GEARING UP
TECHNOLOGY AND THE FUTURE OF MANUFACTURING

Lenovo ThinkStations and servers, powered by Intel® Xeon® processors.

Call 1-855-253-6686 to speak to a representative about the future of manufacturing technology.
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Emerging technologies are now integral to the manufacturing sector and are set to become even more significantly intertwined in the future.

With each new year, comes a new baseline for technology integration in manufacturing. Making the right choices on infrastructure and devices will help your distributed manufacturing enterprise optimize productivity, reduce operational costs and improve customer experiences.

As a leading global manufacturer ourselves, Lenovo understands from experience how smart use of technology can aid the manufacturing process. Using smart analytics tools, implementing efficiencies in your processes and empowering your workforce with in-hand, near-time information could allow your business to be more agile and effective in a rapidly developing landscape.

HELPING YOU ADAPT TO CONSUMER NEEDS

The manufacturing sector is highly competitive, and sometimes a small advantage can make all the difference. Customer expectations shift quickly as the world adopts new technologies and it could be that predictive analytics, integrated planning and superior product quality are ultimately what sets you apart from the rest.

In the ebook, understand how technology can drive your growth through customer data and insights, optimizing production and enhancing efficiency in the logistics chain.
1. Gain better insights

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RESPONSIVE, REAL TIME CONNECTED ENTERPRISE

The need for innovation in the manufacturing industry has put IT in the spotlight. How you adapt to new trends and demands will determine your success.

Today, the use of data drives growth. We are stepping into an era of digitally executed manufacturing, where data provides the agility required to adapt to changing market dynamics. With big-data comes a whole new ecosystem, comprising analytics, integration and implementation, which helps you garner better insights faster and put them to work in your processes more quickly. This level of agility and responsiveness will become more and more critical, with production even automatically adjusted in line with data-driven insights to gain the crucial edge over the competition.

STAY PROACTIVE: SUPPLY CHAIN RISK MANAGEMENT

With the right technology, you can identify optimal suppliers and enable easier collaboration across the supply chain. You can monitor risks real time, allowing you to react to mitigate them more easily.

NO MORE GROWING PAINS: CLOUD-CONNECTED PLANTS

Cloud-based access to enterprise applications and technology now means that you can scale your IT infrastructure to a new plant or distribution hub by

BY 2018, INVESTMENTS THAT ENABLE DIGITALLY EXECUTED MANUFACTURING WILL INCREASE BY 50%.

Fast and reliable, Lenovo ThinkStations and servers are powered by Intel® Xeon® processors.
simply changing settings. This means no complex on-site implementations that stretch over months, and even expanding to a new presence in an emerging economy can be as easy as plug-and-play.

GET DATA DELIVERED TO YOU: ENTERPRISE MOBILITY

Informed manufacturing workflows are made real by mobility. Critical information can be delivered via devices to your workforce across design, production, sales and delivery, providing clear process visibility and operational intelligence wherever they are.

STORE MORE, EXPLORE MORE: MANUFACTURERS AND BIG DATA

Breakthrough innovations can be inspired by insights mined from large amounts of data. With on-demand cloud storage and computational power, you needn’t discard data just because your internal infrastructure doesn’t have the capacity to store or process it.

“Emerging technology trends in mobility, cloud and big data can add value to your enterprise by helping your manufacturing operations become smarter and more efficient.”

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BUSINESS INSIGHTS REQUIRE POWERFUL DATA INFRASTRUCTURE

Data volumes in business are becoming exponentially larger every year. Digitally executed manufacturing is today's reality – do you have the systems in place to help you adapt to this new landscape?

Manufacturing battles will be won and lost by adapting to fluctuating demand while maintaining design and production excellence. Data integration, scaled through your organisation across key functions and processes, could be key to your success.

With the acquisition of System x, IBM’s industry-defining server infrastructure, Lenovo is now able to provide you with solutions that enable you to take a holistic approach to improving the production cycle. This includes:

- Establishing a scalable, reliable data infrastructure
- Deploying strategies for increased mobility, accumulation and analysis of data
- Empowering in-house engineering systems with greater innovation to leverage data

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ANALYTICS SOLUTIONS

Manufacturers are witnessing a huge inflow of data from both internal and external sources.

Data is being gathered from many sources in the manufacturing process, across the value chain and even from unstructured sources such as social media.

GAINING INTELLIGENCE THROUGH ANALYTICS

Though big data and analytics enables you in theory to better understand your customers and their needs, actually making intelligent, timely decisions and adapting to trends means managing and leveraging huge amounts of data. Your IT infrastructure also needs to support a comprehensive enterprise network including suppliers, factories, warehouses, logistics service providers and customers to gather data, process it, derive insights then act quickly based on the learnings.

MAKE BETTER DECISIONS WITH BUSINESS INSIGHTS

With more effective business processes and technologies in place, manufacturers are more likely to gain the benefits of analytics and enhance operational intelligence. Lenovo integrated solutions enable you to keep abreast of the latest market developments and move quickly with demands and trends. We ensure that the investment you make helps you gain better insights, and even make predictions, to reduce downtime and increase efficiency.

IN 2015, 65% OF COMPANIES WITH MORE THAN 10 PLANTS WILL ENABLE THE FACTORY FLOOR TO MAKE BETTER DECISIONS THROUGH INVESTMENTS IN OPERATIONAL INTELLIGENCE.

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LOGISTICS VISIBILITY

Mobility is becoming increasingly crucial to enabling efficient operations management.

Enabling better visibility and data integration on the shop floor, across inventory, warehouse and transportation networks can help to simplify processes and reduce complexity around picking, shipping and receiving inventory.

“\textit{The right technology can deliver end-to-end visibility, helping to reduce time to market and minimizing the total cost of logistics}”

**MOBILITY ENABLES BETTER BUSINESS ACROSS MANUFACTURING AND DISTRIBUTION**

As it improves upstream operations, mobility can also play a role in supply chain collaboration and even B2B integration.

Equipping warehousing and logistics personnel with connected mobile devices with sufficient capability to handle data streams, such as tablets, gives them access to data with the immediacy required to effectively manage the distribution network.

This is an essential step in setting up micro-logistics networks to meet the unique needs of individual customers and respond quickly to any potential disruption.
2. Integrating departments

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SEAMLESS COLLABORATION

Successfully integrating data from various sources and providing easy access to it is key to enabling seamless planning across the organization.

In order to do that, you need entire systems – from cloud and analytics to networking and hardware – to be working seamlessly and in sync. A combination of connectivity and on-ground visibility helps develop solutions that customers really need.

Not surprisingly, IDC finds that 75% of manufacturers are investing in customer-facing technologies.

BUILDING THE RIGHT INFRASTRUCTURE

As you seek constant improvement in all aspects of your operations, there are specific areas of focus that can drive tangible results:

- **Insights**: Data sourcing, analysis and integration are all essential to effective planning
- **Centralization**: Information can be located in many systems, sometimes outside the company
- **Networks**: Both internal and external networks need to be efficient and well supported
- **Data management**: Solutions must be economical, fast and scalable

By 2016, 30% manufacturers will invest substantially in increasing visibility and analysis of information processes, within the company and with partners.
INTERDEPARTMENTAL PLANNING

INTERCONNECTED INFRASTRUCTURE ENCOURAGES CONSTANT INNOVATION

As manufacturers, we understand the importance of economical, fast and scalable management solutions; solutions that help you manage and integrate data from different networks to improve the production cycle and product quality.

Be it cutting-edge hardware or software solutions, Lenovo offers you systems that are secure and customizable, enabling a seamless collaboration between internal functions, as well as support external networks.

TOOLS TO ENABLE YOU AT EVERY STEP

Lenovo has always provided the most reliable and innovative workstations and servers. Now, with the acquisition of System x, we can help you establish a comprehensive data center, with powerful, best-in-class architecture and engineering instantly at your disposal.

Reshape supply chains and rethink product strategies to accommodate market growth and trends without having to change your IT infrastructure.

Support and manage separate heterogeneous environments with ease and scale up or down according to your needs using the industry’s leading technology solutions.

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CLOUD-ENABLED INTEGRATION

There’s been a huge surge both in the growth of cloud-based services in the industry and commensurate reliance by internal and external stakeholders on capabilities in the cloud.

KEEPING UP WITH THE CLOUD PHENOMENON

It’s imperative that IT managers constantly monitor emerging digital trends and evaluate any potential impact on their market sector, whether it affects quality, compliance or service delivery. Concurrently, consideration must be given to software upgrades, hardware maintenance, deployment and ease of use while also managing the total cost of infrastructure and its ongoing management.

“Scalable storage and services make the cloud an ideal destination for your data – especially if you’re experiencing rapid growth.”
WHAT CLOUD COULD DO FOR YOUR COMPANY

Manufacturers like us are looking at cloud as the way of the future for several different reasons. Cloud computing transfers the responsibility for running on-premises hardware and software out to the Internet, allowing external service providers to handle the burden that would otherwise stress IT departments.

Now, IT managers can simply click a few menu selections to access computing power from the cloud whenever manufacturing operations require additional resources or to accommodate new software modules.

INTEGRATED ARCHITECTURE TO ENHANCE EFFICIENCY

Operational efficiency is further enhanced by Lenovo Solutions. Our servers are affordably scalable and ready for industry Clouds, analytics, and data management. We also make management easy with features like at-a-glance-monitoring and intelligent diagnostics, providing a foundation for more demanding applications. The result is architecture that allows for growth without increasing costs or complications.

“The cloud can reduce the strain on IT by limiting commitment to physical infrastructure which requires regular updates and hands-on maintenance.”

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SYSTEM X: EXPERT INTEGRATED SYSTEMS

System x technology is an ideal foundation for a manageable infrastructure that can grow with your business without breaking the bank.

The industry’s top performer in high-end x86 servers according to standard benchmarks, System x delivers high performance for:

- Big data
- Analytics
- Cloud computing
- Database
- ERP workloads

THE SYSTEM X ADVANTAGE:

- 100% faster compute performance to accelerate decision-making while decreasing costs
- 3 times more memory capacity for increased application/VM performance
- 50% more flash storage capacity with IBM eXFlash DIMMs
- 3 times lower latency for significantly faster database performance

“System x delivers revolutionary levels of processor and storage performance, memory capacity, and resiliency.”
Creating better products

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QUALITY GOVERNANCE IS THE NEW WAY FORWARD

A key challenge in using data is the improvement of product quality governance, but the benefit could be the difference between success and failure.

Since data relevant to product quality is typically located in silos across processes, manufacturers must employ systems that govern quality at different stages of the product development cycle.

In this paradigm, IT infrastructure plays the dual role of both the solid foundation beneath efficient business operations and the catalyst for evolution – enabling new systems for manufacturers to design, produce and deliver differentiating products faster and more efficiently.

BETTER PRODUCTS THROUGH QUALITY GOVERNANCE

Quality is a top priority for all manufacturing stakeholders, from the corner office to the shop floor. In 2015, product quality – including compliance – already absorbs two-thirds of all IT application investments.

As enterprises pursue an holistic approach to quality, infrastructure must be deployed that can handle the data management and integration tasks. IT investments being made by manufacturers are focused on broadening access to information and using the cloud in the most effective way possible. Lenovo enables you to do precisely that.

BY 2017, 25% OF A MANUFACTURER’S IT BUDGET WILL BE CHANNELED TO INDUSTRY CLOUDS THAT ENABLE SEAMLESS, FLEXIBLE COLLABORATION MODELS.
INSIGHTS DRIVE INNOVATION

IDC predicts that by the next year, 70% of global discrete manufacturers will offer connected products, with increased software content driving the need for systems engineering and a product innovation platform.

Lenovo makes it easier for you to gain an edge in this competitive market, providing solid support at every step – from devices that help you gather real-time insights, to servers that can help you use these insights to enhance innovative product development.

Scalable, easy-to-deploy cloud-based systems can provide the information base you need to govern product quality, Lenovo offers a range of systems specially optimized for Cloud, giving users the ability to effectively manage and optimize Cloud services and applications.

“Using data to closely manage quality means achieving consistent high standards that drive customer loyalty and satisfaction.”
ENGINEERING INNOVATION

SOLUTIONS TO ENABLE INNOVATION
IN ENGINEERING AND BEYOND

With more data, more connections, and more intelligence available than ever before, manufacturers must understand more, innovate more, and create more – for less. A good place to start is installing servers that are affordably scalable and ready for industry clouds, analytics, and data management to help your business be more responsive to changing demand. Lenovo servers also utilize intelligent diagnostics to provide a strong foundation for more demanding applications.

“Powerful, reliable workstations enable engineers to develop prototypes and refine products more quickly and efficiently.”

WORKSTATIONS THAT EMPOWER ENGINEERS

Lenovo workstations are fast, configurable and upgradeable – and work without any hassles. With the right mix of processing power, reliability and support, Lenovo enables designers, engineers and program managers to bring better products to market faster, particularly with a platform designed specifically for their needs.
Superior solutions

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## DATA ANALYSIS

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<tr>
<th>KEY TASK</th>
<th>CONSIDERATIONS</th>
<th>PRODUCT REQUIREMENT</th>
<th>LENOVO ADVANTAGE</th>
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</thead>
</table>
| Analyze inputs from consumers  | • Simulate data from various sources  
                                • Organize unstructured data  
                                • Analysis and recommendations | Desktops with high processing capability and ability to handle big data            | The ThinkCentre E93z with an Intel® Core™ i7 processor offers superior performance |

## HIGH PERFORMANCE COMPUTING

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| Converting sketches to digital drawings       | • Precision  
                                • Accurate scaling  
                                • Workflow simulation  
                                • Computational fluid dynamics | Workstation with the ability to run specific AutoCAD or SolidWorks software       | ThinkStation workstations promise faster rendering with Intel® Xeon® processors and NVIDIA Quadro graphics |
| Rapid prototyping                            | • Simulation and analysis  
                                • Optimal manufacturing cycle | Workstation with the ability to run specific software  
                                • Mainstream desktops          | ThinkStation workstations with Intel® Xeon® processors are ISV-certified to run all major CAD applications |
| Converting concept design to product prototype | • Stock keeping  
                                • Real-time updates  
                                • RFID  
                                • ERP deployment | • Virtualized environment  
                                • Tablets          | The ThinkCentre E93z has 1 TB storage for optimum virtualization                  |

## INVENTORY AND LOGISTICS

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| Inventory management            | • Stock keeping  
                                • Real-time updates  
                                • RFID  
                                • ERP deployment          | • Virtualized environment  
                                • Tablets          | The ThinkCentre E93z has 1 TB storage for optimum virtualization                  |
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