case. And then you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=38.031000000000006) [can choose a queue depth. By default, it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=40.37725) [starts at 4. Higher queue depths are more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=42.621) [relevant for servers, so if you wanted to,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=45.015230769230755) [you could change this to a queue depth of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=47.206) [10, that's the highest you can choose. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=50.20975000000002) [after you've made your selections here,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=52.791333333333334) [you go ahead and click the Start button](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=54.26333333333334) [and then the test will start running.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=56.226) [Started with the smallest transfer size](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=58.176) [and going up. And what you'll notice is,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=60.93600000000001) [on the very smallest transfer sizes, at](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=64.21600000000001) [least from my SSD, you have relatively](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=66.87599999999998) [poor sequential performance 'cause that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=69.57292307692309) [all those test is doing, it's testing read](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=71.53446153846157) [sequential performance and write](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=75.14266666666668) [sequential performance. The writes are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=77.33822222222227) [done first at each size and they're going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=79.19753846153847) [to be in red and then the reads are in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=81.22830769230771) [green. And what'll happen with this test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=84.71377777777776) [is as the transfer size gets larger, the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=87.39830769230765)[sequential performance will increase for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=90.507) [both writes and reads. Now this test has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=92.56200000000001) [been around for a number of years and it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=95.66200000000002) [quite popular with the hardware enthusiast](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=98.93800000000006) [websites that like a test, every new disk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=101.27171428571427) [that comes out in every new SSD, they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=104.48314285714281) [generally run several different benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=107.70600000000002) [test, most of which we've talked about in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=109.7226666666667) [this module. And so, what's nice about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=112.35822222222225) [that is you can compare the test that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=114.52266666666668) [have for a particular disk to other disk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=117.27066666666671) [that are out there in the market place so](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=119.3493333333333) [you might not have access to it yet that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=121.61314285714286) [you might be considering. And what's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=123.74742857142857) [probably more relevant for servers is if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=125.36541176470587) [you're testing a disk array of multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=127.70835294117641) [disk, you can say a RAID 5 or a RAID 10](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=130.05129411764705) [array, you can see your overall sequential](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=133.33145454545442)[read and write performance. And that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=136.302) [important especially for file servers and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=138.846) [it's also very, very important for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=141.12599999999998) [database servers when they're doing things](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=143.50099999999998) [like database backups and database](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=145.97099999999995) [restores and index rebuilds, you really](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=148.326) [have to pay attention to your sequential](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=151.21200000000002) [performance. And you can see with this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=153.47300000000007) [particular 256 gigabyte OCZ Vertex SSD](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=156.41885714285706) [that's plugged into a SATA 3 port, they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=159.04171428571414) [were getting quite good sequential](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=162.30100000000004)[performance as the test continues and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=164.28850000000008) [transfer sizes get larger. So this is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=167.276) [valuable test again, for testing only](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=171.5126666666667) [sequential performance. And it's almost](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=174.8676666666667) [done here. And what's nice about this is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=177.12000000000003) [you can see it both in graphical form here](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=179.44400000000005) [and then here's the actual results that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=181.796) [it's getting for each transfer sites. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=183.93369230769227) [one thing you'll notice is if you do test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=186.13725) [SSGs, they tend to do better at higher](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=189.47850000000003) [queue depths and that's one of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=192.26266666666666)[advantages they have which makes them well](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=194.211) [suited for some server usage. So we just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=196.78822222222226) [have one more test to go and, you know,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=199.8536470588235) [you can just see looking at the results](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=202.51658823529397) [here that we were picking over 500](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=204.94799999999998) [megabytes per second on some of these tests which is quite good.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=13&mode=live&start=207.16933333333324)

[SQLIO Disk Benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live)

[Next, we'll talk about the SQLIO disk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=2.206) [benchmark. Despite the name, this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=5.22475) [benchmark has nothing to do with SQL](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=7.059333333333332) [server. It was actually a free tool that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=9.515166666666667) [Microsoft developed and released, let you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=12.58327272727273) [evaluate I/O performance on any disk that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=14.790545454545455) [you want. It does not requires a SQL](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=17.08145454545455) [server and it does not use a SQL sever](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=19.630736842105254) [workload during the test. You can use it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=22.472842105263133) [on any server running a recent version of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=24.773777777777777) [Windows and you can use it against any](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=26.84933333333333)[logical disk that's been presented to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=29.281555555555556) [Windows. It's command-line utility and it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=31.90822222222223) [actually does require a little of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=34.20100000000001) [expertise that properly configuring run.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=36.451) [There's a lot of different command lines](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=38.426) [switches to choose from. It can also take](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=40.341454545454546) [quite a long time to run a comprehensive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=42.827999999999996) [set of test. It does allow you to test the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=45.61199999999999) [absolute limits of your I/Os subsystem, it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=49.642666666666685) [measures I/Os per second and also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=52.62933333333337) [sequential throughput in megabytes per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=55.206769230769225) [second and then latency in milliseconds.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=57.38369230769229) [It is a free download and you can get it from this URL.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=14&mode=live&start=59.996)

[Processor Benchmarks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live)

[Next, we'll talk about processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=2.396) [benchmarks. There's three benchmarks in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=4.671) [particular we're discussing in this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=6.601999999999999) [module. The first one is Geekbench 2. 3.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=8.447) [4, this is a very popular cross platform](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=11.397764705882356) [benchmark that's extremely easy to use.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=14.348352941176476) [The next one is the SPECCPU 2006](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=17.246) [benchmark, that's also a popular benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=20.697538461538464) [that is somewhat expensive to buy and use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=23.656) [yourself but luckily, there's a lot of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=26.252363636363633) [online results that you can look at to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=28.465999999999994) [compare a particular processors. And the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=30.945999999999984) [finally, we'll look at the Maxon Cinebench](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=33.047666666666665) [11. 5 benchmark that actually measures](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=36.06349999999999) [video card performance and CPU](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=38.789333333333325)[performance. And you can choose just to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=41.178222222222196) [measure the CPU performance when you run](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=43.423999999999985) [this test. The nice thing about this test is also free.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=15&mode=live&start=45.486666666666636)

[Geekbench 2.3.4 Benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live)

[The Geekbench 2. 3. 4 benchmark, this is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=2.716) [cross-platform processor and memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=7.7109999999999985) [benchmark. It runs on Windows, it runs on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=9.930999999999997) [Mac OS and also runs on a Linux. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=12.679333333333329) [requires and allows no configuration or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=15.530615384615384) [whatsoever and it runs in two to three](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=17.59830769230769) [minutes based on the speed of your system.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=20.342000000000002) [It's going to measure the processor and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=23.046) [memory performance with 39 different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=26.27676923076922) [tests. It gives you an overall Geekbench](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=28.584461538461518) [score for the system. It also has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=31.212000000000003)[subsection scores for each one of those 39](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=33.503499999999995) [test. There's an online database of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=35.763499999999986) [submitted results and that's very useful](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=38.93236363636364) [for comparing systems you don't have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=42.396) [access to because anybody who runs this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=44.01599999999998) [test can easily submit their results so](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=46.11933333333333) [there's a lot of results in that database.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=48.483777777777775) [The URL for that is shown right there.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=51.026) [Now, the 32-bit evaluation version is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=54.276) [free. And if you want to run the 64-bit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=57.36171428571428) [version for Windows, it cost 12. 99 as of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=60.014181818181804) [the time of this recording. The 64-bit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=62.95418181818184) [version has higher floating point scores](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=65.59028571428571) [on some processors so you want to make](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=68.15314285714284) [sure that you compare 32-bit results, a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=71.62145454545454) [32-bit results and on the same way for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=74.79054545454545) [64-bits results. The main web page for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=78.036) [Geekbench is shown at this URL. Now this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=80.20236363636366) [is what results look like after you run](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=82.63933333333334) [the test. You can see that I run a 32-bit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=85.7326666666667) [version of this test on my system and I](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=88.74600000000001) [got a score of 13645 as my overall](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=91.26600000000002) [Geekbench score. And then at the top, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=95.19171428571426) [can see the integer, floating point,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=98.54100000000004) [memory and stream results. And then if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=100.65600000000008) [were to scroll down further, in this, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=103.02236363636362) [would see individual results for each one](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=104.98933333333333) [of those 39 test. Do you know the nice](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=107.04266666666669) [thing about this is it shows you some](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=109.42850000000003) [detailed system information about the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=111.36850000000008) [system that was being tested. So that's what the Geekbench test results look like.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=16&mode=live&start=112.82742857142858)

[Demo: Geekbench 2.3.4 Benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live)

[In this demo, I'm going to show you how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=2.326) [run Geekbench. What I've got going on here](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=5.317666666666666) [is I have the CPU-Z utility up as we can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=7.741000000000003) [watch it while we're running Geekbench.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=10.702000000000004) [And I also have Window's task manager](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=12.406) [running. And this is a user interface for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=14.584749999999996) [Geekbench. It shows me the operating](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=17.372249999999994)[system that have and my processor. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=19.489636363636357) [then, if this was a real server instead of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=21.850705882352944) [a workstation that I built from parts, it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=24.053058823529426) [would show me in the manufacture and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=26.04528571428571) [model number of the server. And this shows](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=28.279571428571415) [that I've got 32 gigs of RAM. And I can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=30.438000000000002) [choose a 32-bit benchmark or if I paid for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=33.01541176470588) [a license like I have, I can run the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=35.41364705882352) [64-bit benchmark and that's all there is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=37.99215384615385) [to it, there's no configuration that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=40.17292307692308) [can do. You just click on Run Benchmarks.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=42.58885714285715) [And then what you'll notice is it goes](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=45.476) [through and starts running the test and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=47.43599999999998) [you can see my CPU is getting quite busy.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=49.178) [This is a quad-core processor with hyper](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=51.626) [threading so I have 8 logical processors](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=54.34725000000001) [during task manager. And you can see the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=56.76266666666668) [clock speed on my processor is jumping up](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=59.07183333333333) [as they're running this load on this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=61.367111111111114) [processor. That's because of Intel turbo](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=64.73488888888889) [boost. So this is going through pretty](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=66.99100000000001) [quickly 'cause it's 64-bit test that runs](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=69.17872727272731) [quicker on Ivy Bridge processors. So, in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=71.68885714285715) [few more seconds, this will be done and it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=74.964) [will actually come up with the web page](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=77.41799999999999)[that shows the Geekbench score. So I'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=80.04100000000003) [move this out of the way and you can see](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=82.55266666666668) [that my overall score was 18844. And you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=86.08600000000007) [can see the processor floating point](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=88.82433333333334) [performance is quite high on this 63-bit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=90.67933333333336) [version of the test. And if you scroll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=92.96599999999998) [down through this results, you can see](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=95.95349999999998) [more details about your system. So it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=98.73162499999994) [shows me all the details about the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=101.26488888888888) [processor and the cache size and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=103.18599999999996) [memory size and the northbridge and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=105.10711111111105) [BIOS version and then it gets (inaudible)](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=107.25599999999997) [to all those 39 different tests here. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=109.496) [you can scroll through this and see what's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=113.878) [happening there and you can click on the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=115.734) [Upload button and upload that to the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=118.18100000000001) [Geekbench browser website so that other](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=121.87350000000004) [people can see these results. And there's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=124.56975000000001) [no information about you there, just the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=127.00725000000001) [information about your system and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=129.04162500000004) [score so that more people that do this, the more valuable this tool is.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=17&mode=live&start=130.78537500000007)

[SPEC CPU2006 Processor Benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live)

[Now, we'll talk about the SPEC CPU 2006](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=2.436) [processor benchmark. This benchmark has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=7.204000000000001) [been released by the Standard Performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=9.547538461538462) [Evaluation Corporation or SPEC. And it's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=11.850615384615384) [standardized processor and memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=14.766000000000002) [benchmarks so it's similar to Geekbench.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=16.606000000000005) [It's designed to stress your CPU and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=19.366) [memory subsystem and it provides a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=22.26400000000001) [comparative measure of compute-intensive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=24.74800000000002) [performance. It's going to be measuring](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=26.956000000000003) [integer and floating point performance,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=29.64242857142857) [very similar to Geekbench. This is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=31.63885714285714) [little different from Geekbench though](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=34.184000000000005) [because you can't just run this program or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=35.76400000000002) [buy it and run it, you actually have to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=38.258105263157894) [buy the source code for 800 dollars from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=40.79705263157895) [SPEC, that's going to be C++ source code](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=43.05389473684211) [that you have to compile and run yourself.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=45.618) [So it's most often used by hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=48.226) [vendors such as Dell and HP for example.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=50.727333333333355) [Dell go through and run test on different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=53.586) [model servers with different processors in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=56.607538461538454) [them and then publish the results. It's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=58.85457142857143) [very useful for comparing different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=61.332153846153844) [processors so you're trying to decide](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=62.96292307692306)[whether to buy this processor or another](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=64.91984615384612) [one from a different vendor or, you know,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=67.46600000000002) [a higher end processor versus the lower](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=70.426) [end processor in the same line so this can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=72.54753846153851) [help you decide whether it's worth it to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=74.93) [spend more money on a higher end](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=76.59155555555554) [processor. Now the main information page](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=79.01044444444439) [for SPEC CPU 2006 is at this URL. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=81.72523076923076) [what's the most useful part of this though](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=85.77711111111111) [if you don't want to spend the 800 dollars](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=87.86599999999996) [to buy the source code is that, there's an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=90.216) [online database where you can look through](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=93.01800000000003) [submitted results, and the URL for that is right there.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=18&mode=live&start=95.886)

[Maxon Cinebench 11.5](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live)

[Now, we'll talk about the last CPU](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=2.846) [benchmark for this module, this is the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=5.086) [Maxon Cinebench 11. 5 benchmark. This is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=7.937249999999999) [cross-platform test suite that's based on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=11.957999999999997) [some actual software called Cinema 4D.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=14.761999999999992) [It's an actual application workload rather](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=17.566) [than just a synthetic benchmark so they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=19.769636363636362) [advertise it as being more realistic. It's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=22.411) [designed to evaluate your processor and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=25.252) [graphics card performance. So it can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=27.80799999999999) [useful if you're dealing with engineering](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=29.896)[workstations or graphics rendering](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=31.82314285714286) [servers. And it's also a benchmark that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=34.05742857142857) [used by a lot of different hardware review](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=36.400000000000006) [site so you can compare your results to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=38.77866666666668) [what they have on their site for hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=40.989333333333335) [that you don't have access to personally.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=43.176) [And if you want to, you can choose only to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=45.296) [run the CPU portion of the test rather](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=47.73284210526318) [than, than the CPU and the graphics part](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=49.682315789473726) [of the test. Because most servers, unless](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=51.934999999999995) [they're graphics rendering servers, are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=54.781000000000006) [not going to have a very powerful graphics](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=57.079) [card. So their graphic score is not going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=59.58300000000002) [to be very good when you run this test.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=61.466625000000015) [Now, the main information page for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=63.486) [Cinebench is at this URL. And this is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=66.68781818181817) [free download at that URL. So here's what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=71.59155555555554) [the results look like after you run the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=75.0835)[test. And there's no configuration](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=76.94350000000001) [acquired for this test, you just click on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=78.35733333333333) [the Run button for OpenGL for the graphics](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=80.71999999999998) [portion and you click on the Run button](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=83.14423529411766) [for this CPU portion. And what's kind of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=85.60541176470593) [interesting about this is it shows you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=87.92849999999999) [some information about your system on the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=89.84037499999994) [left including the graphics card. And then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=91.94600000000001) [down at the bottom, it compares your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=94.532) [performance to some other common processors that have run this test.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=19&mode=live&start=97.10799999999996)

[Demo: Maxon Cinebench 11.5 Benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live)

[In this demo, I'm going to show you how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=2.916) [run Cinebench. I've already got the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=5.882666666666668) [program running here and you can see that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=7.38509090909091) [it has some details about my system. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=9.306000000000001) [then right here, there are two Run](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=11.90711111111111) [buttons. First of all, we'll run the CPU](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=13.944888888888883) [test, this only measures your CPU](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=16.805999999999997) [performance. So you click on the Run](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=19.00885714285713) [button and it starts rendering a graphic](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=21.49266666666667) [scene here on the screen. And how fast](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=23.962111111111113) [this is going to run depends on how fast](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=26.672000000000004) [your processors is. And this will go ahead](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=29.51000000000002) [and continue to render squares a going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=31.869333333333337) [around and around until it finishes the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=33.847999999999985) [test, and then when it's done, it's going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=35.67599999999999) [to give us a score somewhere in this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=37.78236363636364) [range. So this is only measuring your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=40.3278181818182) [processor performance. And this will be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=42.843500000000006) [done in probably about another 30 seconds](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=44.978666666666676) [or so, maybe less. And you can see from my](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=47.43333333333336) [system that I've got an Intel core I73770K](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=52.84266666666667) [processor that's a quad-core with hyper](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=58.184888888888906) [threading so it has 8 threads and that's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=61.503499999999995) [speed that it's rated at and it's running](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=64.41724999999998) [64-bit version of Cinebench here. Some of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=67.39725) [my score came in at 8. 95 and that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=70.25975) [compares pretty favorably to some of these](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=72.931625) [other systems that have 8 cores and 16](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=75.26872727272726) [threads since this is a brand new Ivy](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=78.67963636363632)[Bridge processor. And you can hover over](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=81.89044444444443) [this and get more details about the score.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=85.08600000000003) [Next, we'll run the OpenGL test and this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=88.926) [is going to be more relevant for gaming](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=91.83423529411762) [systems and engineering workstations that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=94.74247058823524) [do a lot of graphics work and also for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=96.45933333333335) [graphics rendering severs that might have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=99.53266666666667) [a very powerful video card that they use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=101.73266666666672) [to render graphics. So what this does is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=104.95100000000002) [actually runs a rendered car chase scene](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=108.36655555555558) [of a red car running away from a police](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=111.20933333333339) [car and this is measuring graphics car](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=114.67799999999998) [performance and frames per second. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=117.08599999999994) [there is some relationship to CPU](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=119.26266666666666) [performance here. These are primarily](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=122.00266666666664) [stressing your graphics card so this might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=124.03725) [not be relevant for most servers such as a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=126.65350000000001) [database server or a web server. Any ways,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=130.086) [this is almost done here and you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=133.0006666666667) [choose not to run this, you just run the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=135.1393333333334) [CPU test if you have a normal non-graphics](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=138.15314285714283) [type server. So this came in at about 70](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=141.50742857142848) [fames per second which is not super high](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=145.00162500000008) [performance. I have sort of a midrange graphics card in my workstation.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=20&mode=live&start=148.03662500000016)

[Memory Benchmarks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=21&mode=live)

[Now we'll talk about a couple of memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=21&mode=live&start=2.396) [benchmarks. The first one is Geekbench 2.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=21&mode=live&start=4.769333333333335) [3. 4, there's processor benchmarks part of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=21&mode=live&start=7.551714285714287) [that and there's a memory benchmark part](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=21&mode=live&start=10.451714285714289) [of that overall test. So we'll talk more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=21&mode=live&start=12.684000000000005) [in detail about the memory benchmark](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=21&mode=live&start=15.086769230769228) [portion of it. Then you also have SiSoft](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=21&mode=live&start=16.872923076923072)[Sandra 2012 which we'll be talking about a little bit.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=21&mode=live&start=22.766)

[Geekbench Memory Benchmarks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live)

[Now we'll talk about the Geekbench memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=2.196) [benchmarks. This is a subset of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=4.8035) [overall Geekbench test. There's 13](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=7.502666666666668) [different memory and stream-related test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=9.702000000000002) [in this benchmark. They're going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=12.292000000000005) [measure read and write memory performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=14.839333333333334) [and also they'll be stream tests that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=16.826) [measuring memory bandwidth. This is very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=19.590999999999998) [useful for evaluating your memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=22.132666666666665) [performance. It can be used to evaluate](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=24.393777777777775) [your performance after a configuration](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=27.041000000000007)[change. So for example, maybe you go into](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=28.87016666666668) [your BIOS and change one of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=31.620374999999996) [memory-related settings. After you do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=34.00475000000001) [that, you can use Geekbench to see whether](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=35.661882352941184) [that improved your performance or not. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=38.264235294117675) [can also do something like, if you add](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=40.50725) [more memory or different types of memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=42.83724999999998) [to your server, run a Geekbench before and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=44.876) [after and see whether that had a positive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=47.38099999999999) [or a negative effect on your memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=49.886) [performance. Another thing we keep in mind](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=52.22225000000002) [is when you're adding memory to a server,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=54.137428571428586) [it makes a lot of difference in some cases](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=56.246) [what slot you put the memory in, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=58.569125)[what's going to happen in the performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=60.711) [as far as speed and bandwidth. So this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=63.056000000000004) [test is very good for validating whether](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=65.51225) [or not that was a good thing or a bad](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=67.07412499999997) [thing for your particular server. So if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=70.04974999999999) [you want to know more details about how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=72.78200000000001) [interpret Geekbench scores, you can go to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=74.682) [this URL. And the last part of that is an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=77.45400000000001) [R a 0 an X and a capital O. And then if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=80.99034782608693) [you want descriptions of each individual](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=85.10686956521734) [Geekbench test and what's its doing and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=87.23266666666667) [what it's testing, this URL will explain](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=89.93377777777778) [that. So here's what the memory scores](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=93.4882222222222) [look like for Geekbench. The top portion](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=96.354) [shows the memory scores and there's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=99.19061538461538) [several different test there and in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=101.71984615384615) [bottom portion as your stream performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=104.19600000000001) [which is measuring memory bandwidth in gigabytes per second.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=22&mode=live&start=105.776)

[SiSoft Sandra 2012](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live)

[Next, we'll talk about SiSoft Sandra 2012.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=1.976) [This is a comprehensive suite of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=6.016) [benchmarks and utilities that measure as](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=7.805090909090907) [far more than just memory performance. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=9.696) [has many different benchmark test for all](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=12.454461538461539) [of your different server components. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=14.963692307692309) [part of this is your memory bandwidth and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=17.182363636363636)[latency test. One useful thing about this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=20.593272727272723) [benchmark is a lot of hardware review test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=22.842875000000006) [sites use it so you can compare your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=25.07787500000002) [results to other systems that you don't](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=27.642666666666663) [have access to. Now unfortunately, this is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=30.05999999999999) [not a free program. And the most useful](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=32.476) [version if you're going to be doing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=35.05866666666666) [serious testing of lots of different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=37.16333333333331) [server hardware is the Test Support](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=39.152249999999995) [version cause it works on the Windows](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=41.51099999999998) [domain and it's licensed per user not per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=44.262874999999966) [machine so you can buy one license for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=47.07099999999999) [yourself and then use it on as many](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=49.83099999999998) [machines as you want to. And it costs 299](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=51.8735) [dollars and 99 cents as the time of this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=54.51171428571429) [recording. Now the main site for SiSoft Sandra is at this URL.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=23&mode=live&start=57.71957142857145)

[Understanding Hardware Tradeoffs](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live)

[Understanding hardware tradeoffs. You may](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=2.356) [have a limited hardware budget. And if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=6.590285714285715) [that's the case, how do you allocate your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=8.656588235294116) [hardware budget to get the best](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=11.17894117647058) [performance? You've got four main](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=13.070705882352929) [categorizing opponents that we're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=14.842000000000002) [concerned with. First are your processors.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=16.298000000000005) [Next is your memory. Then you have your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=19.156) [I/O subsystem and then you have any money](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=21.627428571428567) [you want to spend on redundant components.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=24.3702857142857) [So depending on the kind of workload you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=27.126) [have and the current bottlenecks on your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=29.751882352941177) [old server, this will help you decide how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=32.04952941176471) [to allocate that money. Even with an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=34.889999999999986)[unlimited hardware budget, there are still](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=37.24171428571428) [going to be some tradeoffs. So for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=39.03314285714285) [example, larger servers in terms of socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=41.40333333333334) [counts are usually not faster servers,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=44.47400000000003) [this is particularly true with Intel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=47.106) [processors. Higher socket counts usually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=49.94314285714287) [means that you have slower processors](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=52.24145454545453) [installed in each socket of the server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=54.97963636363633) [And if you have more memory installed,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=57.776) [that usually means your memory bandwidth](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=60.956) [is also reduced somewhat. Larger servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=63.73400000000001) [have more absolute load capacity so they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=66.65171428571428) [have more total processor cores and may](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=70.38171428571425) [also have more total memory capacity. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=73.88600000000001) [finally, they have more PCI-E expansion](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=77.406) [slots so you have more ultimate I/O capacity.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=24&mode=live&start=83.406)

[Summary](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live)

[Now it's time to summarize this module.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=1.986) [It's extremely important that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=4.816) [understand how to evaluate server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=6.4887272727272745) [hardware. It's going to help you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=8.161454545454548)[understand your current capacity and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=10.257111111111112) [scalability and also your performance.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=12.154333333333334) [It'll also help you evaluate whether or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=14.596) [not component upgrades makes a sense and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=16.66369230769231) [whether it's time to buy a new server or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=18.729636363636363) [not. Rather than guessing when you do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=21.37236363636363) [this, you should be running application](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=23.812153846153844)[benchmarks and looking at application](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=25.958307692307688) [benchmarks that are available online. An](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=27.88488888888889) [application benchmark is an actual](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=30.33225) [application test than test the entire](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=32.76349999999999) [server with a certain sort of workload.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=35.29963636363636) [You also have component benchmarks.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=38.036) [They're going to focusing on one](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=40.486) [particular set of components such as a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=42.249999999999986) [processor or I/O or memory. And as you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=44.70099999999999) [doing this, you need to understand some of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=47.73835294117647) [the tradeoffs should we face with. You'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=50.171294117647065) [have budget based tradeoffs that might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=52.42418181818182) [constrain your available choices. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=54.99327272727274) [you're also going to have other tradeoffs](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=57.026) [depending on what component choices you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=59.266000000000005) [make. So for example, if you add more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=61.18600000000001) [memory, the memory might have less](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=64.25349999999999) [bandwidth and have a slower speed. Or if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=66.30054545454544)[you decide to only have one processor and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=68.84457142857144) [a two socket server, that's going to have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=71.0788571428572) [an effect on your maximum memory and also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=73.6385) [your maximum I/O capacity. So these are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=76.52349999999998) [things you need to think about as you're going through and evaluating hardware.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=25&mode=live&start=80.966)

[What is Next?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live)

[So what's in the next module? Module 4](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=1.726) [cover hardware selection. We'll be talking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=5.101999999999999) [about how to choose server vendor and then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=7.991000000000001) [how to choose a server form factor, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=10.510999999999997) [how to choose a processor vendor. Then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=13.658307692307693) [we'll get into how to choose a server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=16.398999999999997) [model, and then how to pick a particular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=18.902999999999988)[processor for that server model. And we'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=22.214333333333343) [talk about how to figure out how much RAM](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=24.869) [you should put in your server and we'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=27.17749999999999) [talk about choosing between the different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=29.229499999999984) [available storage types. And we'll get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=31.717249999999996) [into understanding different RAID levels](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=34.6235) [and how to calculate your RAID storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=37.236)[overhead. And we'll discus how to choose](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=40.727250000000005) [your components for redundancy and then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=43.215230769230786) [how to minimize your hardware and licensing costs.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m3-evaluation&clip=26&mode=live&start=45.20446153846157)

[Hardware Selection](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live)

[Introduction](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live)

[Hi, this is Glenn Berry from SQLskills,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=1.746) [com. I'm recording this course for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=3.7585000000000006) [Pluralsight. It's about Understanding](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=6.562666666666665) [Server Hardware. This is Module4: Hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=8.308) [Selection. So what we're going to talk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=11.431999999999999) [about in this module? Well, first, we'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=14.43) [talk about choosing the server vendor.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=17.139333333333333) [We'll talk about how to choose between the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=19.326) [major first tier server vendors then we'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=21.990999999999993) [get into how to choose a server form](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=24.322874999999986) [factor whether it's going to be a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=26.707874999999998) [rack-mount server, a tower server, or a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=28.759749999999997) [blade server. Then we'll talk about how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=31.18171428571428) [choose a processor vendor whether it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=33.94599999999999) [going to be AMD or Intel. Then we'll going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=35.97599999999998) [to do how to choose a particular server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=38.69599999999999) [model from a preferred server vendor that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=40.535999999999966) [has to do with the motherboard and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=43.002) [processors, the available memory and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=45.98333333333334) [available storage. And we'll talk about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=48.162666666666674) [how to determine the amount of RAM put it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=50.174235294117636) [in your new server. And then we'll get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=52.66776470588231)[into talking about how to choose a storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=55.0935) [type for this server, whether it's going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=57.72849999999999) [to be internal drives or PCI-E storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=60.106909090909085) [cards, or direct-attached storage, or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=62.58236363636362) [maybe a SAN. And we'll also get into RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=64.42742857142858) [levels and understanding the difference](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=67.65145454545451) [between them and RAID storage overhead.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=69.406) [And finally, we'll talk about how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=73.346) [choose components for redundancy because](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=75.78963636363633) [you want avoid single points of failure were possible.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=0&mode=live&start=78.186)

[Choosing a Server Vendor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live)

[Choosing a Server Vendor. There are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=2.216) [several "top-tier" server vendors to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=5.103777777777777) [choose from. This includes Dell, Fujitsu,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=7.148222222222222) [HP, IBM, NEC, and Unisys. It's likely at](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=10.606) [your organization already has a preferred](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=14.85509090909091) [server vendor that they normally work](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=16.753272727272726) [with. So that means you're likely to be a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=18.458000000000002) [Dell shop or an IBM shop for example. If](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=21.161) [that's the case, you can usually get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=23.9635) [anywhere from a 15 to 25 percent discount](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=26.535999999999998) [from your preferred vendor. And it's also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=29.715999999999994)[going to be easier to maintain the servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=32.517999999999994) [from that particular vendor. It's also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=35.42999999999997) [going to be pretty difficult to talk your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=37.470000000000006) [organization to buying a server from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=39.80600000000002) [another vendor besides their normal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=41.873777777777775) [preferred server vendor. Despite that,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=44.91266666666666) [different vendors have different strengths](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=47.7471111111111) [and weaknesses. Some vendors such as Dell](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=50.27488888888887) [for example are typically less expensive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=53.04266666666668) [than the other ones. And then some vendors](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=55.1506666666667) [such as IBM for example sometimes have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=58.32523076923077) [proprietary technology that builds on the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=61.421384615384625) [references design they might get from AMD](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=63.462363636363634) [or Intel for a motherboard for example.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=65.486)[And sometimes that technology can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=68.506) [valuable but it's typically more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=70.96599999999998) [expensive. So what I recommend that you do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=73.01599999999996) [is try to stay current about what the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=75.53377777777779) [different vendors offer for the kinds of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=77.94266666666668) [servers that you normally buy. Because a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=80.0771111111111) [competitor might have something that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=82.521) [very interesting or actually compelling in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=84.7835) [a new model that would make it worth your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=87.37776470588236) [while to fight to try to buy that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=90.3636470588235) [particular model of server that has that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=93.02711111111111)[feature. And even if you're not planning](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=95.41488888888884) [on doing that, you can still get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=97.48000000000002) [competitive bids from other vendors when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=99.49133333333337) [you're going to buy several servers and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=101.34599999999998) [you'll often get much better pricing that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=104.266) [way by paying the vendors against each other.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=1&mode=live&start=111.266)

[Choosing a Server Form Factor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live)

[Choosing the Server Form Factor. There are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=2.226) [three main choices for Server Form](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=5.480444444444445) [Factors. These include rack-mounted](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=8.19377777777778) [servers, tower servers, or blade servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=10.435999999999998) [Rack-mounted servers are the most common](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=14.016) [form factor 'cause most data centers have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=16.351384615384617) [standardized racks that rack-mounted](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=19.076)[servers go in to. So, your choice maybe](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=20.951) [determined by your existing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=24.261555555555553) [infrastructure. If your data center or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=25.697111111111106) [server room uses racks, you're likely to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=27.865999999999993)[use rack-mounted servers or perhaps blade](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=30.39999999999998) [servers that fit in standard racks. Tower](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=32.88933333333333) [servers are typically a little bit less](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=36.058499999999995) [expensive than rack-mounted servers. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=38.595999999999975) [they're seen as entry level servers, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=40.363142857142854) [know, they don't have the racks and they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=42.58314285714284) [have more space inside so they're a little](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=45.039333333333325)[bit easier to work on but, you know, they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=47.252666666666634) [can't have the same density as a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=49.800615384615384) [rack-mounted server or blade server. A lot](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=52.14292307692306) [of times, tower servers are under](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=54.46725000000001) [somebody's desk or in a closet that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=56.42100000000002) [serving as a make shift server room in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=58.70037500000004) [smaller organization. Blade servers are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=62.49) [very popular with IT departments because](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=64.60475000000001) [they give you a lot higher server density](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=66.99742857142857) [in the same space compared to tower](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=69.48885714285709) [servers or even rack-mounted servers. A](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=72.09457142857143)[blade server is going to have a shared](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=75.08999999999999) [common infrastructure in the blade](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=78.08199999999995) [chassis. And that blade chassis is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=79.95199999999993) [actually a single point of failure and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=81.83963636363633)[also can be a bottleneck in come cases.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=83.97933333333334) [But for non-mission critical applications](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=86.566) [especially IT departments really do with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=89.44100000000002) [like blade servers 'cause they can fit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=92.66963636363637) [more computing capacity and less rack space compared to rack-mounted servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=2&mode=live&start=95.14509090909095)

[Common Server Form Factors](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live)

[Now, we'll get a little bit more detail](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=2.416) [about common Server Form Factors. First,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=5.480615384615386) [you have rack mount servers, which is the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=7.728727272727273) [most common. These are in standardized](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=10.39054545454545) [width and length design to fit for post](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=12.763692307692304) [racks. You can also put them in two post](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=16.179076923076916) [telecom racks but four post racks are more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=18.87423529411766)[common. A typical chassis is 444](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=21.14247058823532) [millimeters wide and 684 millimeters long.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=25.20327272727272) [There are various standard vertical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=29.736) [heights for rack mount servers and these](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=31.611) [are refereed as rack units. So you'll have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=34.228857142857144) [1U, 2U, or 4U as a most common vertical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=37.439750000000004) [size for the number of rack units that a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=41.50100000000002) [server takes up. And again, this is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=44.81225000000001) [describing how tall the server is and how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=47.132) [many rack units it will take up in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=49.87907692307692) [standard rack. All rack-mount servers have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=52.682923076923075) [some sort of mounting rails so that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=54.676) [can pull him in and out of the rack while](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=57.41600000000001) [the cables are still plugged in and while](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=60.649157894736845) [the server is still running to do certain](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=63.13336842105264) [kinds of maintenance. And then some kinds](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=65.74099999999999) [of maintenance, you have to power down the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=67.78933333333335) [server to do but they're still in the rack](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=69.77600000000002) [and everything still plugged in. Next, we](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=72.57475000000001) [have tower servers. Tower servers are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=75.62) [going to be in a vertical tower very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=78.02171428571428) [similar to tower that you might have for a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=80.97028571428571) [desktop machine. And this tower is going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=83.89850000000004) [to have a lot of space inside for the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=85.86849999999997) [internal components. Some tower service](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=88.32099999999991) [can be fitted with rails so they can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=89.76) [mounted to sideways in a standard rack but](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=92.44200000000002) [that's not done that often because it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=94.90100000000001) [quite a waste to vertical space. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=97.19599999999998) [again, tower servers are commonly used for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=99.76236363636363) [entry level servers where cost is your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=102.39690909090908) [primary consideration and you don't have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=104.91849999999998) [rack infrastructure to worry about. So a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=107.35537499999995) [lot of times, you might see tower servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=109.7181052631579) [sitting on the shelves and racks or just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=112.20652631578946) [shelves in a server room or closet](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=114.69494736842103) [somewhere. Finally, we have blade servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=117.26028571428569) [And the idea with the blade server is you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=119.946) [got have multiple blades that are actually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=122.29984615384618) [individual servers that are mounted in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=124.81138461538461) [shared, rack-mount chassis that can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=128.23061538461536) [sometimes hold anywhere from 12 to 14](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=130.616) [blades in a single chassis. So this gives](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=133.83600000000007) [you a lot more server density, you can put](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=136.97776470588235) [a lot more computing capacity in a smaller](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=139.50305882352941) [space but again, that shared chassis which](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=142.2185) [has things like your network connections](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=145.281) [and sometimes your I/O connections and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=147.5115555555555) [your power can be a bottleneck in a single](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=149.51292307692307) [point of failure. So, for example, I would](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=152.27523076923083) [want to use a blade server from mission](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=155.02725000000004) [critical database server, it would be much](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=157.9572500000001) [better use for say, a web farm of web](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=160.47314285714285) [servers or application servers in my opinion.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=3&mode=live&start=163.66171428571423)

[Choosing a Processor Vendor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live)

[Next, you have to choose a processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=2.706) [vendor. For mainstream Windows-based](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=5.479750000000001) [servers, your choice is restricted to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=7.253692307692309) [either Intel or AMD. And the reason why](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=10.009076923076925) [you have to do this now is that your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=12.729636363636363) [processor vendor choice determines the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=15.083142857142857) [available server model choices from that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=17.101) [vendor. If you decide to pick in an Intel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=19.52242857142857) [server or an AMD server, only certain](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=22.664823529411773) [model servers from the rack-mount line, or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=25.061294117647076) [the tower line, or the blade line are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=27.171)[going to support that processor. Processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=30.126000000000005) [vendor choice can have a major effect on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=32.58236363636364) [several factors for your server furnishes](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=35.43327272727275) [a performances' scalability of the server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=38.30200000000001) [Next is the hardware cost and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=41.536) [electrical power usage of the server which](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=43.95907692307693) [can be a major factor over time. And then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=46.27975)[finally, the software licensing costs are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=48.936) [affected by your processor vendor choice.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=51.78600000000001) [Different vendors have different numbers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=54.636) [of cores and that's very important in for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=56.59509090909091) [certain software applications, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=59.702) [actually have to count the number of cores](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=61.236) [for licensing purposes. Now, Intel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=64.43599999999999) [processors have certain advantages that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=66.531) [you should take into count. First, it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=68.76850000000003) [typically has better single-threaded](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=72.13690909090909) [performance than AMD processors do. They](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=74.39872727272726)[also usually have lower power usage than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=77.80054545454546) [AMD processors do. On the AMD side, they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=81.82236363636366) [have some advantages. They often have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=85.49600000000001) [higher physical core counts than Intel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=88.29599999999999) [processors do, and they also have a lower](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=90.74099999999999) [processor hardware cost. So if cost is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=94.07600000000001) [your primary consideration and AMD](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=96.87314285714284)[processor will be less expensive than in Intel processor.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=4&mode=live&start=100.026)

[Choosing a Server Model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live)

[Next, we actually get to choosing a server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=2.216) [model. Again, you have to choose your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=5.6737777777777785) [processor vendor before you can choose a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=7.769999999999998) [server model because that's going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=9.711333333333329) [restrict your available choice of server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=11.989636363636366) [models. Your processor socket count choice](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=14.575090909090916) [must be made next. So, this is going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=17.089333333333336)[also restrict your available choice of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=20.525230769230763) [server models. Do you want a one-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=22.64830769230768) [server, a two-socket server, a four-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=25.255999999999997) [server, or do you need something larger](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=27.53599999999999) [that's going to restrict your available](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=29.348499999999998) [choices for server models. One thing to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=31.565999999999995) [keep in mind is you're making this choice](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=34.16266666666666) [is that bigger servers and by bigger, I](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=36.44711111111109) [mean servers with more sockets are not](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=38.82933333333333) [faster than smaller servers. Higher socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=41.51266666666666) [count servers will have slower Intel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=44.51044444444444) [processors than lower socket count servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=48.903777777777755) [do. And, even if that's not the case, even](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=52.01100000000001) [if you decided to choose an AMD processor,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=54.791000000000004) [there are scaling losses as you go from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=57.096) [two-sockets to four-sockets aside from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=59.86266666666665) [four-sockets to eight-sockets. An](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=61.8935) [eight-socket server is not going to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=64.176)[twice as fast or have twice the capacity](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=66.55600000000003) [as a four-socket server with the exact the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=69.276) [same processor, even with NUMA, you don't](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=72.42) [get linear scaling. The next thing you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=75.68100000000003) [need to think about here when you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=77.82377777777776) [choosing a server model is what are your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=79.361) [total memory in I/O performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=82.22100000000002)[requirements? Higher socket count servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=85.07350000000002) [will have more memory slots but two-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=87.53984615384616) [servers have up to 24 memory slots now, so](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=90.60907692307693) [you can get a lot of memory in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=93.80766666666665) [two-socket server. Higher socket count](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=96.79266666666662) [servers will have more PCI-E expansion](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=98.749) [slots but again two-socket servers will](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=101.33499999999998) [have anywhere from a six to eight PCI-E](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=104.10600000000002) [expansion slots which is a lot more than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=107.85000000000005) [they had a few years ago. Finally, you've](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=110.42099999999996) [got to decide, what vertical form factor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=112.891) [do you want? Do you want a 1U server, a 2U](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=115.81350000000003) [server, a 4U server or something even](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=120.076) [larger? And by larger, I mean taller](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=122.70974999999999) ['cause that's going to affect how much](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=125.16599999999998) [room you have for internal components.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=127.85799999999999) [Taller servers are going to have more room](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=130.336) [for internal drive bays and sometimes they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=133.0293333333334) [have more room for PCI-E expansion slots](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=135.74699999999999) [and of course they take more room up in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=138.946) [your rack. So it's sort of trade off](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=141.05690909090922) [there, you got to think about this before you choose your particular server model.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=5&mode=live&start=142.81171428571434)

[Choosing a Processor Model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live)

[Next, you have to choose a processor model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=2.246) [for the server model that you've selected](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=4.646) [previously. First thing you need to think](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=7.410999999999998) [about when you do this is what type of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=9.01885714285714) [workload will you have on the server? Is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=10.968499999999999) [it going to be a CPU intensive workload?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=13.644888888888888) [Is it going to be a single-threaded](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=16.436) [workload or a multi-threaded workload? And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=19.42849999999999) [as you're thinking about that, you either](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=21.99475) [consider the number of cores in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=24.996000000000006) [processor, the clock speed and then the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=27.99725000000001) [cache sizes. You also need to think about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=31.22349999999999) [the architecture of the processor and with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=34.27314285714284) [generation of processor it is when you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=36.743142857142814) [making this choice. Next thing you need](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=39.88933333333332) [think about, what kind of licensing model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=42.608666666666664) [does your application have? It could be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=44.923333333333325) [that it's based on the socket count of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=47.10215384615385) [server, or it could be based on the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=49.67061538461538) [physical core count. And so, that's going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=52.25900000000001) [to really have an affect on your overall](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=54.96333333333333) [software licensing cost. Core-based](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=58.39799999999999) [licensing which is becoming more and more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=60.00957142857143) [common and this is usually based on the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=62.27457142857141) [number of physical cores in a processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=64.87599999999999) [can be very expensive when you have high](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=67.18599999999998) [core counts. So for example, if you have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=70.0393333333333) [16 core AMD processor and you're paying](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=73.341) [for core-based licensing, that can be very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=75.876) [expensive. Next, you need to consider,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=79.48100000000001) [what kind of a hardware budget do you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=81.51658823529408) [for the server? Again, high core count,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=84.25364705882343) [high clock speed processors are pretty](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=87.40963636363637) [expensive. And if you decide to get the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=90.77509090909092) [absolute top of the line processors and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=93.29968421052631) [you have a fixed amount of money to spend](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=95.26336842105262) [on a server, that might force you make](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=97.906) [compromises on other parts of the server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=100.38600000000002) [such as the amount of memory, or the I/O](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=102.6444210526316)[capacity that you put in that server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=105.69968421052639) [Sometimes, though over-provisioning your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=108.076) [processor can save your money overall. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=110.14000000000001) [by over-provisioning, even if you think](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=113.628) [you don't have a particular CPU intensive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=115.97999999999998) [workload, you still get one of the top of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=118.72399999999995) [the line processors because you know that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=122.0188571428571) [you can do things without processor that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=124.53742857142856) [might save you money on I/O capacity for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=126.911) [example. And by things, I mean, things](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=129.51099999999997) [such as compression which is very popular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=131.64350000000007) [with a lot of different software](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=133.75225000000015) [applications. Now, as you're making this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=136.921) [processor model choice, you want to choice](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=139.47957142857146) [very carefully because it's very unlikely](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=142.00457142857152) [you're ever going to upgrade the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=144.2886666666667) [processors in an existing server because](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=146.63266666666675) [if you do that, the server vendors are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=148.916) [going to charge a very expensive prices](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=151.55599999999987) [for that processor upgrade kit. They're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=154.35690909090906) [going to charge you above the retail](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=156.76155555555556) [price. And usually, it doesn't make](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=159.1804444444445)[economic sense to upgrade the processors](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=161.28933333333333) [in an existing server. Usually it's less](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=163.40533333333332) [expensive to actually buy a brand new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=165.99350000000004) [server instead of upgrading your existing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=168.74100000000013) [processors. So, choose carefully 'cause](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=171.34200000000004) [you're going to be stuck with that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=172.6848888888889) [processor probably for the life of the server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=6&mode=live&start=175.796)

[Determining the Amount of RAM](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live)

[The next step is to determine the amount](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=2.086) [of RAM or memory to put in the server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=4.406) [There are several different limits you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=7.016) [have to consider when you make this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=8.807428571428572) [decision. First, you have the physical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=10.897428571428568) [limits of the server. That's going to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=13.179333333333332) [determined by the server model and the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=16.148857142857143) [processor memory controller and also by](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=18.56885714285715) [the number of the memory slots in the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=20.7435) [server. Next, you need to consider the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=23.776833333333332) [license limits of the operating system](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=26.205230769230774) [version and edition that you're going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=28.25446153846155) [install. So for example, Windows Server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=30.747428571428582) [2008 are two standard edition has a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=33.20957142857142) [license limit of 32 gigabytes of RAM which](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=36.1545714285714) [is relatively low for modern servers. The](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=39.815999999999995) [next thing to consider is the license](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=42.99984615384616) [limits of the application version and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=45.546769230769236) [edition you're going to install. So an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=47.73266666666667) [example of that might be SQL Server 2012](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=50.489333333333335) [Standard Edition and that has a limit of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=54.18266666666666) [64 gigabytes for RAM. And again, that's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=57.05600000000002) [license limit. As you're thinking about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=59.83599999999999) [this, keep in mind that physical RAM is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=62.43885714285714) [extremely affordable. Right now, in late](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=66.16457142857142) [2012, the price range for DDR3](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=69.17333333333335) [error-correcting code RAM is anywhere from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=72.28933333333336) [10 to 15 dollars per gigabyte. And that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=75.27885714285713) [been following over time for quite](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=78.64488888888889) [sometime. RAM is much faster and much less](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=81.67155555555556) [expensive than I/O capacity. So, I](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=85.63781818181822) [typically-- like to have lots of RAM and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=88.49236363636363) [servers. Now populating all of your memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=91.99781818181818) [slots in a server can sometimes reduce the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=94.33028571428568) [memory bandwidth and memory speed. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=97.72016666666666) [this is going to depend on the processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=100.25516666666667) [and memory controller. So you need to look](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=102.96850000000003) [at the documentation for your server and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=105.34054545454543) [decide to how you want to handle that. But](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=107.22377777777777) [quite often, even slower memory, that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=109.682)[running at a reduced bandwidth is still](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=112.058) [going to be much, much faster than I/O](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=114.83000000000001) [capacity. Next, when you're making this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=119.06724999999999) [decision, you want to try to favor larger](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=121.93933333333337) [capacity DIMMs. And so right now, again,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=125.65666666666675) [in late 2012, 8 gigabyte and 16 gigabyte](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=128.87423529411765) [DIMMs are good choices. They have a lot of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=132.53541176470597) [capacity and they're quite inexpensive. If](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=136.10100000000006) [you jump up to a 32 gigabyte DIMM right](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=138.20725000000002) [now, it's much, much more expensive and it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=141.54850000000005) [really doesn't make economic sense in most](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=144.57) [cases. Now, having some empty memory slots](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=147.34899999999993) [lets you easily add more RAM later without](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=150.39984615384608) [having to take out existing memory. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=153.92600000000002) [know, pretty much in the IT department](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=156.85894117647058) [I've ever walked into has a drawer](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=159.32952941176464) [somewhere full of smaller capacity memory](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=161.8001176470587) [that they've taken out of servers over the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=164.02599999999998) [years, and this really just end up being](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=167.06599999999995) [expensive paper weights. So you want to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=169.56699999999998) [try to avoid that and get the larger](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=171.62126315789476)[capacity DIMMs and have some empty slots, you can fill up if you need to later.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=7&mode=live&start=173.91178947368428)

[Choosing the Storage Type](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live)

[All right, the next step is choosing the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=2.106) [storage type for your new server. This is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=4.591714285714287) [going to depend on a server usage in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=7.00523076923077) [workload type, your performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=9.476769230769227) [requirements, and your available budget.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=11.040285714285716) [And also, it's going to depend on your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=13.576) [existing infrastructure, your employee](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=16.336000000000006) [skillset, and politics to be quite honest.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=17.96822222222222) [You know, a lot of shops might have a bias](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=21.266) [towards the direct-attached storage or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=24.923142857142864) [towards Storage Area Networks or SANs. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=26.88885714285714) [that's going to be really affect what you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=30.165333333333333) [end up using for your storage for a new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=32.24) [server that you decide to buy. So you may](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=34.516000000000005) [take that into consideration. There are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=37.156) [really four main storage types we're going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=39.35292307692308) [to talk about here. The first one is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=41.44215384615384) [internal drives, that are inside of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=44.29753846153847)[server itself and I have been talking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=47.205230769230795) [about internal drive bays and servers and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=49.37690909090908) [so that's where this internal drives fit.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=51.3185) [And this can be traditional magnetic](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=53.646) [drives, they're typically going to be 10,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=55.66199999999999) [000 RPM OR 15, 000 RPM SAS drives or they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=58.01399999999998) [can be solid state drives. Solid state](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=61.849076923076915) [drives are coming down in cost and they're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=64.66725) [becoming more popular for server usage.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=68.03225) [The next type is PCI-E storage cards such](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=70.556) [as fusion I/O card is probably the most](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=74.7583076923077) [famous example of that. These are quite](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=77.3367692307692) [expensive but they give very good](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=79.48400000000001) [performance and they are becoming more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=81.20000000000002) [common for server usage. The next type is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=83.45822222222223) [Direct-Attached Storage or DAS. And this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=87.30599999999998) [can be again traditional magnetic drives](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=90.41446153846152) [or SSDs or some combination of both of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=92.92984615384611) [those types of drives. And then finally,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=96.27314285714286) [you have Storage Area Networks or SANs.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=99.31) [And this can be filled with traditional](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=102.516) [magnetic drives or SSDs or combination of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=104.66412500000004) [the two. You can have hybrid storage in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=106.81225000000008) [SAN. So, all three of these storage types,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=111.48599999999999) [internal drives, Direct-Attached Storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=115.85872727272731) [and SANs can use hybrid storage or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=118.026) [sometimes, it's called tiered-storage, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=121.30666666666664) [that's a mixture of magnetic storage and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=123.64999999999996) [SSD storage. And hybrid or tiered-storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=127.78266666666667) [sometimes especially in SANs has some](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=131.246) [intelligence behind it so that the data](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=133.81599999999997) [that used the most often or that the data](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=136.47599999999994)[that has the highest performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=139.68676923076922) [requirements will be automatically moved](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=141.32523076923073) [to the SSD storage. Hybrid storage or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=143.126) [tiered-storage is a good compromise](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=146.56242857142857) [between the available space you have and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=149.02314285714283) [the available performance you're going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=152.26885714285714) [get out of it, and a cost. Now, the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=154.026) [storage details that you choose make a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=157.07314285714287) [huge difference for I/O performance. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=160.56314285714294) [by details, I mean things like choosing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=163.464) [10K drives versus 15K drives, and whether](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=166.3199999999999) [or not you're using 3 gigabit per second,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=169.176) [SAS or 6 gigabit per second SAS. These](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=171.98133333333323) [details actually have a huge effect on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=174.87266666666667) [performance. Another thing to think about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=177.92933333333335) [is the bandwidth of your RAID controller,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=180.22988888888887) [your HBA or your iSCSI NIC that has a very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=182.83933333333326) [large effect on your potential performance for I/O.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=8&mode=live&start=189.076)

[Internal Drives](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live)

[Now I'm going to some more detail about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=2.556) [internal drives. Internal drives can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=5.723999999999999) [adequate for some workload types. Good](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=8.080444444444444) [examples of that would be a web server, or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=10.420375) [an application serve, or caching server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=13.879750000000003) [Those sorts of servers typically don't](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=16.186) [have a lot of I/O workload or requirements](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=18.37599999999999) [so they can get by on a small number of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=21.296) [internal drives. In some cases, only a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=23.81266666666665) [single drive but usually it's more common](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=25.89655555555556) [to have two drives at least that are in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=28.10933333333335) [RAID 1 configuration. Another example you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=31.503142857142862) [might be able to get away with internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=33.16933333333334) [drives only is a light-duty database](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=35.03885714285714) [server that doesn't have a lot of workload](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=37.38742857142856) [or a lot of I/O workload. Another example](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=40.571) [is that some newer server models have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=43.84894117647058) [very high number of internal drive bays.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=46.94070588235291) [For example, Dell has a model that has 26](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=49.646) [internal drive bays, so that gives you a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=52.876000000000026) [lot of spindles and that opens up the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=55.74711111111116) [possibilities for running in workload on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=58.716999999999985) [your internal drives only. One thing that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=61.32742857142856) [has an effect on this is the server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=64.17446153846154) [vertical size. So, a one new server is not](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=66.46369230769236) [going to have a lot of room for internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=69.13933333333333) [drive bays where a 2U or 4U server will](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=71.84361904761903) [have a lot more room and you might have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=74.51933333333335) [lot more internal drive bays in that sort](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=77.42349999999998) [of a server. Next, you need to think](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=79.72349999999993) [about, are you going to use 2 and a half](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=81.66516666666668) [inch drives or 3 and a half inch drives?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=83.9335) [And you've got to make this choice when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=86.206) [you pick the server model because quite](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=88.54600000000003) [often, server models come in 2 and a half](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=90.59350000000006) [inch drive chassis or 3 and a half inch](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=93.49652631578945)[drive chassis. And that obviously has an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=96.43336842105259) [affect on the drive density. So, a one new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=98.71100000000001) [server might have anywhere from 8 to 10,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=101.83915789473683) [two and a half inch drive bays. And if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=104.84547368421049) [decided to go with three and a half inch](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=108.00314285714288) [drive bays, it might be roughly half that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=109.58457142857151) [number. A 2U server might have anywhere](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=112.1902857142857)[from 16 to 26-2 and a half inch drive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=114.91725) [bays. And, a 4U server is going to have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=118.44412499999999) [probably about the same amount in most](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=121.61377777777783) [cases because usually about a time we go](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=124.04433333333343) [to a 4Userver, that's-- in most case, it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=126.64155555555558) [going to be a four-socket or above server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=129.12266666666667) [And usually those sorts of servers are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=131.596) [going to have the kind of workload, that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=133.53099999999998) [really not going work very well with just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=135.758) [internal drives only so they're going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=138.09400000000002) [be using something like directed-attached](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=140.16533333333334) [storage or a SAN, so they don't have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=141.762) [higher and higher numbers of internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=144.31666666666666) [drive bays like you might expect. Now,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=146.29509090909096) [regardless of what you do here, you want](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=148.63266666666667) [to use a hardware RAID controller with a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=151.40599999999998) [dedicated cache memory for your internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=154.3948888888889) [drives. That's going to give you better](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=157.12155555555557)[performance in software RAID and it's also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=159.2945714285715) [going to let you take advantage of that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=161.2995714285716) [cache memory to further improve the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=164.241) [performance. And when you used internal](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=166.5167142857143) [drives, you want to prefer 15K drives over](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=169.29933333333338) [10K drives. They give you better](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=173.1446666666668) [sequential performance and higher IOPS.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=176.27933333333328) [So, you want to use those even though they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=178.996) [cost more unless it's an application that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=181.546) [just really doesn't have a lot of I/O](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=183.619) [requirements. Now, more drives are better](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=186.60299999999992) [than fewer drives for performance. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=189.79599999999996) [what I mean by that is let's say that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=192.95835294117649) [you'd need one terabyte of drive space.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=196.03952941176473) [Well, you could just have two or three](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=198.436) [quite large drives and have a terabyte of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=201.41011764705885) [space but you would be better off from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=204.3842352941177) [performance point of view if you had a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=206.69952941176473) [higher number of smaller drives to get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=208.920705882353) [that same amount of space because you'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=211.01599999999996) [have more sequential throughput and more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=213.47236363636367) [random I/O performance by having a higher](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=216.22145454545463) [number of drives. You also should consider](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=219.42457142857143) [SSDs where that's appropriate where you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=222.4931428571428) [had some hardware budget and if you need](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=225.038857142857)[really much better especially random I/O](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=227.971) [performance and you're going to get from conventional magnetic drives.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=9&mode=live&start=229.82350000000002)

[PCI-E Storage Cards](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live)

[Next, we'll talk about PCI-E storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=2.046) [cards. These are flash-based storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=5.363142857142856) [that's mounted on a PCI-E expansion card](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=7.289333333333335) [that fits in one of your PCI-E expansion](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=9.692666666666671) [slots in your server. It uses a very high](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=12.670999999999998) [bandwidth PCI-E slot instead of a SAS port](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=16.579125) [or SATA port. Right now, SAS and SATA](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=20.264125000000003) [ports are restricted to 6 gigabits per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=23.89266666666666) [second of bandwidth. And that's really not](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=27.037999999999982) [a lot of bandwidth compared to what you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=29.759333333333334) [can get out of a PCI-E expansion slot. Now](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=32.43054545454545) [the type and speed of the PCI-E expansion](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=35.33866666666667) [slot can be a limiting factor from your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=38.24000000000002) [overall bandwidth. And what I mean by that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=41.316) [is if you have an older server with the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=43.99389473684209) [PCI-E 1. 0 slot, that could be a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=46.660736842105216) [bottleneck for some of the higher end](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=49.497428571428564) [PCI-E expansion cards that we're talking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=52.38742857142856) [about here for storage. Now these storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=54.90314285714285) [cards can deliver extremely high I/O](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=58.04599999999999) [performance especially for random I/O but](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=60.92599999999997) [they also can give you very high](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=63.683) [sequential performance that give you again](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=66.182) [high sequential throughput and extremely](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=69.20369230769232) [high random I/O performance. Now the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=72.08830769230772) [capital cost of these cards is anywhere](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=75.20533333333334) [from a high to extremely high. The cost](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=78.03800000000004) [range right now in late 2012 is anywhere](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=81.19171428571427) [from 2, 000 dollars for a card all the way](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=84.09457142857137)[to 150, 000 dollars for one storage card.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=88.04457142857142) [Now these storage cards use less](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=91.376) [electrical power than multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=94.91600000000003) [conventional hard drives and that's one of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=97.27600000000004) [their selling points. You can take one of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=100.14885714285715) [these higher end storage cards and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=102.66528571428573) [potentially replace dozens or even](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=104.69242857142861) [hundreds of conventional hard drives that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=106.50753846153846) [use a lot more electricity. So that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=108.91215384615383) [going to save on your operating and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=111.7469090909091) [maintenance costs. Now, right now the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=114.65509090909096) [leading vendors for these types of cards](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=117.39600000000003) [are Fusion-io, OCZ and Intel, but there's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=120.73850000000007) [other vendors on the horizon and this is a growing market over time.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=10&mode=live&start=125.126)

[Direct-Attached Storage (DAS)](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live)

[Now we'll talk about Direct-Attached](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=2.116) [Storage or DAS. This refers to an external](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=4.5785) [storage enclosure with multiple drives.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=8.366) [It's usually going to be somewhere between](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=10.676) [8 and 24 drives in a single storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=13.265999999999995) [enclosure. These drives can be magnetic](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=16.22599999999999) [hard drives or SSDs or some combination of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=18.622666666666674) [both types. You're going to have a direct](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=21.865333333333353) [cable connection between a hardware RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=25.19600000000001) [controller, that's one on your PCI](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=27.71600000000002) [expansion slots that goes to the storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=30.324461538461545) [enclosure. You can also daisy-chain](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=33.388307692307706) [additional storage enclosures to each](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=35.711714285714294) [other and finally that one of those](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=38.06885714285717) [enclosures is connected to the server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=41.13850000000001) [Daisy-chaining is not a best practice for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=43.276) [performance or redundancy but if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=45.754) [really need lots and lots of space for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=47.806) [direct-attached storage and you've used up](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=50.445999999999984) [all your PCI expansion slots for RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=52.52822222222222) [controllers, that's really your only](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=55.553777777777775) [alternate to get more storage space. Now](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=57.669999999999995)[direct-attached storage is very easy to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=60.655) [configure and manage. It doesn't require](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=63.40900000000002) [any special training or expertise. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=66.13975) [don't have to be a SAN administrator or go](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=68.66885714285715) [to some vendor training and learn how to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=71.12457142857149) [use direct-attached storage. You can get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=73.93028571428572) [very good sequential read and write](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=76.49700000000001)[performance with direct-attached storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=79.05900000000005) [especially if you've got multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=81.031) [dedicated RAID controllers for each](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=83.61399999999999) [enclosure. Now, ultimately this can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=86.19899999999997) [limited by your PCI-E slot bandwidths. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=89.216) [so, it's going to make a difference what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=92.46488888888888) [model server you have and how old it is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=94.45599999999996) [for how much PCI-E slot bandwidth you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=96.696) [going to have available on a server. Now,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=99.201) [direct-attached storage will have much](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=102.22061538461539) [lower initial capital cost in most SANs.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=104.7936923076923)[And also your incremental cost to add more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=108.396) [capacity is lower because a typical SAN](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=111.05781818181815) [enclosure full of drives is going to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=113.75200000000002) [somewhere between 10 to 15, 000 dollars to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=117.14400000000008) [add more incremental capacity and usually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=120.68385714285711) [with no SANs, if you exhaust the amount of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=123.40528571428564) [space in drive bays in your SAN, it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=126.43400000000004)[going to cost a lot more than that to add](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=128.65800000000004) [more incremental capacity. Now SANs are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=132.4688571428571) [less flexible and they have less features](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=135.34984615384613) [than a SAN. So you're not going to get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=138.32215384615378) [things like thin provisioning or SAN](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=141.01799999999997) [snapshots or SAN replication. You just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=143.05599999999998) [don't get that with direct-attached](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=145.88850000000002) [storage. So that's one of the tradeoffs you make with this storage type.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=11&mode=live&start=147.5197500000001)

[Storage Area Network](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live)

[The next storage choice is a storage area](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=2.416) [network or SAN. This is going to be an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=6.1178181818181825) [external storage enclosure with multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=9.640999999999998) [components. You're going to have a large](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=11.420166666666663) [number of drives that can usually be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=13.595999999999997) [expanded maybe by adding another](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=15.89) [enclosure. You're going to have multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=17.62) [storage processors with a large dedicated](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=20.470166666666664) [cache and a dedicated operating system for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=23.47516666666666) [the SAN. You also going to have a storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=25.528499999999994) [area network that can have switches and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=29.025375) [other components, so it's a fairly](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=32.00475) [complicated piece of machinery here. SANs](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=34.39822222222222) [are very flexible and very feature-rich.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=37.00028571428572) [They give you things like](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=41.046) [thin-provisioning. They give you SAN](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=43.23766666666666) [snapshots. And they also give you SAN to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=45.227999999999994) [SAN replication. Snd it's pretty easy to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=47.97266666666666) [change the RAID level on a SAN and move](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=50.246) [data from one part of the SAN to another.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=53.126000000000005) [Of course, it takes a trained SAN](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=56.156) [administrator to do some of these things](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=58.60099999999999) [so that's something you can keep in mind](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=61.046) [if you're going to be using a SAN.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=62.91100000000001) [Usually, you have a much higher initial](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=64.776) [capital cost than you have with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=67.62733333333328) [direct-attached storage. Typically, an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=70.07133333333324) [entry level SAN might be anywhere from 50,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=71.60999999999999) [000 to 100, 000 dollars or just quite a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=74.50599999999994) [bit more than a few storage and closures](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=77.90266666666665) [with direct-attached storage. And again,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=81.07599999999994) [you're going to have to have some training](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=82.86742857142858) [and expertise to set up and manage your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=85.27314285714291) [SAN correctly. Now there are two main](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=88.25599999999997) [types of SANs. The first one is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=90.98350000000002) [fiber-channel SAN that uses a host-bus](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=94.12171428571429) [adapter that fits on a PCI-E expansion](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=96.56457142857144) [slot and uses a very thin fiber-channel](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=99.38885714285715) [cables that go out to your SAN network and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=102.19385714285715) [into the SAN itself. The next type is an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=105.86200000000001) [iSCSI SAN that uses dedicated Ethernet](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=109.64974999999997) [cards that also usually fit in a PCI-E](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=112.22224999999993) [expansion slot and uses either gigabit or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=115.7235) [10 gigabit or 40 gigabit Ethernet for your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=118.891) [SAN traffic. Now SANs are usually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=123.84599999999999) [optimized for IOs per seconds. So, they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=127.08044444444445) [give you very good random I/O performance.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=130.46266666666665) [But your sequential throughput can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=134.056) [limited by your interface and the complete](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=136.3745714285715) [path between your host server and the SAN](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=139.07957142857157) [itself. So for example, a 1 gigabit per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=142.94850000000002) [second iSCSI SAN is limited to about 100](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=147.27655555555552) [MB per second of sequential throughput](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=151.65433333333326) [which is really very low. And then a 4](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=154.64599999999996) [gigabit per second fiber-channel HBA is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=158.29028571428572) [going to be limited to about 400 MB per](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=160.3817142857143) [second which is also quite low. So you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=163.69872727272724) [need to think about this and look at the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=166.59776470588233) [kind of workload that you're going to have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=169.2607058823528) [before you decide whether you want to use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=171.57155555555556) [a SAN or not because again, quite often,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=173.7137777777778) [they have relatively poor sequential](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=175.856) [throughput compared to some of these other storage types.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=12&mode=live&start=180.856)

[RAID Basics](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live)

[RAID Basics. RAID stands for redundant](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=2.226) [array of inexpensive disks. This is a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=6.586) [standardized method for managing multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=10.076) [drives with a RAID controller. This gives](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=12.176) [you redundancy in higher performance that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=15.012) [you can get with a single drive. It allows](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=17.219999999999995) [you to have higher capacity logical drives](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=20.592) [and is possible with one drive. Hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=23.377999999999997) [RAID controllers are what you want to use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=26.041714285714285) [for servers and are used to manage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=28.24742857142858) [multiple drives in a RAID array. A server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=30.598499999999998) [RAID controller can have dedicated cache](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=34.37822222222223) [memory, usually with a battery backing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=36.964888888888915) [behind it. The cache in a RAID controller](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=40.14599999999999)[can be used for reads or writes or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=44.037764705882374) [combined for both. There are several RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=47.76011764705887) [levels that are commonly used for servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=50.69781818181817) [First one is RAID 1. Next, we have RAID 5.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=53.396) [Then you have RAID 50. And then finally, you have RAID 10.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=13&mode=live&start=57.916)

[RAID 1](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live)

[RAID 1. RAID 1 is called mirroring. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=2.646) [requires two physical drives and your data](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=7.100615384615385) [is copied to both drives. So because of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=10.702923076923074) [this, it requires a 50 percent storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=14.438499999999998) [space overhead. So you have 2-- 300](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=17.150999999999993) [gigabyte drives in a RAID 1 configuration.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=19.92599999999999) [You only have 300 gigabytes of space after](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=22.726) [the RAID 1 has been applied. This drive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=25.760285714285715) [array can survive the loss of either one](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=28.73292307692308) [of the drives. If one of the drives fails,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=31.52061538461539) [you're going to have to replace the failed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=34.378)[drive and then the RAID controller is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=36.794) [going to automatically rebuild the mirror.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=38.795999999999985) [And you need to do this as soon as](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=40.496) [possible because if you lose the other](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=42.454823529411776) [drive, obviously you're going to lose your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=43.97835294117649) [data. Now there's no performance impact](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=46.29600000000001) [after you lose one drive in a RAID 1](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=48.98933333333332) [array. It's very common to install the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=53.207333333333295) [operating system in a server on a RAID 1](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=56.16974999999999) [volume. So that means you have two drives](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=59.91037499999998) [that are managed by your RAID controller](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=62.027000000000015) [and they're in a RAID 1 array. That way if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=64.17418181818181) [you lose one of the drives, the server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=67.63957142857143) [won't go down. So again, this is usually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=70.26242857142856) [done with two internal drives in a server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=72.6793333333333) [and it allows the server to operate](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=74.9726666666666) [normally after losing either one of those](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=77.14600000000002) [two drives. So it's sort of a standard thing that you do with most servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=14&mode=live&start=79.73600000000005)

[RAID 5](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live)

[The next common RAID level is RAID 5. RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=2.016) [5 is called striping with parity. RAID 5](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=5.923142857142857) [requires at least three physical drives](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=9.569076923076922) [and your data is striped between all of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=11.91830769230769) [your available drives. After the data is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=15.225999999999999) [written to the drives, your RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=18.13314285714285) [controller calculates parity information](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=20.468857142857125) [and then that's also striped between all](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=22.026) [of the drives. This causes a write](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=24.783999999999992) [performance penalty for RAID 5. Having](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=27.992666666666672) [this in place allows the RAID to survive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=30.901) [the loss of any one drive in the array. If](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=33.901) [you lose a drive in the array, your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=37.60028571428572) [performance can be severely affected](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=40.194571428571436) [because the RAID controller has to read](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=41.816) [the parity information from the other](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=44.28599999999998) [drives to reconstruct the missing data](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=46.40314285714282) [from the drive that failed. That failed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=48.94099999999999) [drive has to be replaced as soon as](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=51.6824705882353)[possible because if you lose another drive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=53.908352941176496) [in that RAID 5 array, all of the data is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=55.856) [lost. RAID 5 requires one over the number](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=59.937818181818166) [of drives as storage overhead for that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=63.815374999999975) [parity information. So if you have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=67.28475) [4-drive array, you're going to lose one](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=69.9029230769231) [fourth of your space for parity](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=72.18061538461545) [information. RAID 5 is very popular with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=75.5976666666667) [IT departments. It's quite economical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=79.1185) [because of the low storage overhead and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=81.18287499999998) [the risk of failure actually goes up as](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=83.74224999999994) [you add drives to the array. So if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=86.49350000000001) [have three drives in array versus, say,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=89.35742857142856) [eight drives in array, the risk that any](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=92.13742857142853) [one of those drives in the array is going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=94.92599999999999) [to fail is the same but by having more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=97.62599999999996) [drives makes the overall risk of failure](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=100.24600000000001) [go up. So it's riskier to have more drives in a RAID 5 array.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=15&mode=live&start=102.20600000000002)

[RAID 50](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live)

[The next common RAID level is RAID 50.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=2.356) [RAID 50 is called striping across multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=6.026) [RAID 5 data sets. This requires at least](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=9.347818181818182) [six physical drives. You had to have o](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=13.080285714285713) [have a minimum of two, three-drive RAID 5](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=15.675999999999998) [arrays to build a RAID 50 array. This](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=18.525) [requires one over the number of drives in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=22.76070588235294) [each RAID 5 array for your storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=26.238352941176462) [overhead. RAID 50 arrays can survive the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=29.281294117647043) [loss of one drive in each RAID 5 array.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=31.90400000000001) [This gives you better performance than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=35.186) [RAID 5 after the loss of any one drive.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=37.61799999999999) [And it can be a good compromise between](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=41.266) [RAID 5 and RAID 10. RAID 50 is less](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=44.45984615384615) [expensive than RAID 10 and it's more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=48.021333333333345) [expensive than RAID 5 but it provides](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=50.760666666666694) [better redundancy than RAID 5 does. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=53.706) [not all RAID controllers support RAID 50.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=56.88725) [But if your RAID controller does support](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=59.836) [it, you might want to consider it instead of RAID 5.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=16&mode=live&start=66.836)

[RAID 10](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live)

[Next we have RAID 10. RAID 10 is called a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=2.446) [striped set of mirrors. Your data is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=6.332666666666668) [mirrored and then striped across multiple](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=8.978) [drives. With this set up, it's possible to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=11.521999999999997) [survive the loss of more than one drive.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=14.17666666666667) [RAID 10 requires a minimum of four](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=16.726) [physical drives. And then number has to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=19.71266666666666) [an even number when you're using RAID 10.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=22.713142857142852) [RAID 10 does not have a write performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=25.576) [penalty like RAID 5 does or RAID 50 does.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=28.14070588235294) [So it's very well-suited to write](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=31.026) [intensive workloads. RAID 10 does require](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=34.708500000000015) [a 50 percent storage space overhead, so](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=37.644) [it's a lot more expensive than RAID 5.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=40.52488888888889) [Sometimes RAID 10 is called rich man's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=43.076) [RAID. RAID 10 is very popular with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=46.44475000000002) [database administrators because it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=49.96350000000001) [provides better write performance and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=51.82766666666666) [better redundancy than RAID 5. On the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=53.95683333333331) [other hand, RAID 10 is less popular with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=56.792249999999996) [IT departments and SAN administrators](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=59.617249999999984) [because, again, it's more expensive than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=61.38287499999998) [RAID 5 or RAID 50. But if you have a very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=63.50599999999999) [write intensive workload, you should be looking to use RAID 10 if you can.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=17&mode=live&start=71.276)

[Choosing Components for Redundancy](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live)

[Choosing components for redundancy.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=2.166) [Depending on the intended server usage,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=4.836) [you might want to invest on some redundant](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=6.925090909090912) [components to make that server more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=10.193000000000001) [reliable. Database server should have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=13.247000000000003) [redundant components. On the other hand,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=15.982666666666667) [web servers or application servers may not](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=18.624571428571425) [need redundant components. It could be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=21.29957142857142) [that low hardware cost per server is the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=23.694333333333333) [over-riding goal and so in some cases if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=27.023222222222216) [you have a web farm of multiple web](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=30.273692307692308) [servers or application servers, your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=32.97523076923077) [organization might choose not to spend the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=34.65475) [extra money on each one of those servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=36.955999999999996) [to make each individual server more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=39.586) [redundant because you have redundant](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=42.37171428571429) [servers behind a load balancer in that web](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=44.275999999999996) [farm. Typically though, on a mission](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=47.15599999999999) [critical server, you want to eliminate all](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=49.787428571428585) [the single points of failure that you can.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=52.43061538461538) [So you're going to be looking at things](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=55.206) [like dual power supplies that are plugged](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=57.73933333333336) [into separate electrical circuits. You're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=59.956) [going to look at multiple network ports](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=62.291) [that are plugged in to separate network](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=64.986)[switches. And those network switches](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=67.80350000000003) [should have dual power supplies in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=69.76266666666668) [different circuits. Most new servers, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=72.09766666666668) [know, have two or four embedded Gigabit](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=74.72742857142859) [Ethernet network ports. So it's not that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=77.96742857142861) [hard to have multiple network ports in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=80.50369230769229) [server. You also want to have RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=82.79907692307688) [protection for your logical drives. RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=85.24054545454545) [10 is going to give you more redundancy](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=87.31284210526316) [than RAID 5 but it's going to cost more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=89.52757894736841) [money and you'll have less storage space](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=92.01915789473682) [so it depends on your workload whether you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=94.07129411764707) [want to go to RAID 10 or seek with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=96.43835294117649) [something like RAID 5 for your RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=99.70028571428574) [protection. Finally, you want to make sure](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=102.47028571428578) [that you've got hot-swappable components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=105.13676923076922) [were possible. And these are things like](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=107.0290769230769) [your hard drives, your internal drives,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=109.33600000000001)[you might have hot-swappable fans, you'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=111.196) [going to have hot-swappable power](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=114.006) [supplies. And on some higher end servers,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=116.34766666666667) [you even have a hot-swappable memory and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=118.791) [hot-swappable processors. Although that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=121.596) [a less common thing that you're going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=123.7702857142857) [have to worry about and that's only](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=125.82742857142853)[available on higher end servers and higher](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=128.1385) [end editions of Windows that will support that.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=18&mode=live&start=131.13100000000006)

[Summary](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live)

[Now it's time for the summary of this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=2.586) [module. We've covered a lot of ground this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=5.199333333333332) [module talking about how to pick different](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=7.645090909090909) [components for your server. There are lot](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=10.188857142857142) [of choices you have to make. First of all,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=12.779333333333332) [you got to pick the server vendor then you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=15.149076923076924) [have to choose the server form-factor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=17.378307692307693)[whether it's a rack-mount server, or a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=19.891) [tower server, or a blade server. After](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=22.8735) [that, you've got to choose the processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=25.336) [vendor whether it's Intel or AMD. After](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=27.50599999999999) [that, you've got to choose one of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=29.832666666666665) [available server models from that vendor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=33.565999999999995) [that uses that brand of processor whether](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=36.366) [it's Intel or AMD. After that, you have to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=39.344181818181795) [choose the exact processor model for that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=42.850999999999985) [particular model server that you want to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=45.338) [use. Then you've got to decide how much](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=47.72500000000001) [RAM to put in the server. Next, you got to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=50.05292307692309) [decide what type of storage that server is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=52.79907692307691) [going to use whether it's internal drives](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=54.88523076923073) [or PCI-E storage cards or direct-attached](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=58.458) [storage or storage area network. Servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=62.111714285714285) [have multiple redundant components. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=66.274) [have a motherboard and you've got](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=68.91) [processors and memory. And then you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=71.57400000000001) [internal storage such as PCI-E storage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=74.68885714285716) [cards or internal drives and your power](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=77.36314285714289) [supply is going to be redundant. And then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=79.96599999999998) [you've got a number of integrated](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=82.21099999999998) [components on the server that may or may](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=84.02599999999995) [not be redundant. So examples of this are things like fans.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=19&mode=live&start=86.38457142857142)

[What is Next?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live)

[So what's in the next module? Module 5 is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=2.076) [going to cover hardware maintenance. We'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=5.670999999999999) [be talking about the importance of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=8.042666666666667) [hardware maintenance. We'll talk about how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=10.422666666666666) [do you what has to be maintained on a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=12.096000000000002) [server from a hardware perspective and an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=14.076000000000008) [operating system perspective. We'll also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=16.976)[talk about how do you discover when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=18.90305882352941) [updates are needed and how do you decide](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=20.957764705882347) [when to actually apply these updates.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=23.306) [We'll consider how you go about planning](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=26.856) [and testing your hardware updates and how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=29.282666666666675) [you use rolling maintenance techniques to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=31.822666666666663) [minimize your down time and minimize the risk from these updates.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m4-selection&clip=20&mode=live&start=34.24266666666668)

[Hardware Maintenance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live)

[Introduction](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live)

[This Glenn Berry with SQLskills. com. I'm](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=2.046) [recording this course for Pluralsight.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=5.146) [It's Understanding Server Hardware, Module](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=7.046) [5: Hardware Maintenance. This module is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=11.189749999999998) [going to be talking about the importance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=14.785999999999998) [of hardware maintenance. System vendors](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=17.375999999999998) [frequently release firmware updates that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=19.210615384615384) [you need to be concern with. Knowing what](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=21.02215384615384) [has to be maintained is also very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=23.808000000000003) [important. You have your Main BIOS, your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=25.95000000000001) [NIC firmware, your RAID controller](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=28.763999999999996) [firmware among other things. You also need](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=30.853999999999992) [to know when are hardware-related update](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=33.67690909090909) [actually needed. Do you need to apply them](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=35.97872727272727) [when they're released? Or do you need to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=38.27933333333332) [wait when you actually have issues? Also,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=40.65054545454545) [I'll be talking about planning and testing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=43.056)[for hardware updates. And the ideas that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=46.415999999999976) [in an ideal situation you would have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=48.99011764705882) [identical hardware to do your testing on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=50.97482352941174) [and if not, how to do it in a maintenance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=52.966) [window. We'll be talking about when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=55.86599999999999) [operating system updates are needed. These](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=57.955999999999996) [are released on Microsoft Patch Tuesday](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=60.25266666666667) [every month. We'll get into planning and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=63.23266666666669) [testing operating system updates. And the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=66.7871111111111) [idea that in a perfect situation you would](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=69.446) [have regression testing on test servers](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=71.88600000000005) [and how to plan a maintenance window. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=73.716) [finally, I'll be talking about how to use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=76.48016666666666) [rolling maintenance techniques. And this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=79.79349999999994) [will let you minimize your (inaudible) and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=81.60933333333332) [reduce the risk when you apply these sorts of updates on your servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=0&mode=live&start=83.61599999999996)

[The Importance of Hardware Maintenance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live)

[The Importance of Hardware Maintenance.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=1.966) [The hardware system vendors such as Dell](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=5.016) [and HP have frequent main system BIOS](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=7.076) [updates that they release. Important fixes](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=11.072363636363633) [and enhancements are included in these](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=14.113777777777779) [updates. And staying current can help you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=16.387111111111114) [avoid problems in the future. On top of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=19.02963636363637)[that, if you ever actually have to make a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=21.63) [hardware support call to your system](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=23.771999999999995) [vendor, they're going to run a utility](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=25.35138461538462) [that collects information about your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=27.3706153846154) [hardware and driver versions, and they're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=28.750285714285713) [going to want you to be on a current](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=30.29314285714285) [version of its main system BIOS. So I](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=33.006) [think it's a good idea to try to stay](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=35.90066666666666) [current if you can. You also would get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=38.39666666666664) [frequent firmware updates from the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=40.95266666666666) [hardware system vendors for the components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=42.76099999999998) [that are in your server. And this is going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=44.58099999999999) [to vary based on what's in your server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=46.742666666666665) [But typically, you might have RAID](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=48.616) [controllers, Host Bus Adaptors, Network](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=51.38061538461538)[Interface Cards, and other things that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=53.684461538461534) [have any sort of firmware that actually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=55.77933333333335) [has to be updated. And again, important](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=57.832666666666704) [fixes and enhancements are included in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=60.18145454545454) [these updates. They don't go to the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=62.53236363636363) [trouble to release these updates unless](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=64.82671428571427) [something important actually needs to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=66.6395714285714) [fixed. And staying current will help you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=68.94850000000001) [avoid problems in the future. And again,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=71.45054545454548) [if you ever have to call them for a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=73.60933333333334) [support call, they're going to be checking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=75.69433333333336)[on the versions of your firmware to see if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=77.316) [you're up to date or not. The hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=80.40000000000006) [vendors also have frequent driver updates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=83.252) [for all the components in a server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=85.63999999999997) [Updated drivers will often correct problem](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=88.426) [that you have run into or may run into in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=90.09933333333332) [the future. So I think it's a good idea to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=92.88822222222218) [try to stay current with your drivers also.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=1&mode=live&start=101.446)

[Knowing What Has to be Maintained](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live)

[Knowing What Has to be Maintained. This is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=2.076) [going to depend on the make and model of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=5.14225) [your server first of all. It's also going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=7.060374999999998) [to depend on what components are actually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=9.060285714285714) [installed in the server. So for example,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=11.240285714285713) [you might have or you will have a main](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=13.330736842105265) [system BIOS in any server and then if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=15.86494736842106)[have a RAID controller, you're going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=18.378857142857143) [have the firmware for that. And this could](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=20.27885714285715) [be your embedded RAID controller for your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=22.6785) [internal drives or it could be the great](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=25.111) [controller that you have for a direct](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=27.628500000000006) [detach storage array, so you have PCI-E](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=29.754750000000012) [card that has its own firmware. You're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=32.15) [also likely to have embedded server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=34.73028571428571) [management firmware that needs to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=36.85600000000001) [updated. And then you're going to have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=38.981714285714304) [Network Interface Card firmware that could](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=41.046000000000014) [be for you embedded NICs on the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=42.51171428571431) [motherboard or for PCI-E expansion card](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=45.58523076923079) [NIC. If you're using a SAN and you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=48.41446153846158) [using a Host Bus Adaptor, the firmware for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=50.61266666666669) [that is going to have to be updated and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=52.58600000000005) [maintained. And finally, if you're using](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=55.30599999999999) [something like a Fusion-io card, it has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=57.206) [firmware that needs to be updated and maintained.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=2&mode=live&start=60.776)

[Discovering When Hardware-Related Updates are Needed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live)

[So when are hardware-related updates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=2.186) [needed? This is going to depend on the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=4.977666666666666) [importance of the update. Typically, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=7.451454545454544) [see some vendors will give some sort of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=9.090285714285713) [rating to the update. It might be a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=11.267428571428567) [critical or urgent update or a recommended](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=13.667428571428571) [update for example. It also depends on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=15.962428571428571) [what issues are actually fixed with the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=18.089333333333332) [update. You need to ask yourself, have you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=20.09016666666666) [experienced any of these issues that are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=22.87850000000001) [supposed to be corrected in the update?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=25.203777777777777) [Does it seem likely that you will ever](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=27.086) [experience them in the future? And how far](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=29.23984615384616) [out of date is your firmware or drivers?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=31.521454545454546) [If you're several versions behind the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=34.016) [current version, that's probably more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=36.406) [incentive to apply a new update when it](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=38.397666666666666) [comes out. This decision also depends on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=41.69711111111109) [your SLAs for your system uptime. It's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=44.089636363636366) [going to depend on whether or not you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=46.343333333333334) [any high-availability solution in place or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=49.73933333333333) [whether you actually just have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=51.95711111111111) [standalone server. If you have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=53.94377777777779) [high-availability solution or if you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=55.91100000000001) [your servers in a server farm, this might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=57.86850000000002) [let you install firmware and driver](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=60.636769230769225) [updates with virtually no downtime or at](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=63.0690769230769) [least less downtime than if you had](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=65.79054545454545) [standalone server. If you do have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=68.22145454545452) [standalone server, you need to think about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=70.27776470588232) [how long this actually take to reboot that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=72.18423529411757) [server versus how much downtime is allowed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=74.91957142857142) [according to your SLA. So for example, if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=78.12457142857137) [you're tying to have five 9s availability,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=81.09599999999999) [that only gives you a little bit over five](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=83.09099999999997) [minutes per year of downtime. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=85.9717142857143) [typically, a server might take anywhere](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=88.53957142857143) [from five to ten minutes to reboot so a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=90.661) [single reboot would absolutely go through](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=93.91963636363636) [your available downtime for the year if you have standalone server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=3&mode=live&start=96.27054545454544)

[Planning and Testing Hardware Updates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live)

[Planning and Testing Hardware Updates.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=1.506) [Ideally, you're going to have an identical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=4.876) [test server, the exact same model server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=7.175999999999998) [to install all firmware and driver updates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=9.476) [before you actually have to do it in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=12.017875000000002) [production. If that's not possible, one](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=14.922875000000003) [other alternative to reduce your risk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=17.01725) [somewhat is to use part of your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=19.09475000000001) [high-availability solution for testing and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=22.033499999999997) [production. So for example, if you have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=25.052249999999987) [fail of a cluster, you can install updates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=27.93418181818181) [on one node of a cluster. And if there's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=30.564000000000004) [any issue, you still have the other nodes](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=33.19433333333334) [of the cluster that you can work on while](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=34.89655555555559) [you're resolving that issue. Another](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=37.24266666666667) [example would be installing on one server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=39.454750000000004) [in a server farm that's behind the load](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=42.946) [balancer. So for example you might have 10](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=45.20377777777779) [web servers in a server farm and you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=47.478307692307695) [install these updates on one of those](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=49.764) [servers. And if there's an issue with any](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=51.78700000000001) [those updates you still have still the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=53.515374999999985) [other nine servers available. In my](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=54.95474999999997) [experience, firmware and driver updates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=58.07433333333334) [don't cause problems that often but](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=60.320166666666694) [there's always a risk that they will. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=62.831)[in reality, many organizations do not have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=65.09200000000001) [any kind of a good test environment](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=67.93400000000005) [especially a test environment with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=70.47377777777774) [identical hardware to what they have in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=72.27488888888888) [production. This is a dangerous situation,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=75.20711111111109) [for many reasons. Firmware updates are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=77.81975) [normally very reliable, but there's always](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=80.19099999999997) [some risk of any update to a server. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=82.18145454545454) [so if you don't have a good test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=84.924) [environment and you don't have identical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=86.90800000000004) [hardware one thing you can do to reduce](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=88.70600000000002)[your risk is to try a schedule maintenance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=91.18600000000004) [window on a Friday night. That way if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=94.43099999999997) [there's any kind of issue you have all](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=97.60011764705881) [weekend to recover from the problem. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=99.87776470588231) [might not be a very pleasant weekend for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=101.82547368421052) [you but you do have some time before](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=103.7412631578947) [Monday comes around to get the problem resolved with the hardware vendor.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=4&mode=live&start=105.65705263157889)

[Discovering When Operating System Updates are Needed](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live)

[When our Operating System Updates Needed?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=2.256) [Microsoft releases important updates on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=5.336) [Patch Tuesday every month. This is the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=7.747111111111111) [second Tuesday of the month and this is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=10.523500000000002) [going on been going on since October of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=12.783500000000007) [2003. They release security updates and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=15.043500000000012) [other important updates on Patch Tuesday.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=17.812363636363635) [The normal way that you get these updates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=20.796) [is Windows Update, but this is for the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=22.992363636363628) [operating system only. There's a super set](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=25.391000000000005) [of Windows Update called Microsoft Update](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=27.933142857142855) [that patches other applications such as](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=30.32885714285714) [Microsoft Office, the. NET framework and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=32.918) [SQL Server. For production servers you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=35.89400000000001) [don't want to have the automatic](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=38.74753846153846) [installation option enable. Instead, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=41.53984615384615) [want to change that update setting to only](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=43.6585) [download updates or only notify you that a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=46.54849999999998) [new updates are available. Now, it's very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=49.55266666666667) [important that you test your Windows](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=52.20957142857142) [Updates before you apply them to a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=54.17671428571427) [production server. You're going to want to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=57.176) [install them during a scheduled](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=59.75742857142858) [maintenance window as opposed to having](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=60.978857142857166) [them happen automatically at 3 a. m. on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=62.66975000000001) [Wednesday on the Patch Tuesday week. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=65.52475000000003) [want to install them when you are ready to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=67.98599999999999) [do it during a scheduled maintenance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=70.86599999999993) [window. It's also a best practice to use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=72.78599999999989) [Windows Server Update Services server to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=75.78349999999995) [actually download these updates and then](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=78.00446153846154)[distribute that ones that you want to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=79.8552307692308) [distribute to your other servers. This is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=82.096) [going to allow to you manage which updates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=84.59725000000002) [are distributed to your other servers. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=86.80225000000006) [it's going to let you limit your bandwidth](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=88.77766666666668) [usage for updates. So instead of having](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=91.35100000000006) [every single server download all the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=93.65200000000002) [updates, you have one server to download](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=95.65600000000003) [them and then the rest of your servers get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=97.791) [them from that Windows Server Update](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=99.88350000000001) [Services box. This is will save you a lot](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=102.35171428571425) [on internet bandwidth. And again, that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=105.06600000000003) [can control what updates are being pushed out to your other servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=5&mode=live&start=109.846)

[Planning and Testing Operating System Updates](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live)

[Planning and Testing Operating System](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=2.126) [Updates. Ideally, you have a robust test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=5.176) [environment for your operating system](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=7.955999999999998) [updates so that means you have some real](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=9.76433333333333) [hardware with the same version of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=12.300374999999999) [operating system and it is set up as](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=14.474749999999998) [closely as possible to your production](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=17.149846153846152) [system. You also have an automated](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=19.203692307692304) [regression test suite. That's going to let](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=21.314750000000007) [you run a lot of automated test very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=23.63952941176471) [quickly and find out whether or not](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=26.166588235294125) [anything in your application is broken by](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=28.49369230769231) [an operating system update. This would](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=31.1106153846154) [give you a higher degree of confidence](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=33.12377777777778) [that the operating systems update had not](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=34.936) [cause any problem for your applications or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=37.31600000000002) [the servers themselves. Now in reality,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=40.64457142857144) [most or many organizations have a limited](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=43.67349999999999) [test environment. They might have virtual](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=46.70099999999997) [machines instead of physical machines, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=49.108222222222224) [they might may multiple server rolls](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=51.42516666666667) [consolidated onto a single server because](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=53.76016666666668) [they don't have the budget or the full](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=56.06266666666667) [test environment available. They might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=58.916000000000025) [have limited testing resources. So instead](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=60.75266666666666) [of a full automated regression test suite,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=62.9736923076923) [they might be limited to doing what's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=65.3806153846154) [called smoke-testing and some limited](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=68.07000000000001) [functional testing after they apply an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=69.93)[update. So that's going to mean there'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=71.89800000000002) [be more risk of breaking an application](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=73.86600000000004) [with an operating system update. It's also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=76.55266666666668) [common for some organization to wait](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=79.80933333333334) [awhile before installing an operating](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=82.50711111111113) [system update. So these updates will come](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=84.63488888888894) [out on Patch Tuesday and they might wait a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=86.86599999999999)[week or two before they actually start](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=89.34999999999995) [applying these updates to their production](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=92.05830769230772) [servers. This allows other organizations](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=94.49061538461544) [to encounter problems first and they'll](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=96.56509090909093) [read about it on the internet for example.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=99.06872727272732) [But it also gives a false sense of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=102.366) [confidence to your organization because](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=105.83457142857141) [waiting for other people to run into](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=108.00242857142854) [problems instead of doing your own testing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=109.82350000000002) [really is not a good solution. It also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=112.03145454545452) [increases the chance that you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=114.87215384615385)[unpatched servers that are vulnerable to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=117.11061538461539) [day zero attached, for example, there's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=119.37225) [been many, many examples over the past 10](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=121.74974999999996) [years of servers that were compromise](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=124.91974999999992) [because of things that have been patched](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=127.43266666666666) [in previous updates they hadn't bother to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=130.396) [apply. So you know where to find yourself](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=133.05599999999995)[in that situation. You need to really put](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=134.91999999999993) [some effort into having the best in test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=137.28600000000003) [environment possible so you can actually](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=140.05400000000006) [test these updates and stay up to date](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=141.8815555555556) [with them instead of being months and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=144.15266666666676) [months out of date with all of your Windows Operating System Updates.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=6&mode=live&start=146.856)

[Using Rolling Maintenance Techniques](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live)

[Using Rolling Maintenance Techniques. If](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=1.886) [you want to use rolling maintenance to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=4.855090909090909) [reduce your downtime, you can have to have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=7.018727272727269) [either an HA solution of some sort or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=9.453894736842106) [server farm to make this happen. This can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=11.866526315789475) [be very effective for reducing your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=14.569333333333335) [downtime. And it's also a good method for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=17.249333333333333)[reducing your risk when you apply any sort](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=19.609333333333336) [of a hardware or software update to your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=21.796000000000003) [servers. Now, the server farm technique](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=25.016000000000002) [goes like this. All you really have to do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=27.352249999999998) [is remove one server from the farm so you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=30.279846153846158) [might have again 10 web servers in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=33.088499999999996) [server farm behind a load balancer. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=35.85849999999998) [what you do is you remove one server from](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=38.25711111111111) [that farm and then you install the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=41.14711111111108) [hardware and software updates that you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=43.394888888888836) [going to do on the rest of your severs on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=44.77963636363636) [that one server first. And then you test](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=47.32600000000001) [that patch server and make sure that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=49.74) [everything is working correctly, and when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=51.74200000000001) [you're satisfied that that's the case, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=53.31336842105264) [add it back to the farm and then you go to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=54.809157894736856) [the next server and the farm and repeat](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=57.21054545454545) [the process. So that way, if something](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=59.3269090909091) [goes wrong in the first server, all the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=60.996909090909085) [other servers are untouched and they still](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=63.081999999999994) [work. Now, the high availability technique](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=65.58800000000001) [goes like this. You patch one node in a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=67.87100000000002) [cluster if you're using failover](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=71.05541176470591) [clustering or if you're using something](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=72.74658823529417) [like database mirroring, you could just](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=74.776) [patch one of the sides of the mirror in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=77.2523636363636) [that HA solution. Then you failover the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=81.03028571428572) [node or the portion of the HA solution](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=83.59599999999998) [that you didn't patch and you repeat that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=86.156)[technique. And you continue doing this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=89.87155555555552) [until everything is patched. And using](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=92.09711111111112) [these techniques will dramatically reduce](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=94.37933333333334) [your downtime for scheduled maintenance.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=96.56266666666667) [So for example if you got a standalone](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=98.746) [server and you had to apply a BIOS update,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=100.8212941176471) [that's going to require a reboot of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=103.156)[server. And again, that could take](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=105.26266666666669) [anywhere from 5 to 10 to 15 minutes for a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=107.11129411764703) [single reboot of a standalone server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=110.28188235294111) [whereas if you had a server on a server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=112.28171428571426) [farm, you can pull it out of the farm and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=115.35457142857135) [do whatever you have to do and have a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=118.02652631578943) [reboot and it won't matter, they won't be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=120.35705263157885) [any effect of production while that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=122.03933333333333) [happening to that one server. So that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=123.66377777777777) [how you reduce your downtime by using rolling maintenance techniques.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=7&mode=live&start=127.186)

[Summary](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live)

[So what have we covered in this module?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=1.786) [Servers have many components that must be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=4.396) [maintained. This includes firmware and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=7.493499999999999) [driver updates for all of the components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=9.415999999999997) [in your sever, so this can include things](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=12.005999999999991) [like your main system BIOS, your embedded](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=14.926714285714283) [server management, RAID controllers if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=17.46171428571428) [have them, Network Interface Cards, and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=19.61369230769231) [any other components that have firmware or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=21.755230769230778) [drivers in your server. The operating](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=24.770999999999994) [system also must be maintained. This](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=27.561714285714288) [includes Service Packs for the operating](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=30.051) [system and monthly operating system](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=32.301) [updates from Windows Update. Failing to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=34.95100000000001)[maintain your servers increases your risks](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=38.194) [of problems. You're much more likely to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=41.09800000000001) [have problems with poorly-maintained](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=45.06600000000001) [servers. You might have vendor support](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=47.466000000000015) [issues with poorly-maintained severs. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=49.98266666666667) [for example if you call your hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=51.76242857142857) [vendor because you have some sort of a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=53.48742857142859) [hardware problem, they're going to run a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=55.434571428571424) [utility that's going to look at all your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=57.0745714285714) [driver and firmware versions. And if any](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=59.34314285714285) [of those are out of date, they're going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=61.40412500000001) [want you to get up to date before they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=63.19850000000004) [started helping you really. There is also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=65.91266666666664) [a risk whenever you make a change to a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=68.1706153846154) [server. So you need to consider what the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=70.34446153846162) [update fixes and whether or not you really](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=72.83236363636368) [want to apply it or not right now. Proper](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=75.38933333333331) [planning and testing can reduce your risk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=78.35933333333334)[whenever you apply updates. You can use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=81.32266666666666) [rolling maintenance techniques to reduce](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=84.23400000000001) [your downtime and also reduce your risk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=86.26400000000004) [from updates. Regular server maintenance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=89.74028571428569) [can force you to exercise your HA solution](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=91.98963636363635) [which is also a good thing for your overall server environment.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=8&mode=live&start=95.146)

[What is Next?](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live)

[So what is on the next module? Module 6](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live&start=1.756) [will cover servers in the real world. We](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live&start=4.732666666666667) [begin into how to justify the purchase of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live&start=8.114333333333333) [a new server. Also, it talked about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live&start=10.900999999999994) [knowing what hardware tradeoffs to make](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live&start=13.293999999999999) [when you have a limited hardware budget.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live&start=15.316) [We'll be discussing how to choose hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live&start=18.466) [to minimize your software licensing cost.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live&start=21.336000000000002) [And we'll briefly talk about server consolidation and hardware virtualization.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m5-maintenance&clip=9&mode=live&start=23.796)

[Servers in the Real World](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live)

[Introduction](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live)

[This is Glenn Berry from SQLskills. com.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=1.916) [I'm recording this course for Pluralsight.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=5.026) [This is Understanding Server Hardware,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=7.326) [Module 6 Servers in the Real World. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=9.85933333333333) [what we're going to be talking about in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=13.67364705882353) [this module, the first topic will be how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=15.814823529411765) [to justify the purchase of a new server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=17.956) [So I'll give you some successful tactics](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=21.496) [and negotiation strategy you can use when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=23.585230769230765) [you're trying to get a new server. Next](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=25.6635) [we'll talk about how to know what hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=27.99433333333333) [tradeoffs to make when you have a limited](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=30.54100000000001) [hardware budget, show you how to maximize](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=33.05933333333333) [your hardware budget for the available](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=35.24799999999998) [dollars you have to spend. Next we'll talk](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=37.374750000000006) [about how to choose your hardware to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=40.229333333333344) [minimize your software licensing cost.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=42.48766666666667) [This is very important with socket base or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=45.046) [core based licensing that's becoming more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=48.31933333333333) [popular now. Next we'll talk about server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=51.15933333333335) [consolidation where you can consolidate](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=54.27907692307692) [multiple existing servers onto a fewer](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=56.45215384615384) [number of new servers. Finally we discuss](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=59.12314285714286) [hardware virtualization. This is where you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=62.76999999999999) [can run multiple server virtual machines](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=65.56599999999999) [on a virtualization host and also save](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=67.93599999999996) [money and save operating cost in some cases.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=0&mode=live&start=72.516)

[How to Justify the Purchase of a New Server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live)

[How to justify the purchase of a new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=1.636) [server? As you're doing this, you need to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=4.951555555555555) [make concerted effort to make the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=7.291000000000002) [technical and business case for a new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=8.941000000000004) [server. So the first step in this is to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=11.238857142857148) [gather some performance metrics on your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=14.129333333333328) [existing server that you're trying to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=16.066000000000003) [replace. You want to try to figure out](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=18.045999999999992) [what are the biggest performance and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=19.95100000000001) [scalability bottlenecks that's server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=21.558) [seeing with its current workload? You also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=23.485999999999997) [want to determine what is the impact to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=26.48225) [the business of this old server? If you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=28.82725) [have an old server that's causing problems](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=31.142249999999997) [for your end users or your customers, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=33.089125)[want to try to measure what that impact](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=35.284) [is. It could be lost productivity for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=37.26799999999998) [internal customers, it could be customer](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=39.76369230769229) [complaints from internal customers or](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=42.01138461538458) [external customers whatever it is, you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=43.5785) [want to try to measure that. And you also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=45.36724999999999) [want to reach out to the business that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=47.955999999999996) [using that server and get them involved in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=50.08933333333332) [this process, if they're complaining about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=52.27333333333333) [how slow a server is when you're trying to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=54.177333333333316) [make the case to replace it, get them](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=57.056) [involved. It also maybe more difficult to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=59.776000000000025) [maintain an old server that's out of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=61.928857142857126) [warranty, it maybe more difficult to get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=64.0438571428571) [parts, it may take longer to get parts.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=65.92742857142855) [And it just maybe failing more often](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=68.036) ['cause it's old. Tied into that, you want](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=70.64) [to find out how old are your existing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=73.34284210526317) [servers, are they 6 months old? Are they 5](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=75.88178947368425) [years old? So you need to know the model](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=78.67400000000002) [numbers for example, you want to find out](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=80.91305882352941) [are they out of warranty from the hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=82.79541176470588) [vendor, most hardware vendors have a 3](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=85.12600000000002) [year warranty on servers which can be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=87.29600000000003) [extended but extending warranties is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=90.13907692307694) [usually very expensive, and it really is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=92.36215384615389) [not a good idea and they do that on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=94.57314285714287) [purpose. They want you to buy a new server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=96.54671428571433) [after 3 years. You also want to determine,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=99.41327272727271) [is the operating system our of mainstream](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=102.37266666666666) [support form Microsoft? Because if that's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=105.12599999999998) [the case you're not going to see anymore](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=107.13188235294119) [service packs and you're not going to see](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=109.3342352941177) [any other updates except for critical](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=111.88000000000001) [security fixes and that's another argument](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=114.56200000000003) [you can use that it's time to upgrade a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=116.59599999999999) [server 'cause you're going to put a newer](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=119.07314285714287) [operating system on that new server that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=121.42215384615383) [you buy. You also want to go out and do](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=123.74292307692303) [some research on any relevant application](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=126.88600000000002) [or component benchmark scores that you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=128.746) [find. So you want to run this on your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=131.29225000000008) [existing server and then look on websites](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=133.84266666666673) [or run them on new servers if you have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=135.7560000000001) [access to a new server and use those to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=138.15236363636356) [compare their performance. You again want](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=140.86599999999999) [to compare the existing server performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=142.99600000000004) [to the proposed new server performance. In](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=145.156) [this way you can figure out how much](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=148.566) [improvement is actually possible with this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=150.64599999999993) [new server and as you're dealing with](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=152.31457142857144) [this, you can also figure out where there](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=154.51457142857146) [might be any opportunities for server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=157.23200000000003)[consolidation. So let's say you've got 4](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=159.52400000000006) [or 5 older servers that are perhaps](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=162.2001176470588) [underutilized or they're just on really](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=164.87658823529404) [old hardware on an out of support](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=167.17145454545454)[operating system. It could be that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=169.8505454545454) [could combine the workloads from several](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=172.74541176470595) [older servers onto one newer server and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=175.30070588235307) [actually get better performance and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=178.27314285714286) [scalability and then just a general](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=180.35885714285718) [negotiating tactic that I try to do when](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=182.15266666666662) [I'm trying to get a new server is that I](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=184.3553333333332) [don't negotiate with myself. So what you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=187.63933333333335) [should do is do your research, get your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=189.936) [numbers and then ask for what you really](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=192.41600000000003) [need. Don't cut back on certain components](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=194.82600000000008) [just because you think perhaps there's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=197.7402857142857) [budget problem. You should go ahead and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=200.24599999999998) [ask what you actually need. In that way,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=202.22600000000006) [if you need to, you can negotiate down but](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=204.46541176470586) [if you start off lower than what you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=207.31364705882348) [really need, you're probably going to get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=209.66907692307691) [negotiated down anyways and come out worst for the experience.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=1&mode=live&start=211.47292307692308)

[Knowing What Hardware Tradeoffs to Make](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live)

[Knowing what hardware tradeoffs make. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=2.066) [could be that despite your best](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=5.149333333333333) [negotiating efforts, you don't have an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=7.329333333333333) [unlimited hardware budget. So you've got a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=9.39885714285714) [certain amount of money to spend for all](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=11.355473684210525) [of your server components and you've got](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=13.254421052631573) [to decide how to allocate that money for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=14.916) [those components. So, how you go about](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=18.340000000000007) [doing that depends on your workload. And](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=20.450545454545452) [that's going to depend on where your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=22.32690909090909) [biggest bottlenecks are. So for example,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=24.923272727272728) [you might be processor-bound or you might](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=26.872249999999998) [be IO bound and that's going to help you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=28.82349999999999) [determine how to allocate your available](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=31.651000000000003)[money across the different components. Now](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=33.96099999999999) [if you're not quite sure of where that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=36.1785) [might be, a common best practice is to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=38.518499999999975) [favor your processors when you first buy](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=40.889) [this server, and that's because it's](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=43.150000000000006) [usually not very economical to upgrade the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=45.72830769230769) [processors later. The server vendors are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=49.10984615384614) [more than happy to sell you processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=51.546769230769236) [upgrade kits. But they're quite expensive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=54.1206153846154) [and usually ends up being less expensive](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=56.22776470588236) [to buy a whole new server, rather than to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=58.62835294117648) [upgrade the processors in an existing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=61.82) [server. So that means that you're likely](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=64.088) [to be stuck with your original processor](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=66.35974999999998) [for the life of the server so you want to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=68.56912499999996) [get the ones that you really need for your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=71.2426666666667) [workload rather than thinking you're going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=73.46266666666672) [to be able to upgrade them later. Next is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=75.10509090909089) [memory, it's usually pretty easy to get](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=77.90171428571428) [more memory in a server after you buy](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=80.65171428571425) [assuming you haven't filled up completely](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=83.718) [the capacity right off the bat. Memory is](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=85.92200000000001) [inexpensive and the prices have been](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=88.99327272727274) [falling over time. So it's a lot easier to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=91.59509090909094) [get approval later to buy more memory if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=94.36266666666664) [you really need it. So if you've been able](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=96.31822222222216) [to build a case that 6 months after you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=98.65016666666665) [buy a server, you really do need more](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=101.20054545454546) [memory. It's pretty easy to get the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=103.81872727272729) [approval to do that. Now memory can be a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=107.00800000000002) [good substitute for IO capacity to a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=110.34099999999998) [certain extent especially for reads. So if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=112.56028571428571) [you have a lot of memory in your server,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=114.95863157894736) [you might be able to spend less money on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=116.81547368421046) [your IO subsystem in certain cases. Having](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=119.01028571428571) [empty processor slots is going to affect](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=122.70266666666666) [your total memory capacity. So for](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=125.6893333333333) [example, if you've got a two-socket](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=128.09975) [server, it only has one processor in it,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=130.21100000000004) [your total memory capacity is going to be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=133.026) [cut in half. So make sure to keep that in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=135.28054545454546) [mind if you're tempted to not have all the processors populated in a server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=2&mode=live&start=137.876)

[Choosing Hardware to Minimize License Costs](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live)

[Choosing hardware to minimize your license](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=2.276) [cost. It's becoming much more common to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=5.173142857142857) [tie software licensing to your hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=8.632923076923078) [capabilities. So for example, it could be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=11.60984615384615) [based on your processor socket counts in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=14.410000000000002) [your server. Or it could be based on your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=17.098000000000003) [processor physical core counts in your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=20.325999999999993)[server. So you need to be aware of this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=22.434571428571417) [when you select your hardware and you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=24.57676923076923) [actually pick the processor you're going](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=26.44830769230769) [to use in your server. Buying a 16-core](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=28.705230769230756) [AMD processor could be very expensive, if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=31.846000000000004) [your software licensing is based on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=34.786000000000016) [physical core counts, 'cause you have to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=37.329571428571434) [buy 16 licenses for each one of those AMD](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=40.43457142857145) [processors that you have in your server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=44.03199999999999) [And it could be that buying a lower core](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=46.216) [count Intel Processor that has better](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=49.576000000000015) [single-threaded performance would give you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=51.96199999999999) [better performance and save you a lot of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=54.071999999999974) [money on your software license cost. Now,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=57.111000000000004) [when you're selecting an Intel Processor,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=59.64266666666666) [you have to pay attention to the little](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=61.66266666666666) [details about the processor. And a good](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=64.65314285714285) [example is shown here. Intel has what they](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=67.54885714285713) [call frequency optimized models that have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=70.62100000000002) [lower core counts and higher base clock](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=73.18) [speeds. So here's an example we, have an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=76.76400000000001) [Intel Xeon E5-2643 processor and this has](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=81.28509090909094) [four physical cores and it has a 3. 3](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=84.79662499999999) [gigahertz based clock speed. Now you also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=88.45849999999999) [have an Intel Xeon E5-2690 processor this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=91.71242857142859) [has eight physical cores but it only has a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=95.50742857142863) [2. 9 gigahertz base clock speed. So if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=99.41690909090907) [were going to have some sort of software](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=102.37266666666667) [that was based on physical core counts,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=104.6837777777778) [you could possibly choose that four count](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=106.706) [or four core processor and get better](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=110.05666666666669) [performance and give up a little bit of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=113.40733333333337) [overall capacity and scalability which you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=115.87915789473682) [would save a lot of money in fact 50](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=117.58757894736839) [percent on your software license, if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=120.11389473684211) [went that root so you seem to be aware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=122.0223157894737) [that you have alternatives here and you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=124.476) [balancing the software license cost versus](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=127.11266666666666) [the processor that you pick. And depending](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=129.35433333333333) [on the software you're buying, this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=131.766) [license cost for the software can be much](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=133.624) [more money than the server cost. So you really need to pay attention to this.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=3&mode=live&start=136.08799999999994)

[Server Consolidation](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live)

[Sever consolidation, server consolidation](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=1.886) [is a good method to reduce server sprawl.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=4.089333333333333) [You can take workloads from multiple older](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=8.496) [servers and combine then onto one new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=11.085999999999995) [server. Quite often you'll find lots of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=13.67599999999999) [old servers that are severely](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=16.796) [underutilized. And they're running on old](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=19.08766666666666) [out of warranty hardware and so taking](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=21.296000000000006) [those workloads and moving them into one](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=23.746000000000016) [new server can save you a lot of money in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=26.029333333333334) [several different ways. First, you can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=29.195999999999998) [reduce your software licensing cost. You](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=31.5635) [only need one operating system license on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=34.31327272727273) [a consolidated server. You might save some](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=37.024181818181845)[money on application licensing cost. So if](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=39.70155555555555) [you had several old database servers each](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=42.26541176470588) [running a copy of SQL Sever for example](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=44.60835294117648) [and you consolidate them on to one new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=47.286) [server you wouldn't have to have all those](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=49.67933333333332) [software licenses for SQL server. You can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=52.773777777777774) [also reduce the overall required hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=56.086)[maintenance. Instead of maintaining 5](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=58.90599999999999) [severs you maintain 1 server, so you only](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=60.68044444444444) [have one serve that you have to maintain](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=63.289333333333325) [with the firmware and driver updates and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=66.09599999999999) [operating system updates. Of course the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=69.07099999999997) [downside to that is if this one server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=71.26850000000002) [fails, more applications would be](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=73.72850000000005) [affected. Now, having one server instead](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=76.26799999999997) [of multiple servers is also going to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=78.44418181818183) [reduce the overall required operating](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=80.81984615384614) [system maintenance so things like service](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=82.98907692307688)[packs and windows updates each month, were](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=85.59215384615376) [only going to be applied to one server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=87.58600000000003) [instead of multiple old servers. You can](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=90.101) [also reduce your operating cost if you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=93.01885714285714) [have fewer numbers of servers. You're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=96.14385714285713) [going to have less electrical power usage](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=98.72138461538462) [especially since newer servers tend to use](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=101.13907692307694)[less power than older servers. You're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=103.65171428571428) [going to require less cooling capacity in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=105.881) [the data center and you're going to take](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=107.736) [up less server rack space and use up less](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=109.856) [network ports in your data center. So](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=113.38399999999996) [there's lot of different ways you can save money with server consolidation.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=4&mode=live&start=116.736)

[Hardware Virtualization](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live)

[Hardware virtualization, hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=2.036) [virtualization is coming much more popular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=3.6941818181818182) [nowadays especially with IT departments.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=7.010545454545454) [This gives you another method to reduce](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=9.676) [your server sprawl. It's very popular now](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=12.685999999999998) [to do physical to virtual migrations P to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=15.750285714285713) [V migrations, this is where you take an](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=19.298857142857134) [old server that might be running an old](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=22.068499999999993) [operating system and actually migrated to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=24.578499999999984) [a virtual machine without having to do a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=26.788222222222227) [reinstallation and rebuild to that server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=29.759333333333327) [That's a good way to eliminate old out of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=31.746) [warranty hardware running old legacy](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=35.81333333333333) [applications without having to do all that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=37.556666666666665) [work of reinstalling and reconfiguring the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=39.99733333333333) [application. It also turns out that](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=43.637666666666654) [hypervisors have a lot less overhead than](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=45.95776470588237) [they used to the past, so the performance](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=48.284235294117686) [head of using virtualization is typically](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=51.473499999999994) [very low now. The latest Intel and AMD](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=54.52849999999999) [processors have much better hardware](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=58.13676923076923) [virtualization support built into the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=60.21753846153847) [processor. And that needs to be enabled in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=62.43266666666667) [the bios before you get the benefit of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=64.77974999999999) [that. And it's very important that your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=66.90974999999999)[virtualization host has enough resources](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=69.93599999999996) [to run the workload. So you need to have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=72.23599999999993) [enough CPU, enough memory and enough IO](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=75.95292307692308) [capacity. Virtualization doesn't change](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=78.58061538461541) [the laws of physics, you still have to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=80.11314285714286) [have enough resources to run your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=82.79781818181817) [workload. And another thing to keep in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=84.51054545454542) [mind, is that all these virtual machines](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=86.54350000000004) [that you're running, were going to have to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=88.58225000000007) [have their own software licenses for the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=90.781) [operating system and for the applications](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=92.63600000000001) [and they also all have to be patched in](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=94.28885714285713) [terms of widows updates and application](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=96.81528571428566) [updates. So keep that in mind when you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=99.77933333333331) [starting to think about virtualization. It](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=102.39266666666667) [reduces the amount of work that's required](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=104.13666666666667) [but you still have to do some of the](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=105.96133333333333) [normal work you should do on a regular physical server.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=5&mode=live&start=109.786)

[Resources](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live)

[So here are some more resources to find](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=1.886) [more about the server hardware. First I've](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=4.6306153846153855) [got two blogs, my personal blog is at this](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=7.2829999999999995) [URL then my SQLskills blog is at that URL.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=11.499500000000003) [Next we have AnandTech which is a very](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=15.716) [good hardware review site that's been](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=18.310285714285715) [around for quite a few years now. It's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=20.256) [dot URL and AnandTech has a particular](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=23.178) [focus on IT-related hardware, server](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=25.845000000000002) [hardware in particular. Next, we have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=28.774571428571434) [Tom's Hardware and they have a lot of](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=31.501000000000005) [information about server hardware also and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=33.67433333333335) [they're at this URL. Next we have](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=36.212666666666664) [StorageReview which tends to focus on](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=39.1585) [storage devices as the name would attest.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=41.42349999999998) [And they're at that URL. And then finally,](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=44.066) [CPU world has a lot of news and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=47.198499999999996) [information about new and upcoming](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=50.3518333333333)[processors. So they're available at that URL.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=6&mode=live&start=52.833999999999996)

[Summary](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live)

[So what have we covered in this final](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=2.066) [module of the course? We talked about how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=4.579333333333335) [to make the business case for new](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=7.046000000000001) [hardware. It's very important that you](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=9.163500000000003) [gather metrics and benchmarks as you're](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=11.21215384615385) [doing this. I've found that executives are](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=13.30753846153847) [usually impressed by good research and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=16.521384615384616) [strong evidence. You also need to know how](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=19.539846153846145) [to get the best performance for the least](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=22.278000000000006) [cost. You need to know what components to](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=24.587333333333348) [spend your money on so you get the best](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=26.69599999999999) [performance for your workload. You also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=29.845999999999997) [need to be aware of software licensing](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=32.11666666666667) [cost as you choose your hardware. Bigger](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=34.53400000000002)[servers in terms of higher socket counts](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=37.09957142857143) [are usually slower that smaller servers.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=40.55457142857143) [You should be looking for opportunities](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=43.516) [for server consolidation because that's a](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=45.46171428571429) [good way to reduce your maintenance and](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=47.407428571428575) [operating cost. You also should look out](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=50.584571428571415) [for virtualization opportunities because](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=53.59599999999999) [that's another way to reduce your](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=55.195999999999984) [maintenance and operating cost. It also](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=57.51885714285714) [lets you provision new virtual machines](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=59.791999999999994) [very quickly which is one reason why IT Departments really like virtualization.](https://app.pluralsight.com/player?course=server-hardware&author=glenn-berry&name=server-hardware-m6-realworld&clip=7&mode=live&start=62.11999999999998)