IMPORTANCE OF WORKSTATION SYSTEM DESIGN IN MANUFACTURING

White Paper

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In manufacturing today, technology drives competitive advantage by fostering innovation, productivity and cost-efficiency. In the face of increasingly tough global competition, technology is the manufacturer's avenue for shortening time-to-market; improving production efficiency; developing new products, and much more.

Within that environment, Workstations are the critical link between highly-skilled workers and the critical tasks they perform. The right Workstation enables workers to leverage their skills and expertise to address any key manufacturing challenge or opportunity.

MISSION-CRITICAL MANUFACTURING ACTIVITIES RELY ON WORKSTATIONS

The right workstation is key to effective implementation of virtually every manufacturing activity. For example:

Digital Manufacturing

Such as large-scale 3D printing requires high-end computing power to quickly render simple sketches into 3D models.

Production Engineering

Requires workstations with high performance that enable engineers to work on models that are typically large and have many different data points.

Industrial Engineering

Relies on powerful, reliable workstations for designing efficient new processes and systems.

Computer-Aided Design (CAD)

Needs high-performance, ISV-certified workstations to render models and diagrams using complex professional applications.

Computer-Aided Manufacturing (CAM)

Calls for workstations with exceptional reliability since minimum downtime is key to production efficiency.

Computer-Integrated Manufacturing (CIM)

Also relies on high reliability because a problem with a workstation can delay an entire manufacturing line. Standards support is also key so CIM workstations can integrate with a variety of other machines.

Computer Numerical Controlled (CNC)

Workstations which translate CAD designs into numerical coordinates for tools like lathes, must be highly reliable and efficient to operate on shop floors in warm temperatures.

Industrial Packaging and Labelling

Requires powerful workstations able to render complex designs, but also high reliability because if they go down, so does production.

WORKSTATIONS MUST SUPPORT AGILITY TO MATCH THE SPEED OF MANUFACTURING

Customer needs are evolving faster than ever before. Markets and products seemingly change month-to-month, or even minute-to-minute in the case of operations like mass customization or 3D printing. For today's manufacturers, agility is a business imperative.

Profit margins can hinge on even the smallest hiccup in a manufacturing process. So workstation performance and reliability is mission critical, as is the ability to easily upgrade, reconfigure and expand them to match business evolution and growth.

When buying new workstations, manufacturers must be able to wring optimum performance from every workstation component. They need to consider factors such as memory expansion, graphics card upgradability, additional storage and ISV certification to ensure they can meet both existing and future needs - all this with a critical eye on budgets and cost-efficiency.

IT'S NOT ALL ABOUT THE SPECS ... CONSIDER WORKSTATION DESIGN TOO

When looking for new workstations, it's easy for companies to make the mistake of focusing too closely on the hardware specifications. Engineers and designers typically want the latest CPU, the most powerful GPU, and as many gigabytes of high-performance memory as they can fit in a machine. Speed and power are certainly important considerations factors in assessing the overall performance of a workstation, but they don't tell the whole story.
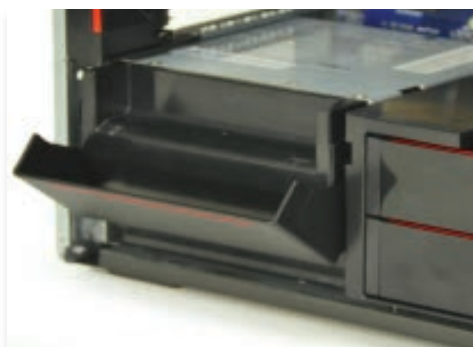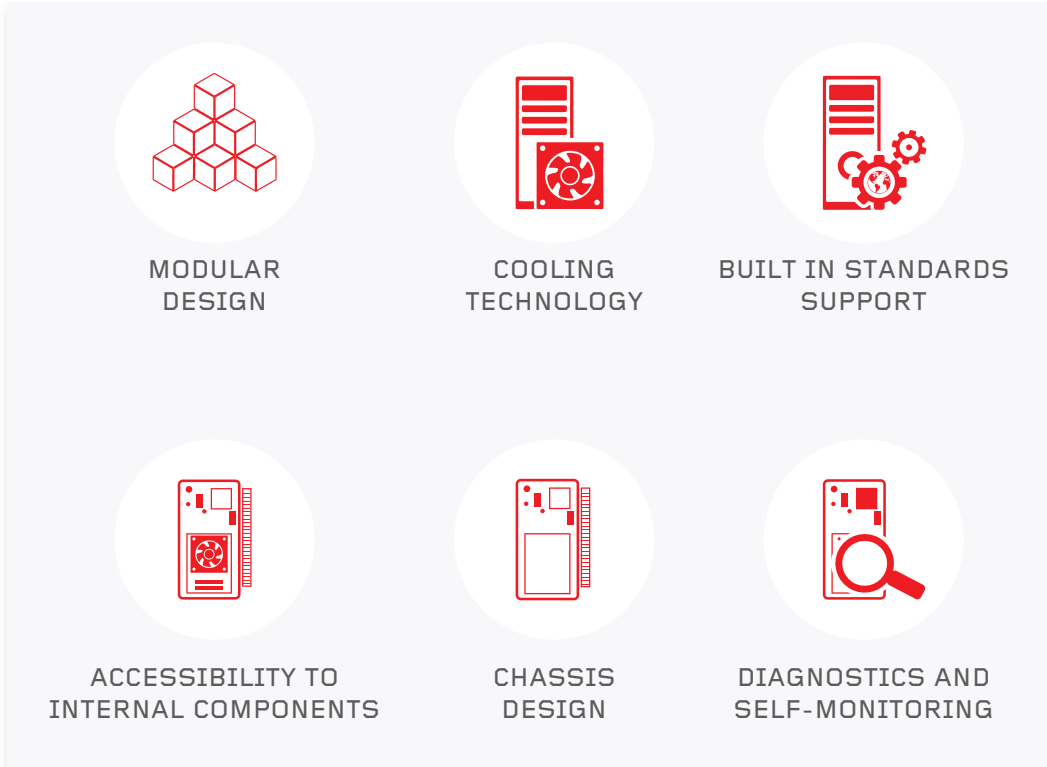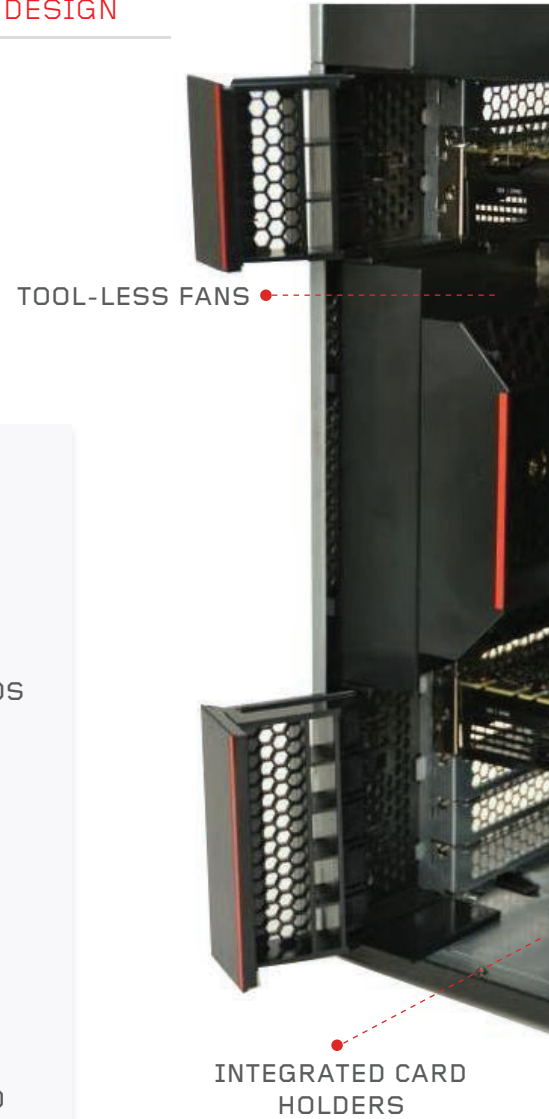
It takes the right workstation design to wring optimum performance from whatever specifications define your

workstations. An architecture that provides excellent cooling, plentiful slots for memory and peripherals, accessible interior layout, and solid build quality is every bit as important to overall workstation performance as the speeds and feeds.

For example, a well-designed workstation is easier to cool and simpler to upgrade, ultimately making it a more cost-effective solution than a machine with high-end components, but a poorly thought-out architecture.

UNDERSTANDING THE FUNDAMENTALS OF ROBUST WORKSTATION DESIGN

Workstation performance in a manufacturing environment is determined by the sum of many factors, not the least of which is good design. A well-designed workstation not only maximizes the performance of all the components, but it also makes it easier to maintain, re-configure, and upgrade. It is important to understand why and how design issues can impact workstation performance.

TOOL-LESS FANS

MODULAR DESIGN

COOLING TECHNOLOGY

BUILT IN STANDARDS SUPPORT

ACCESSIBILITY TO INTERNAL COMPONENTS

CHASSIS DESIGN

DIAGNOSTICS AND SELF-MONITORING

INTEGRATED CARD HOLDERS

TOOL-LESS PSU

BLIND CONNECT HDDS

INTERCHANGEABLE FANS

Cooling technology

Cooling is often overlooked when assessing a workstation, but it is an absolutely critical consideration. A workstation that overheats simply won't function properly; and one that runs at consistently high temperatures will become unreliable and have a short lifespan. Some workstations try to get around the cooling issue by adding more fans, but this brute force approach has only minimal effect if the interior design of the workstation impedes free airflow. Lenovo's ThinkStation P Series workstations use patented Tri-Channel cooling that enables optimal airflow. Plus, a purpose-built air baffle directs cooling air to the components that need it most, while warm air is forced out of the back of the machine without touching any heat-sensitive parts.
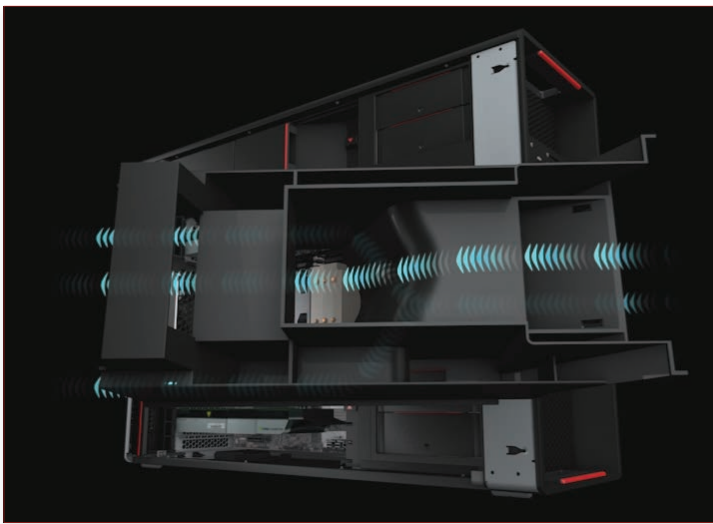
Built-in standards support

The best workstations support not only current standards, but emerging ones as well. For example, DDR4 RAM, which supports higher clock speeds than commonly-used DDR3 RAM, is just beginning to emerge. Intel is also readying its third generation of Xeon E5 processors, which support up to 12 CPU cores. Manufacturers running demanding applications such as CAD should look at workstations like Lenovo ThinkStation P Series which support emerging standards like the latest memory and processor products.
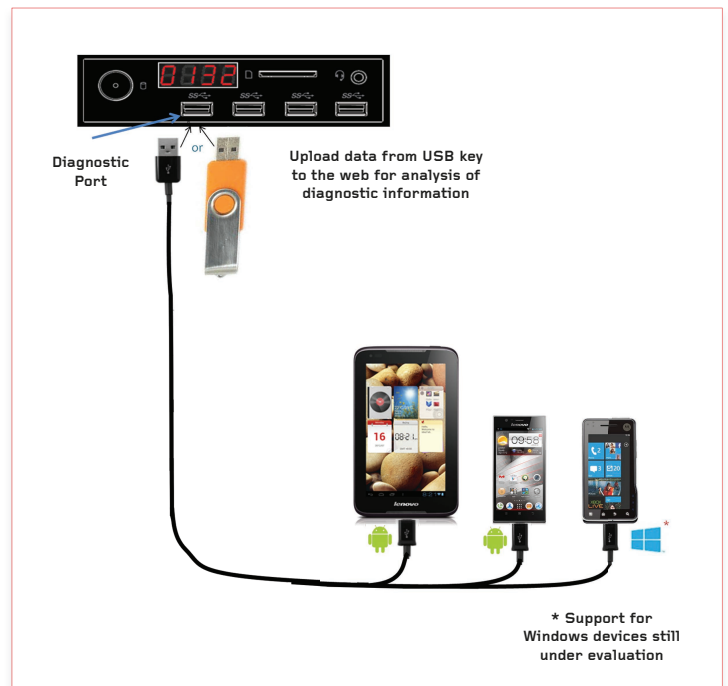
Accessibility to internal components

Easy access to internal workstation components may not sound like an important consideration … until it's time to open one up to replace or upgrade a component, or troubleshoot an issue. Difficult-to-access parts not only take longer to replace, but damage can result if a tool slips. Manufacturers should look for workstations like the ThinkStation P Series that feature convenient tool-less access.

Chassis Design

A durable, well-designed chassis, such as that of the ThinkStation P Series, uses no cables or plugs – all the components slide conveniently into their assigned slots. Dual-wall design makes the P Series exceptionally rigid, and it also features intuitive red touch points that tell users where each component is located, and guides them through upgrades and servicing. The result … exceptionally high reliability.

Diagnostics and self-monitoring

To maximize uptime, a professional workstation needs excellent diagnostics so users can monitor its performance and take immediate action in case of an issue. Lenovo's ThinkStation P Series workstations have an integrated diagnostics port so users can plug in an Android-based smartphone or tablet to perform system analysis using the ThinkStation app. Users can also download diagnostic information directly to a USB storage device, then transfer the information directly to the dedicated ThinkStation diagnostics web page.

Diagnostic Port

or

Upload data from USB key to the web for analysis of diagnostic information

* Support for Windows devices still under evaluation

THINKSTATION P SERIES: RIGHT FOR MANUFACTURING

How do you define a breakthrough? It's about doing things differently, to achieve what's never been done before. That's why Lenovo designed the new ThinkStation P Series, to go beyond simple hardware specifications with an architecture that shatters the limits of workstation functionality and flexibility in manufacturing environments.

Lenovo's ThinkStation P Series was designed from the ground up as a professional workstation. Powerful with the latest Intel Xeon processors, they feature up to 16 memory slots and support up to 14 storage devices and up to three NVIDIA Quadro graphics cards. P Series workstations are fully ISV-certified and support virtually all popular professional applications such as SOLIDWORKS and PTC.

The intelligent design of P Series workstations makes them totally configurable and upgradeable to suit any manufacturing purpose or environment. Lenovo employed a unique CAD system in developing the P Series to test hypotheses around user needs, and design the ideal combination of form and function. The result has been innovations like superior air flow and cooling architecture to ensure maximum reliability, even under the heaviest workloads. And its robust chassis, with a double steel wall design, protects against unexpected bumps or movements.

Perhaps best of all from a user perspective, the P Series is simple to manage and upgrade. Its modular design with convenient tool-less access makes servicing as easy as sliding a module out sliding a new one in. The red touch points guide users to exactly where modules should go, and how to install them correctly.

When considering a workstation upgrade or new purchase, manufacturing companies should consider pure performance, but also much more – innovative design, high reliability, easy, convenient servicing, and cost-effectiveness are just as important.

Leading your industry demands the best performance. That's why the best strategy is to invest in workstations like Lenovo P Series, that will provide superior performance now, and well into the future.