

Lenovo
ThinkStation



Spatial Computing

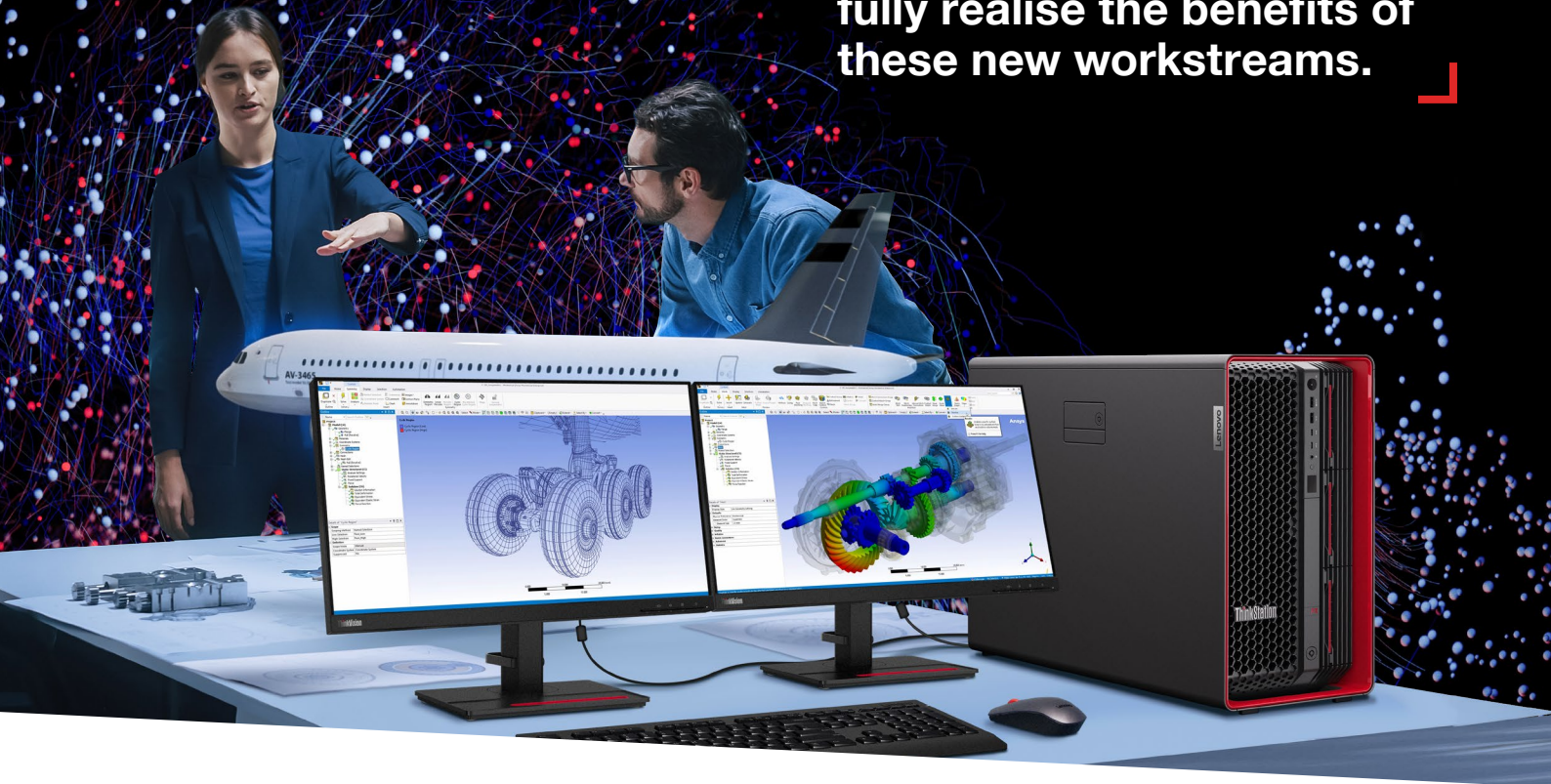
How workstations allow businesses to unlock the benefits & value of virtual & mixed reality through digital twins?



Smarter
technology
for all

Lenovo

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Organisations the world over are increasingly finding that they need to deploy cutting-edge technologies in new and innovative ways in order to survive and thrive in the digital age.

This is true of all industries, but particularly the media and entertainment, architecture, engineering and construction, automotive, healthcare, and energy sectors. Organisations operating in these industries are under pressure to maximise efficiency, facilitate collaboration across multiple locations, and engage with customers in more productive ways, all while ensuring that operations are as efficient and sustainable as possible.

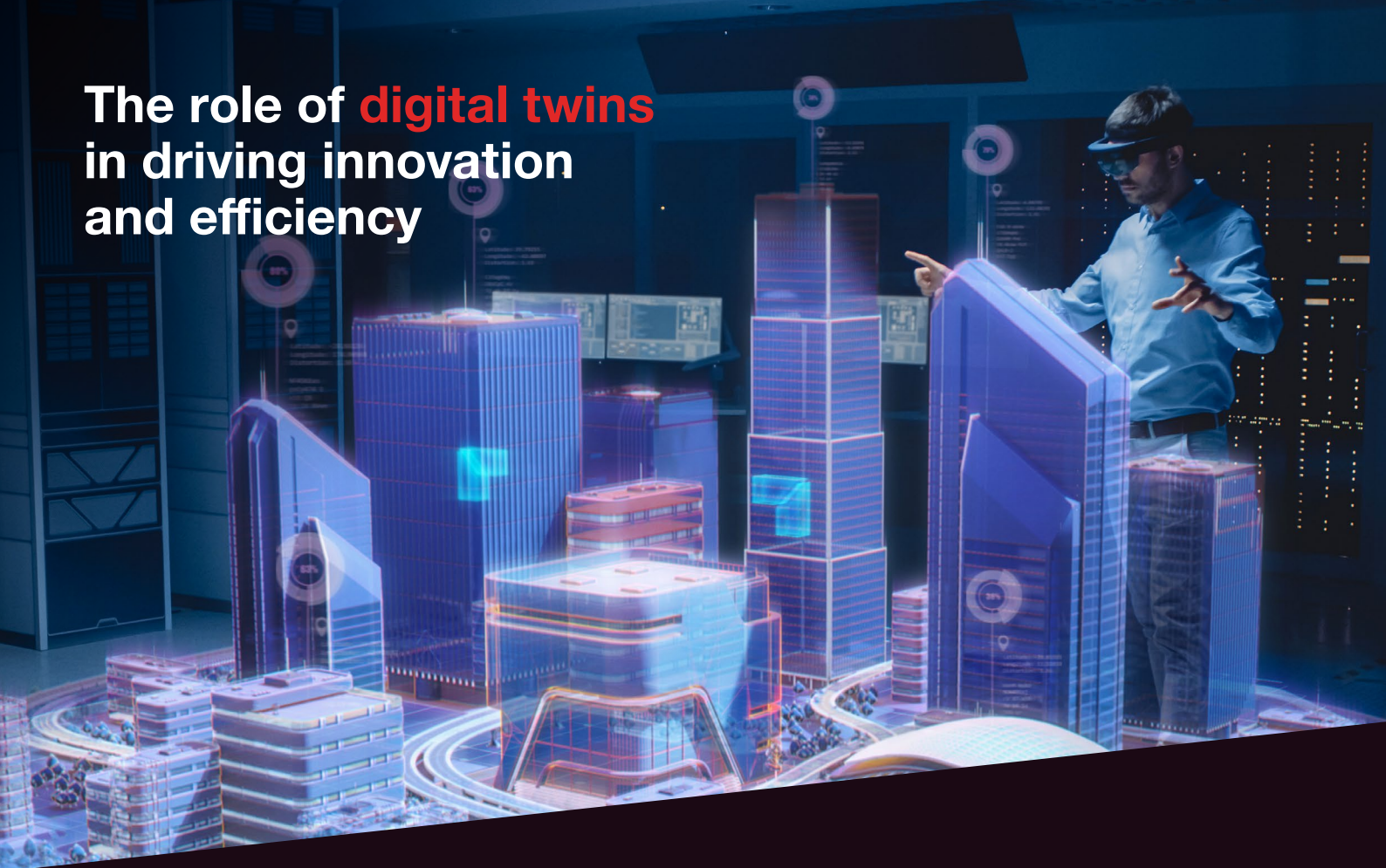
As we shall see in this article, virtual or augmented reality technologies and digital twins can help businesses rise above these challenges by opening up a host of exciting possibilities such as remote design and engineering collaboration, immersive customer experiences, interactive service training and maintenance, and much more. However, these technologies cannot run on traditional IT infrastructure and a new generation of high-performance computing power is needed, one that is beyond the capabilities of conventional desktop computers.

Companies seeking to stay competitive and future-ready will need to consider using workstation computers to fully realise the benefits of these new workstreams. These powerful computing platforms do not just meet but exceed the rigorous performance demands of 3D environment simulations and

digital twins, providing the processing power and performance required for real-time interaction, collaboration and immersion.

The growing demand among companies of all sizes for workstations that can deliver the computing power required to execute these new and heavy workloads has led Lenovo to create its most powerful workstation to date, the ThinkStation PX, offering a new era of desktside compute, with more cores, memory, graphics and expansion capabilities than what was previously deemed possible. The PX has been engineered to go where no other workstation has gone before, bridging the gap between workflows that typically start at the desktop and have to scale into the data centre and enabling professionals to improve and expand their workstreams with real-time interactions, simulations, visualisation, and more.

The role of **digital twins** in driving innovation and efficiency



Digital twins – virtual replicas of physical objects, systems, or environments – have been a mainstay of product design for a number of years, but today they also play a vital role in maintenance, construction, healthcare, transportation, and more.

These virtual replicas use past, present, and future data from a variety of sources, including performance logs, sensors, and machine learning algorithms to simulate the behaviour of real-world assets and systems. They can be used to predict when maintenance will be needed, thus reducing equipment downtime and improving efficiency, or test the impact of changes before implementing them in the real world, thereby reducing costs, or identify safety risks and simulate emergency scenarios.

Digital twins come in a variety of formats but, broadly speaking, there are three main categories:

- Product digital twins, which represent physical products and include information about their design, specifications, maintenance history, and operational data. They help in product development, maintenance, and optimisation.
- Process digital twins, which focus on modeling and simulating a specific process, such as manufacturing, supply chain, or industrial operations. They help in understanding process behavior, identifying inefficiencies, and optimising operations.
- System digital twins, which represent an entire system, such as a factory or a power plant. They are used to monitor and optimise the system's performance, identify inefficiencies, and design solutions to improve its physical counterpart.

Digital twins can also be consumed on a variety of devices, including desktops or laptops, 3D screens, augmented reality (AR)/virtual reality (VR) head-mounted displays (HMDs), mixed reality (MR) devices, and more.

A recent survey by Capgemini found that organisations using digital twins have seen a 15% improvement in key sales and operational metrics and an improvement of more than 25% in system performance on average. Moreover, the surveyed organisations reported an average 16% improvement in sustainability thanks to the technology.

According to Thomas Kaiser, SAP Senior Vice President of IoT, *“Digital twins are becoming a business imperative, covering the entire lifecycle of an asset or process and forming the foundation for connected products and services. Companies that fail to respond will be left behind.”*

More and more organisations are realising this. Those surveyed by Capgemini said they plan to increase digital twin deployment by 36% on average over the next five years.

A (Virtual) World of Possibilities

Spatial computing, the blending of physical and digital worlds via VR, AR, and MR, is increasingly being deployed in a variety of professional settings.

Product design is one area that has been radically reshaped by these technologies. Digital twins enable companies to create, simulate, and optimise products in a virtual environment before they are physically manufactured, thereby unlocking numerous advantages, ranging from faster development cycles to reduced costs and enhanced product quality.

For example, KIA Motors uses Varjo's MR devices integrated with Autodesk VRED to allow employees to collaborate virtually on car designs from any location in the world. Similarly, Lenovo created a photo-realistic digital twin of the ThinkStation PX in order to facilitate remote collaboration and save time, money, and resources in the design process. The PX digital twin also serves as a fully interactive sales tool that Lenovo representatives can use to demonstrate the product in lieu of a physical unit.

Beyond product design, companies are using spatial computing technologies to create immersive and realistic training simulations for employees, such as safety drills, equipment operation demonstrations, and customer service scenarios. This helps employees gain practical experience in a controlled environment, reducing the risk of accidents or mistakes.

VR and AR also allow companies to enhance the customer experience by providing interactive and immersive experiences, personalisation, virtual customer service, virtual try-on, and product visualisation. This allows customers to engage with products and services in a more memorable and enjoyable way, make informed purchasing decisions, and access personalised assistance and support.

Advances in VR and AR technology have led to much talk about the metaverse, a hypothetical virtual world where users can interact with each other and digital entities in a fully immersive and interconnected

environment. While the metaverse doesn't yet exist in the strictest sense, elements of it are coming to life and companies are increasingly exploring the possibilities it offers. According to a recent PwC US Metaverse Survey, 67% of business executives are actively engaging with it, either by building proofs of concept, implementing use cases, or generating revenue from transactions.

The survey found that 36% of businesses intend to use the metaverse to enhance interactions between employees; 42% plan to use it for employee onboarding and training; and 36% plan to use it to create virtual content for customers to interact with.

In line with these trends, 51% of companies are either in the process of integrating VR into strategy or have already built VR into at least one dedicated line of business, PwC said.

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The need for greater computing power

Professional VR, the metaverse, and digital twins are now key C-suite discussions across all industries, and multi-user, collaborative workstreams with an immersive element will soon become commonplace.

However, these tools use increasingly large and complex datasets and thus require more powerful processors, faster memory, and more input/output than conventional desktop computers provide.

Some organisations looking to leverage spatial computing choose to invest in servers that can handle heavy workloads, but this solution, whether purchased outright or accessed through the cloud, tends to be excessively expensive, inflexible at scale and slow compared with local workstations. Thus,

these organisations will need to augment their on- and off-prem compute resources, including cloud-based resources, with high-performance workstations at the edge. These machines provide the computing power needed for creating digital twins which can then be consumed on other devices as needs dictate.

Lenovo ThinkStations are uniquely suited to this job as they support the highest core count and largest memory capacity of any workstation on the market and offer more input/output and greater flexibility. They also support up to nine graphics processing units (GPUs) or four double-wide GPUs, as well as Peripheral Component Interconnect Express (PCIe) Gen 5, four terabytes of memory, and redundant power supply units (PSUs).

With many business processes evolving and the likes of digital twins fast becoming table stakes for many organisations, Lenovo has engineered the P Series ThinkStations to enhance the efficiency and flexibility of these new tools and complex workloads, allowing customers to scale with ease.



How Aston Martin is using VR to advance its business

Aston Martin, co-designer of the ThinkStation chassis, has been using VR and mixed reality technologies to connect with customers and streamline business processes for a number of years now. Since 2016, customers have been able to visualise the company's cars via a VR-enabled experience and experiment with different colours, trim levels, and other customisations before making a purchase.

The carmaker has found VR to be particularly useful throughout the pandemic since it allows customers to choose a car and personalise it without having to visit a dealership in person. The company is also looking at how it can be used to

allow designers to collaborate remotely with just as much effectiveness as if they were in the studio together.

Looking ahead, Aston Martin plans to expand its use of VR and extended reality (XR) technologies, harnessing the computing power of Lenovo workstations. It is exploring the possibility of training its dealers and familiarising them with its vehicles using VR, thereby eliminating the need for having a physical car onsite. In addition, it is looking at using these technologies to allow design teams to iterate more quickly without having to create costly models and to provide more immersive customer experiences.

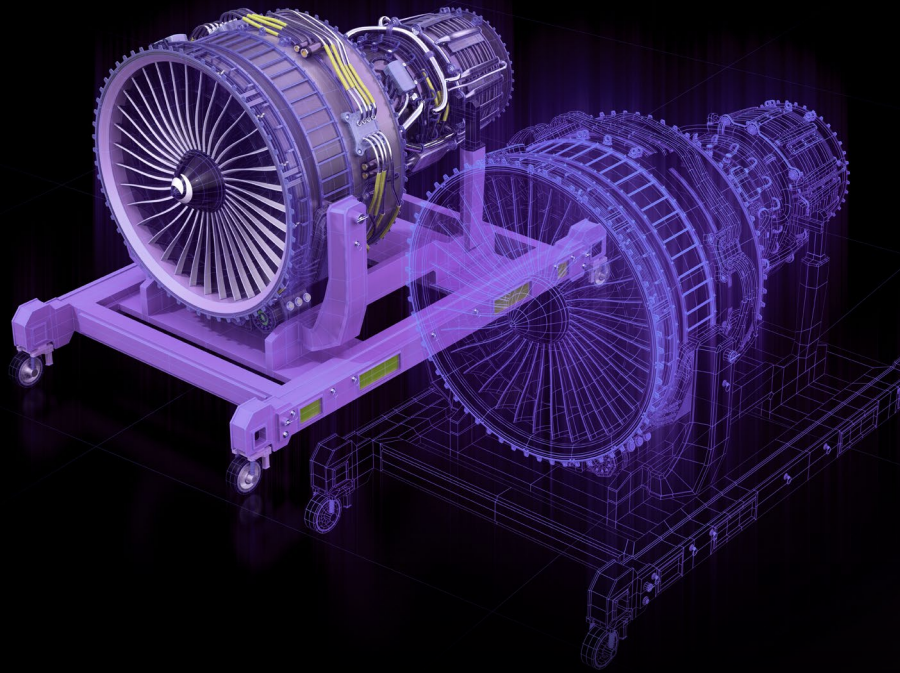
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How Lenovo Workstations are the foundation for creating and deploying Digital Twins

With the growth of collaborative tools, photo-realistic real-time visualisation, and now generative AI, many industries are increasingly creating digital twins of products, factories, and even smart cities. Lenovo's portfolio of high-performance ThinkStation workstations are the foundational building blocks for creating these advanced models. Workstations like the ThinkStation PX, powered by Intel's fastest and most powerful Xeon CPUs are capable of supporting up to four high-end professional GPUs to deliver the ultimate digital twin creation platform.

According to Rob Herman, Vice President and General Manager, Lenovo Workstations, *"These new virtual worlds, built with the power of ThinkStation Workstations will deliver a new level of workflow efficiency with real-time collaboration opportunities that unleash unprecedented global creativity across all industries."*



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Conclusion

The role of workstations in the modern enterprise is more important than ever before. With the rise of digital twins and the increasing use of VR and AR in professional settings, workstations provide the processing power and advanced capabilities necessary to support these complex and demanding applications.

Workstations also offer greater reliability, security, and scalability compared to consumer-grade personal computers, making them an ideal choice for businesses of all sizes. As enterprises continue to embrace new technologies and demand greater performance from

their computing systems, workstations will remain an essential tool for driving innovation and achieving success in the digital age.

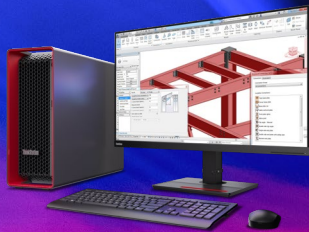
Whether you're creating digital twins of real-world objects or leveraging VR and AR to enhance your workflows, workstations are the key to unlocking the full potential of these powerful tools and related tech like generative artificial intelligence.

To find out how Lenovo ThinkStations, accelerated by Intel Xeon processors, can help you realise your vision and drive greater performance, check out our website.

ThinkStation PX



ThinkStation P7



ThinkStation P5



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