

Adapting to the Growing Demand for Data

NVMe and the Future of SSD Technology





Contents

What is an SSD?	4
Earlier SSD Models: SAS and SATA	5
What is NVMe?	7
What makes NVMe Different?	8
NVMe vs SATA	10
Capabilities and Benefits of SSD Technology	11
What can NVMe do for Me and My Technology?	12
What can NVMe do for You?	14
Questions to Ask Before Upgrading to NVMe	15
Wondering if your Company needs NVMe?	16
Is My Server Compatible with NVMe?	17
The Future Developments of SSD Technology	18
Is NVMe the Future of SSD Technology?	19
What Brand of NVMe SSDs Techbuyer Recommends?	20
Our NVMe SSDs of Choice: KIOXIA and Ortal	21
Which SSD Should You Choose?	22
Impressed with NVMe?	23

Are you wondering if NVMe is the right choice for your business?

Perhaps you're trying to understand exactly what NVMe is, and what it can do for your IT system?

In this latest technology guide we talk you through exactly what NVMe is...

We will talk you through exactly what NVMe is and why it is becoming so popular in the IT industry, as well as discussing the future of SSD technology and how NVMe is helping to shape it.

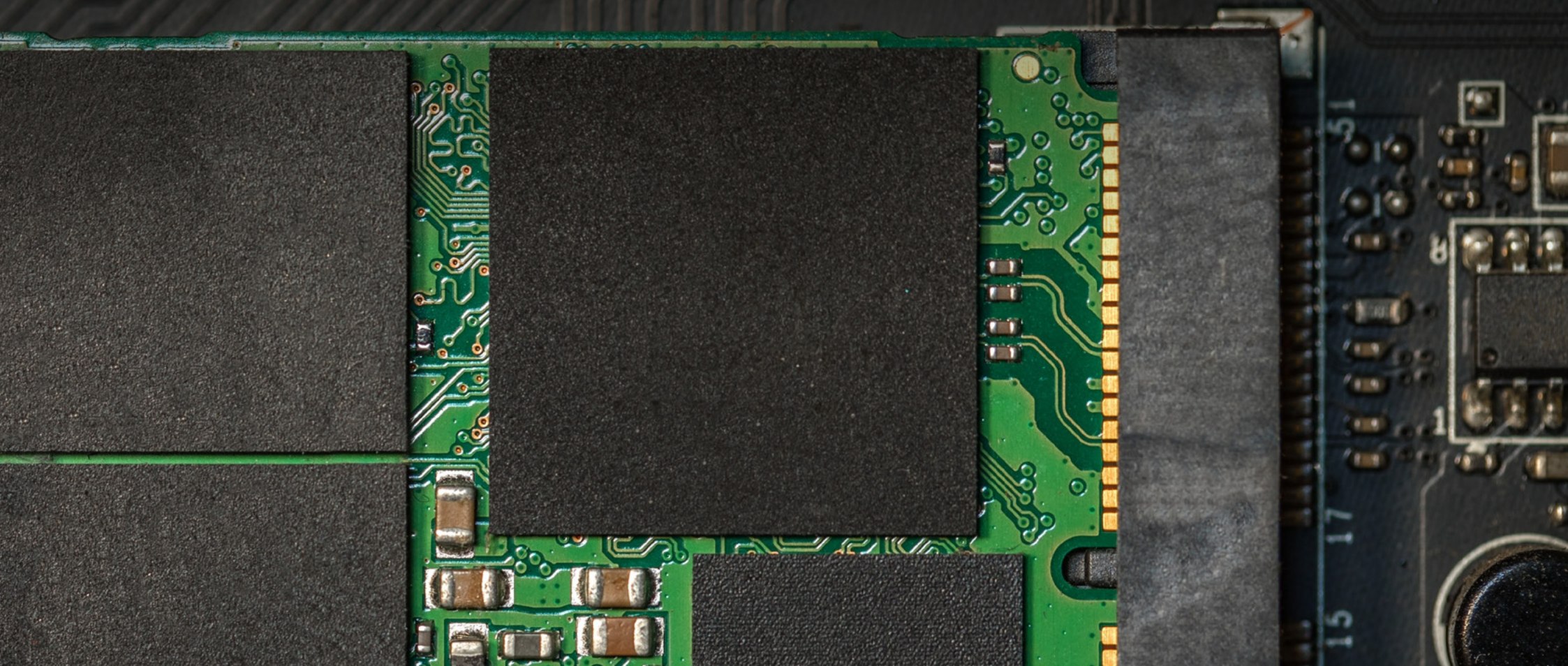
We will also cover what it is exactly that NVMe can bring to the table to boost the performance of your technology, as well as how to determine if your server or computer is compatible with NVMe SSDs.

But first, let's start with some explanations.



What is an SSD?

To understand what NVMe is and how it works, we must have an understanding of SSD technology.





An SSD (Solid State Drive) is a form of non-volatile memory that is capable of storing data even with a device switched off.

The SSD is where files, applications, data etc. are saved and stored to be accessed when and as you, or your device have a need for them. Unlike hard disk drives (HDD), SSDs have no moving parts, and instead rely on computer chips to store data and transfer information between the drive and the motherboard.

The lack of moving disks also means that SSDs are faster than HDD components, particularly for boot up speeds and read/ write operations. This is because SSDs make use of flash memory where data is stored on computer chips, rather than on mechanical spinning disks. HDDs can only transfer data as quickly as the disks are able to spin, meaning that there will also be a maximum speed. SSDs, in comparison, do not have this limitation.

Earlier SSD Models: SAS and SATA

Just as with other components and devices, SSD technology is continuously evolving. Solid State Drives originally made use of the PATA interface to transfer data between the drive and the motherboard. However, PATA was traditionally designed for HDD technology and so did not allow SSD components to reach their full potential.

Later editions of SSD changed the interface used by these storage components to be more suited to the newer technology being developed. Both SATA and SAS improved on the speed, efficiency and performance of PATA to allow for quicker data transfer rate between the storage drive and the motherboard. Both of these forms of SSD interface are incredibly popular and are used in enterprise grade and consumer-based devices around the world.



SAS



SATA



What is NVMe?

Now that you understand SSD technology, we can move on to what NVMe is and how it works.





The term NVMe stands for Non-Volatile Memory Express and refers to the way in which the storage drive communicates and transfers data with the motherboard.

Traditionally, storage drives (both HDD and SSD alike) utilise point-to-point serial protocol to transfer data between component and motherboard. This means that the connection is cabled. Previous SSD editions, such as SAS and SATA, make use of cables and ports to transfer data. However, NVMe storage drives plug directly into the motherboard resulting in a faster and more efficient data transfer rate.

NVMe technology was introduced in 2011 and utilises a more direct interface to transfer data. By making use of the PCIe ports in your server or computer to access up to 65,000 parallel command queues (compared to the single command queue of SATA or SAS), NVMe SSDs can transfer massive amounts of data simultaneously. Therefore, the NVMe interface can provide a significantly faster data transfer rate between your storage drive and CPU.

With so many command queues available to transfer data, it is easy to see just how much quicker NVMe is. A single trackway along a country road will never be able to transport as many vehicles as a six-lane motorway, no matter how quickly the cars travel! The same goes for data transfer, the more lanes available, and the more data that can travel simultaneously, the faster the data transfer rate.

NVMe was the buzzword of 2021 when it comes to storage drive technology. NVMe is becoming more and more popular as businesses and tech users around the world look for new ways to speed up the performance of their devices and IT systems. NVMe is often chosen above other, older SSD technologies due to the increased data transfer rate, enhanced reliability and impressive efficiency, which is becoming increasingly important in our day-to-day lives.

Did you know?

By 2025, it is believed that over 463 exabytes of data will be created every single day, the equivalent to around 212,765,957 DVDs.





PM991 NVMe 512GB
CT UJPPL0129DJP64
PN MZVLQ512HALU-000H1
MODEL MZ-VLQ5120
HP PN L65188-002
SN S4UHNFO361186
RATED DC+3.3V 1.6A
FW HPS4NFXV 2013
R-R-SEC-MZ-VLQ1T00
PRODUCT OF CHINA REV 0
EUI64 002538A301B8F3CB 2020.03
SAMSUNG SERVICE PO BOX 12987, DUBLIN, IRELAND
www.samsung.com/semiconductor
SAMSUNG ELECTRONICS CO

NVMe vs SATA

NVMe and SATA fundamentally do the same jobs; both options are used to connect a storage module to the motherboard of your PC or server. Their key differences lie in the way in which this connection is formed as previously discussed. The difference in method, however, results in varying speeds, capabilities and performance between the two options.

The data transfer rate of SATA technology is capped at 6Gb/s due to the single command queue available. This can cause bottlenecks for IT systems that require access to heavy-duty applications or large databases, such as machine-learning applications of AI software. However, SATA is the more widely accepted option in terms of compatibility and is accepted by the majority of motherboards. NVMe, in comparison, is only compatible with newer options of both computers and servers. This makes it difficult to integrate if you have a fully established server estate or IT system.

NVMe is an efficient choice for your computer or IT system. Because of the increased speed, and capabilities, NVMe drives are not required to work as hard as older SSD technologies, resulting in a more efficient device and less cooling. The core benefit to NVMe, however, is the enhanced speed and performance for your IT system. NVMe technology is currently up to ten times faster than SATA and so is capable of removing those bottlenecks from your system.

Capabilities and Benefits of SSD Technology

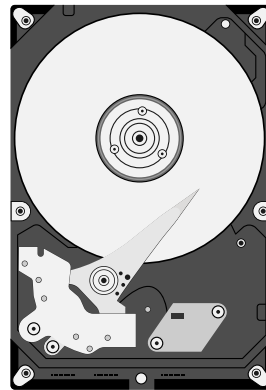
From a technical perspective, the more data your device can process, in a shorter amount of time, the better. An increased data transfer rate results in a more productive user-experience, a more efficient device and a reduction in bottlenecks for your IT system. In terms of storage drives, the increased data transfer rate enables quicker and more efficient access to your saved information. This is essential for most businesses, including finance, healthcare, education and software development.

Components that are capable of accessing and retrieving data quickly and effectively are of growing importance as the world's demand for information increases.

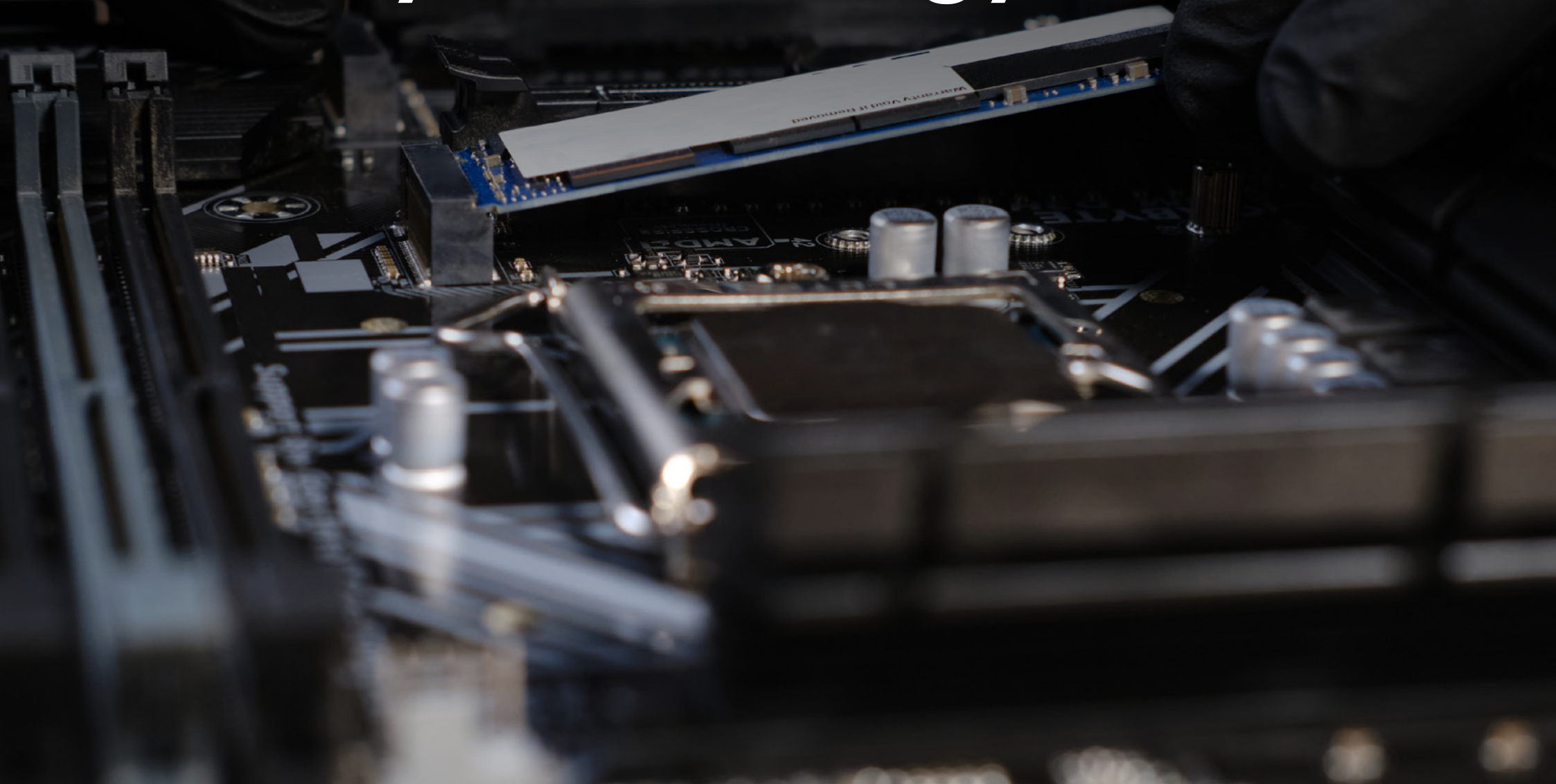
NVMe technology innovates SSD technology to allow swifter access to data. In terms of research and development, it is just the beginning for NVMe and the potential growth of this technology is yet unexplored. With that in mind, NVMe has the potential for future advancement and evolution, bolstering the belief that NVMe is the future of SSD technology.

Did you know?

[Research conducted by YouGov](#) discovered that slow computer speed costs the UK economy over £35 billion every year.



What can NVMe do for Me and My Technology?





Did you know?

[Pegasystems conducted research into the actions of employees.](#)

They found that, on average, employees switch between 35 applications at an astonishing 1,100 times on a daily basis. Even with a three second delay each time an employee switches between one task and another, this results in 3,300 seconds (about 55 minutes) wait over the course of the day for each employee.

NVMe is an essential component for businesses that need near-instant access to data for the effective running of their organisations. The finance sector is a fitting example of this; in many cases, the extra seconds it takes to execute orders or access data could result in a higher buy price or lower sell price for the stock market, potentially losing the company a lot of money. The more time taken in which the user interface transfers data between IT infrastructure, to enact commands, could result in a change of purchase or sale price for stocks or the loss of clients if data cannot be accessed quickly enough.

For example, organisations within the eCommerce, insurance and healthcare industries all require instant access to a client's saved information to maintain quality customer service.

AI and machine learning are reliant on field-programmable arrays, custom integrated circuits, and graphical processing units. Because of this the large bandwidth and low latency of NVMe SSDs are essential for the prevention of bottlenecks within these industries. The same can be said of any industry using applications that require extensive data transfer - but which also experience performance constraints with their technology. To reduce the frequency and impact of bottlenecks for any organisation's IT system, NVMe technology is important to consider.

What Can NVMe do for You?

The popularity of NVMe, and knowing how it could be of use to companies in general, means very little without understanding what NVMe can do for you and your business. In terms of business development and future-proofing your technology, NVMe is worth considering:



NVMe offers twice the performance of SATA drives

SATA data transfer rate is capped at 6Gb/s. In comparison, NVMe can transfer up to up to 15.8Gb/s. NVMe also demonstrates a faster IOPs speed through the use of the PCIe interface on your motherboard.



NVMe technology improves energy efficiency

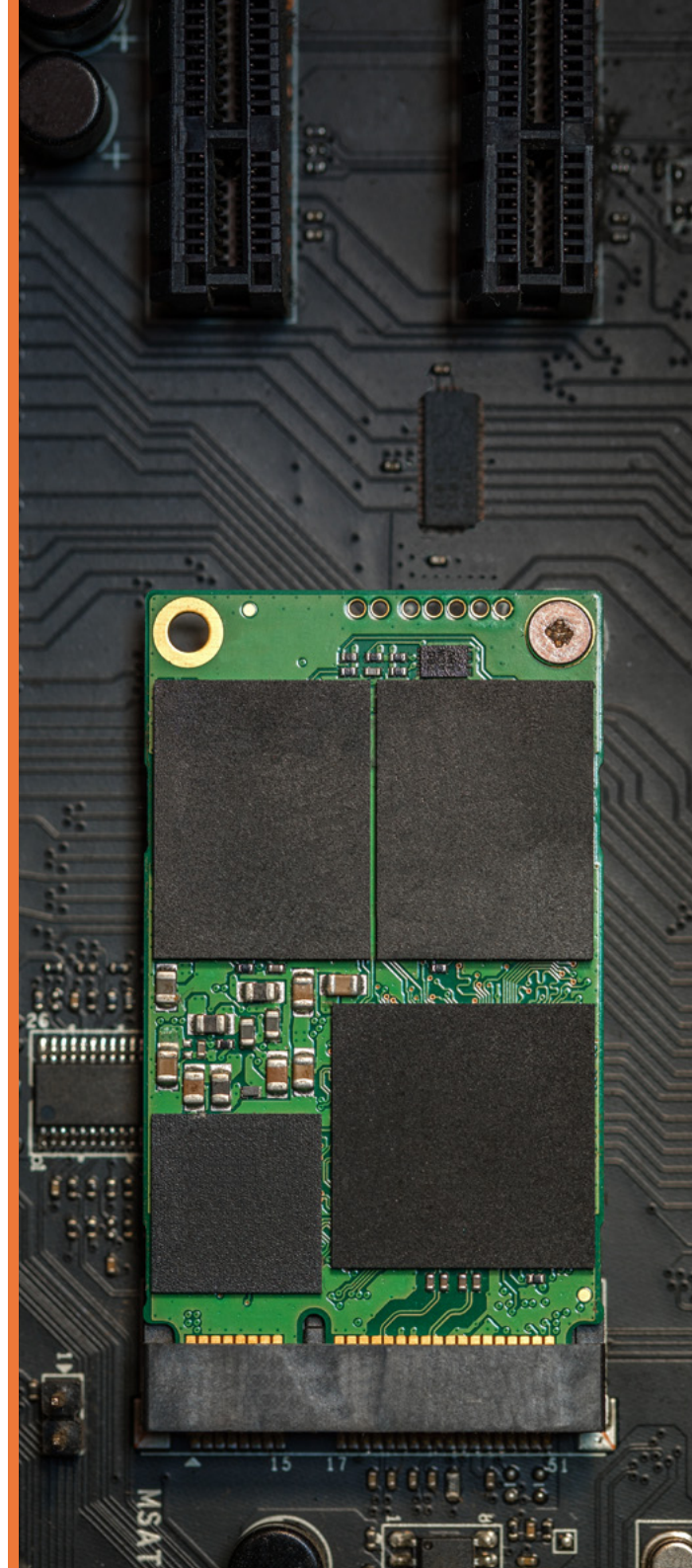
By increasing the SSD performance per watt, NVMe technology improves the energy efficiency of your device for a more productive server as a whole and a reduction in power requirements.



NVMe will become more prominent on the market

NVMe SSDs are just as easy to source as SATA or SAS drives and with the boosted performance and capabilities they offer, it is worth considering NVMe where possible. As the popularity of NVMe grows and more devices are made compatible with this form of component, we will see NVMe become more prominent on the market than older SSD interfaces.

Whether you are creating your IT system or upgrading your existing infrastructure, NVMe is worth the investment to enhance the performance of your technology. With current trends demonstrating a a rise in popularity for NVMe, this newer form of storage drive appears to be the future of SSD technology.



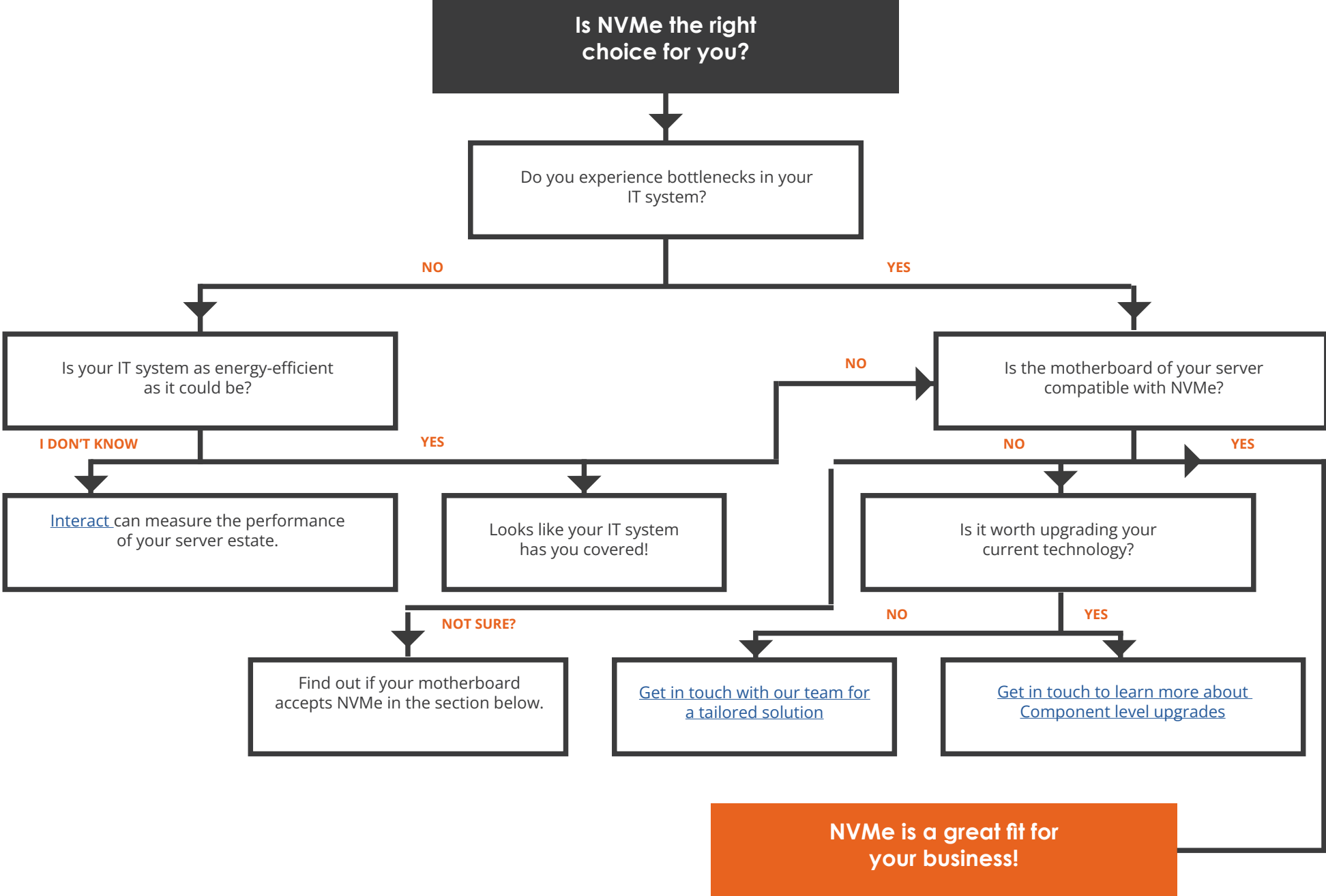
Questions to Ask Before Upgrading to NVMe



 **Orthal** CE FC RoHS 
ON-750-512 512GB NVMe 2280 SSD TLC
S/N:93006

5060674250

Wondering if Your Company needs NVMe?



Is My Server Compatible with NVMe?

The most important thing to check is the specs table of your motherboard. This document includes all the information you need in order to check compatibility for your technology.

When looking at your spec sheet, skip to the drive bay section which should look something like the following image:

Drive bays	Front drive bays: Up to 10 x 2.5" SAS/SATA (HDD/SSD) with up to 8 NVMe SSD max 76.8TB or up to 10 NVMe drives max 64TB, or up to 4 x 3.5" SAS/SATA HDD max 64TB Rear drive bays: Up to 2 x 2.5" SAS/SATA (HDD/SSD), NVMe SSD max 15.36TB Optional DVD-ROM, DVD+RW
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Within this section you need to be looking for phrases such as “up to 8 NVMe” or “NVMe SSD max”. As you can see from the image above, this motherboard includes the following phrase, “up to 8 NVMe SSD max 76.8TB.” With the inclusion of this statement, we know this motherboard supports NVMe technology up to 76.8TB of memory.

Terms such as PCIe or M.2 are also important to look out for on your specs sheet as they can often be used interchangeably or in conjunction with NVMe. However, do not take these terms at face value as older forms of SSD technology, such as SAS and SATA are also compatible with PCIe (3.0), and SATA SSDs can come in the M.2 form factor. The inclusion of these terms, when combined with NVMe, will point towards server compatibility.

If your server specs table explicitly states that it does not support NVMe/ PCIe/ M.2, the component will only be compatible with SATA or SAS storage drives. Furthermore, if your specs table makes no mention of these words within the storage section, it is safe to assume that your motherboard is not compatible with NVMe.



The Future Developments of SSD Technology



Is NVMe the Future of SSD Technology?

With such an increased capacity for data transfer, it is easy to see why many companies around the globe are turning to NVMe technology for their IT infrastructure.

It is predicted that by the end of 2023, over [91% of SSDs in data centres around the world will be NVMe drives](#). As it currently sits, there are [over 7.2 million data centres in the world](#). If each server had one SSD installed, this would mean potentially billions of SSDs installed in servers by the end of 2023.

The rise in popularity for NVMe, as well as the fact that SATA technology does not seem to be advancing in terms of speed, could result in the obsolescence of SATA technology as we know it.

We can already see a shift in manufacturers' mindsets towards NVMe technology. For example, [Apple's MacBook Pro 16' completely bypassed SATA technology in favour of NVMe storage](#). With large companies making the decision to step away from SATA, the growth of NVMe could mean the end for older technologies on a consumer, and even enterprise, level over the next decade.

The latest generation of servers from popular brands, (e.g., Dell, HPE and IBM) all accept both SATA and SAS as a form of storage drive, as well as NVMe. This means that the choice, in terms of data centre technology, remains with the user. So, with the changes in storage drive trends we are seeing in the market, NVMe is essential to consider for the efficiency and performance of your organisation's IT system.



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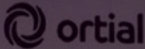

Curious what brand of NVMe SSDs Techbuyer recommends?

Ortal is our sister company, and it is a leading vendor of memory, storage and networking components. Ortal specialises in SSDs (including NVMe) and compared to traditional brands, Ortal has a fully compatible product range that offers significant cost savings. Its range of high quality, brand alternative solutions enables greater performance for significantly reduced levels of investment. Plus, Ortal products come with a full global warranty.

Ortal's globally supported NVMe SSDs are 100% compatible with the leading brands of desktops and laptops. Products undergo a rigorous quality testing process, carried out by experienced engineers, which ensures optimal reliability and performance at all times. With UK-based stock meaning quick delivery, consider Ortal for your next NVMe purchase!

Ortal began their gold partnership with KIOXIA, formerly Toshiba Memory, in 2021.

Our NVMe SSDs of choice: KIOXIA and Ortal

 **ortal** CE RoHS
0N-750-1TB 1TB NVMe 2280 SSD TLC
S/N:60743

5060634256148 1 TB 1.2A

Warranty void
if label removed

2114
SM223XT G AD
18P554 00
CN

Velocity

ADDITIONAL INFORMATION
MILITARY GRADE
CE

AD

Which SSD Should You Choose?

KIOXIA is a major global supplier of SSDs, memory products, and software solutions. According to Statista, KIOXIA is the second-largest manufacturer of NAND flash memory in the world, commanding 18.3% of this market. With customers from a diverse range of growing markets such as mobile, edge, cloud, data centre and automotive, KIOXIA's mission is to "uplift the world with memory".

Recently applauded for its invention of NAND flash memory in 1987, over the past three decades, Kioxia has been at the forefront of industry-leading research and development, including 3D flash memory and other patented technologies related to memory storage.

KIOXIA is working to cultivate a new era of memory with its innovative memory technology, whilst continuously innovating its product offering. Ortial's gold partnership with KIOXIA has allowed Ortial to add a range of market-leading data centre and enterprise SSDs to its product portfolio.

With demand now soaring for SSD (including NVMe) and RAM component upgrades, this key partnership with KIOXIA has helped Ortial to deliver innovative, quality components to a growing customer base. Through our relationship with Ortial, Techbuyer is an affiliated KIOXIA Gold Partner, which means we can offer our customers enterprise-class solid-state drives. There truly is life after SATA, and through our key partnerships with Ortial and KIOXIA who are building the future of SSD technology, you can rest assured that Techbuyer has your IT needs covered!



KIOXIA



 **ortial**





Impressed with NVMe?

Ready to take the next steps when it comes to NVMe? Techbuyer offers a range of solutions to upgrade your IT system or device to NVMe technology. Component level upgrades are a fantastic way to enhance the performance of your IT device without replacing or upgrading the entire unit. For a more advanced option, we offer a personalised NVMe server configuration service to create a bespoke option for your business.

Find out more about the NVMe options we offer and get in touch now on our website.