



**REIMAGINE
MANUFACTURING**

CLOUD INNOVATION SERIES



Google Cloud





THE FUTURE OF GLOBAL MANUFACTURING IS IN THE CLOUD

AMD | Google Cloud

Cloud adoption is on the rise in the manufacturing industry. The Fourth Industrial Revolution is fundamentally changing the way factories operate, introducing [breakthrough technology advancements](#) that enable new approaches to product design, development, and distribution. Manufacturers are rethinking how they work by investing in cutting-edge solutions and capabilities to increase product value and dramatically reduce time to market. Creating a [successful strategy for cloud innovation](#) is crucial if manufacturers hope to capitalize on emerging trends:

- **Virtual workforces** – Companies today are striving to support a growing virtual workforce, equipping factories and remote experts around the world with the compute power and agility to share information, gain insight into geographically dispersed environments, and execute demanding workloads.
- **IoT** – IoT is gaining significant value as manufacturers leverage data from sensors, equipment, and devices to extract real-time insights. The ability to quickly collect and analyze data from numerous sources allows companies to streamline production workflows, proactively address issues before they arise, and enhance operations from end to end.
- **AI/Machine learning** – Advanced analytics provides deep, immediate insight across operating environments, driving major improvements in efficiency and profit margins. Capabilities like AI and machine learning enable companies to develop products with greater precision in a fraction of the time, optimize price-performance, and keep production on track with real-time monitoring and predictive maintenance.
- **5G** – The onset of 5G is changing the game for manufacturers across all markets, prompting companies to enhance their communication networks so they can move mission-critical data from onsite data centers, to edge, to the cloud more quickly.

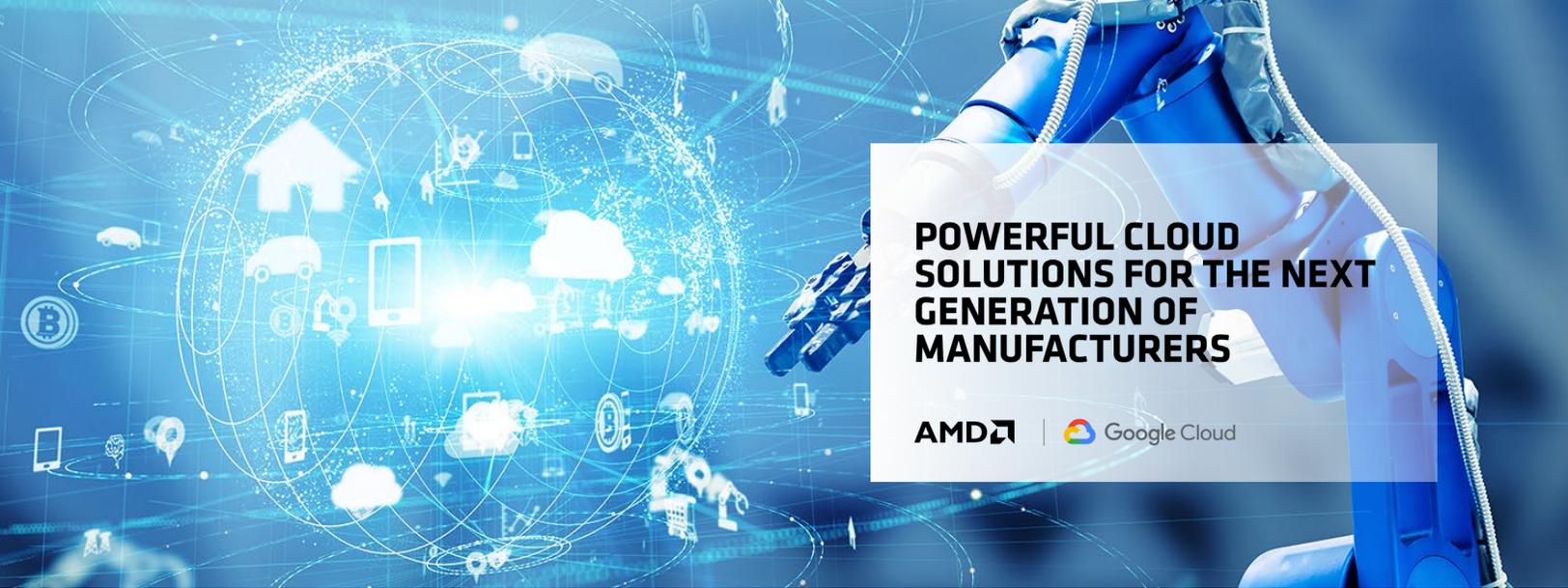
These industry trends call for a total IT shift — one that moves manufacturers away from legacy technologies that lack the extreme compute capacity and performance, and toward a [smarter, faster breed of manufacturing](#). Companies are looking to implement groundbreaking cloud capabilities to help them modernize their environments and fuel manufacturing innovation on a global scale. Those that do will have the unmatched ability to optimize and accelerate the entire manufacturing lifecycle.

Google Cloud and AMD are empowering modernization, with world-class cloud-based systems that deliver superior levels of agility and flexibility to harness advanced analytics, increase virtual productivity, and drive business outcomes. [Google Cloud Confidential Virtual Machines \(VMs\)](#) powered by [AMD EPYC™ 7002 series processors](#) provide high processing capacity and memory bandwidth to handle a wide range of workloads. AMD EPYC™ processors have earned [170 world records](#) for their robust performance and balanced architecture, which enable customers to execute data-intensive workloads.

In addition to providing unbeatable performance, Google Cloud Confidential VMs offer industry-leading data security at every stage of production. These platforms feature [AMD Secure Encrypted Virtualization](#), which encrypts data when it is accessed from different locations. Now, companies can work with the utmost confidence, knowing their sensitive data is protected even while it is being used.

Together, cloud solutions from Google Cloud and AMD enable innovation across the manufacturing value chain. Our joint mission is to help customers achieve operational excellence today and in the future.

Transform your business with the cloud. Visit [Google Cloud](#) and [AMD](#) online to learn how.



POWERFUL CLOUD SOLUTIONS FOR THE NEXT GENERATION OF MANUFACTURERS

AMD | Google Cloud

Manufacturing is a massive industry which is becoming increasingly intelligent and competitive. The goal for manufacturers is to bring high-quality products to market faster and more efficiently than their competitors, in a way that reduces operating expenditures and boosts profits. But this isn't possible for manufacturers that run on rigid infrastructure.

Today, manufacturing operations are more sophisticated and diverse than ever. Companies must find ways to accelerate compute-intensive workloads and optimize data management for a growing number of sources and data types, while effectively supporting remote workers and controlling factories in different geographies. Legacy technologies lack the agility, flexibility, and security that are required to take manufacturing performance to the next level. Innovation is crucial to success, leading many companies to invest in a [new class of compute capabilities](#).

Manufacturers are harnessing cloud technologies to transform the way they work, collaborate, and make decisions. Migrating to the cloud mitigates many limitations of on-premises IT, which can make it difficult and expensive to adapt and scale your operations. [Cloud solutions for manufacturing](#) deliver the unmatched speed and scalability that companies need to rapidly innovate, manage the most rigorous jobs with ease, and expand their operations around the globe.

Yet investing in a cloud platform can also be challenging. Many manufacturers need expert guidance to select and deploy the ideal solution for their unique demands.

Google Cloud and AMD are making cloud adoption a simple and empowering experience for every customer. [Our cloud-based systems](#) combine the seamless performance of Google Cloud with the robust processing capacity of AMD processors to equip the next generation of manufacturers.

[Google Cloud Confidential Virtual Machines \(VMs\)](#) based on [AMD EPYC™ 7002 series processors](#) deliver immense processing power and memory bandwidth, so companies

can execute a wide range of tasks at scale. Google Cloud VMs provide unbeatable flexibility in addition to [industry-leading security](#), which enable companies to drive productivity and manage sensitive workloads in locations around the world. Enhanced data security through [AMD Secure Encrypted Virtualization](#) protects data across the manufacturing lifecycle, including when it is at rest, in transit, and in use.

The latest [Google Cloud N2D Confidential VMs](#) built on AMD EPYC™ processors offer up to [70% higher platform memory bandwidth, plus a 39% performance improvement](#) on industry-standard benchmarks compared to existing comparable VMs.

Together, these solutions create a powerful, proven cloud infrastructure that is helping customers increase manufacturing value and gain competitive advantage. The opportunity to drive operational efficiencies, improve product quality, and accelerate development is waiting in the cloud.

See how [Google Cloud](#) and [AMD](#) can help you succeed. Visit us online.



SUSTAINABLE MANUFACTURING NEEDS A ROBUST CLOUD STRATEGY

AMD | Google Cloud

Manufacturing is a dynamic industry where companies are continually searching for new, more effective ways to operate, anticipate business demands and trends, and accelerate time-to-market. In today's market, success is driven by three key attributes—sustainability, quality, and speed. To excel in these areas, manufacturers must find ways to enhance their production environments so that they can compete now and in the future.

The need for sustainable practices is transforming the industry, as manufacturers begin to reimagine how they work and operate. This is achieved by utilizing [cutting-edge technologies](#) that enable high levels of performance, optimize development and distribution processes, and fuel ongoing innovation. Traditional on-premises infrastructure is no longer sufficient to support this evolution, due to limited compute power and growth constraints. Legacy technology also lacks the speed and precision required to identify inefficiencies as well as predict and prevent issues across production.

In order to succeed, manufacturers are adopting cloud infrastructure to empower sustainable operations around the globe. Manufacturers are [rapidly migrating to the cloud](#) to harness maximum agility, scalability, and insight. These capabilities enable companies to develop and deliver products through economically sound processes across the value chain:

- Faster, data-driven insights for intelligent decision-making
- Greater visibility and control over disparate environments
- Equipment and process automation for faster production times
- Effective allocation of compute resources and materials
- Greater resilience and reduced downtime

The cloud offers countless opportunities for manufacturers to enhance efficiencies and gain significant cost savings while improving business outcomes. As companies invest more and more in cloud technologies, they rely on a robust strategy to help them choose the right solutions and build a future-proof business model.

[Google Cloud and AMD](#) make cloud adoption fast and simple. Together, we offer solutions that are expertly designed to facilitate today's operations and scale for tomorrow's innovations. Now, manufacturers can modernize their on-premises environments—which are complex, costly, and difficult to manage—with world-class cloud infrastructure.

[Google Cloud Confidential Virtual Machines \(VMs\)](#) powered by [AMD EPYC™ 7002 series processors](#) deliver extreme compute performance to improve production from end to end. These groundbreaking solutions deliver high processing power and memory bandwidth, so manufacturers can optimize even the most complex processes. With superior speed, efficiency, and flexibility, Google Cloud and AMD customers are uniquely positioned to innovate and lead the industry.

Google Cloud Confidential VMs provide enhanced data security through [AMD Secure Encrypted Virtualization](#). This leading-edge capability helps to protect sensitive data even while it is in use, so companies can operate and expand with confidence.

The future of sustainable manufacturing is in the cloud. Visit [Google Cloud](#) and [AMD online](#) to learn how you can benefit.



IMPROVE PRODUCTION EFFICIENCY WITH CLOUD ANALYTICS

AMD | Google Cloud

The Fourth Industrial Revolution has changed the way manufacturers work, collaborate, and compete. This era is marked by increasingly powerful technologies and a surge in data from diverse locations and devices. To make the most of these trends, manufacturers are adopting a new type of IT infrastructure that can drive greater efficiency, productivity, and output.

Today's manufacturers are adopting the latest advancements in cloud computing to enhance production processes and help them keep pace with the competition. [Investing in a cloud platform](#) is not just a technology decision—it's a business strategy that facilitates the agility, flexibility, and intelligence to quickly adapt to changing demands and business growth. With their data and applications in the cloud, many manufacturers are discovering more effective ways to optimize operations, increase cost savings, and speed up time-to-market while delivering higher-quality products and services.

Cloud adoption is rapidly improving each stage of production. Manufacturers are applying [cloud analytics](#) to gain visibility and control across their operations, identifying ways to create new efficiencies and boost performance. These capabilities are creating a better-connected enterprise:

- **Enhancing collaboration** – Enabling remote teams, from corporate headquarters to assembly lines, to work faster, smarter, and more collaboratively.
- **Accelerating research and development** – Launching data-driven products and services, uncovering new insights, and speeding up engineering and design processes.
- **Simplifying IT** – Transitioning from on-premises environments that are complex and take up factory floor space to a scalable cloud infrastructure.

[Google Cloud and AMD](#) are helping manufacturers develop a comprehensive cloud strategy to gain maximum business value from the cloud. Our offerings incorporate robust technologies and cloud computing innovations to reinvent the way you operate.

[Google Cloud Confidential Virtual Machines \(VMs\)](#) powered by [AMD EPYC™ 7002 series processors](#) equip manufacturers to manage troves of data to fuel production efficiency. Our cloud solutions provide high processing capacity and memory bandwidth to optimize even the most compute-intensive workloads.

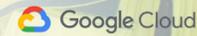
2nd Gen AMD EPYC™ processors hold [170 world records](#) (and counting) for systems that are right-sized to fit your evolving requirements. This portfolio of processors is a proven foundation for Google Cloud Confidential VMs to deliver industry-leading performance and security without compromise. Google Cloud Confidential VMs offer an extra layer of protection through [AMD Secure Encrypted Virtualization](#), an advanced security feature of 2nd Gen AMD EPYC™ processors that can encrypt your mission-critical data even while it's being used.

Our solutions enable manufacturers to meet their toughest challenges head on, with superior levels of efficiency and overall cost-effective computing. Our commitment to ongoing development allows manufacturers to lead their industries, using the latest cloud offerings to transform production and gain sustainable competitive advantage.

Google Cloud and AMD can help you reach operational excellence. [Visit us online](#) to discover your ideal solution.



REVOLUTIONIZE YOUR R&D WITH ADVANCED CLOUD SECURITY



The Fourth Industrial Revolution has reshaped the manufacturing industry, introducing advanced capabilities and IT to enhance the product lifecycle. Today's companies are reaping the benefits of increased visibility, substantial cost savings, and faster production times.

Product design is changing rapidly as companies adopt new technologies to optimize research and development (R&D) processes. Manufacturers are working quickly to capture data from the edge, IoT devices, and smart equipment. Data from these sources contains critical insights to improve production, optimize operations, and address issues before problems arise. However, many companies need more efficient technology to handle the massive influx of data. With so much information being generated across different operating locations, manufacturers are under tremendous pressure to manage and secure their data from the moment it's generated and through to processing and storage.

Cloud computing has made it possible to collect, process, and secure vast amounts of data from diverse sources. By [migrating to the cloud](#), companies can use their data to increase efficiency, improve safety, meet IT security and compliance standards, and accelerate R&D. The extreme speed and flexibility of cloud technologies are key to gain greater visibility into data. As a result, manufacturers can make informed, strategic decisions at each stage of R&D based on real-time insights.

As manufacturers transition to the cloud, IT departments will need to partner with the right experts to help them create a clear vision for their cloud journeys, as well as deploy the [right solutions](#) to help secure and empower their business goals.

Google Cloud and AMD are helping manufacturers accelerate R&D efforts by providing the [unmatched agility and scalability of the cloud](#) with enhanced data security.

[Google Cloud Confidential Virtual Machines \(VMs\)](#) powered by [AMD EPYC™ 7002 series processors](#) deliver high processing performance to execute the most intensive workloads. Manufacturers can benefit from increased memory bandwidth compared to previous instances of AMD EPYC™ 7002, enabling faster data processing with fewer

bottlenecks to improve time-to-market. Built on these robust processors, Google Cloud Confidential VMs provide [record-breaking performance](#) to optimize any workload at a lower cost, while keeping data secure with the latest security features available for cloud environments. [AMD Secure Encrypted Virtualization \(SEV\)](#) offers an extra level of security to Google Cloud Confidential VMs. A cutting-edge feature of AMD EPYC™ processors, AMD SEV secures data throughout R&D and production by encrypting sensitive information, even while it's in use by design and engineering.

Together, Google Cloud and AMD enable manufacturers to meet their toughest design and engineering challenges with greater efficiency and confidence. Our commitment to cloud innovation allows companies to reimagine how they work, with new capabilities to empower today's operations and evolve for tomorrow's challenges.

Let us help you reinvent your manufacturing processes, so you can lead the industry. Visit Google Cloud and AMD online to [learn how](#).



CLOUD SOLUTIONS ARE KEY TO SUSTAINABLE MANUFACTURING

AMD | Google Cloud

For today's manufacturers, the demand for diverse and high-quality products and services is quickly changing the way they operate. To stay ahead of competitors, companies are making sustainability an important part of their business strategies. Their goal is to find new and more efficient ways to optimize key processes, including product design and development, distribution, and inventory. Many companies are realizing the benefits of sustainable manufacturing across these areas:

- Increasing operational efficiency by reducing costs and waste
- Improving workplace and product safety
- Extending and uncovering new revenue streams
- Enhancing performance while reducing resource footprint
- Building long-term manufacturing viability and success
- Remaining compliant with evolving regulatory requirements

To create more sustainable practices, manufacturers are adopting [cutting-edge technologies](#) that are specifically designed to enable growth and support ongoing innovation. The right type of infrastructure will be fast, flexible, and affordable, allowing manufacturers to quickly adapt and scale their operations to meet rising demands while focusing on cutting costs and improving ROI.

Cloud adoption is on the rise as manufacturers look to increase their economic sustainability. By migrating workloads off-premises, companies can better allocate their resources to handle a variety of initiatives. [Cloud solutions](#) eliminate the constraints of inflexible or outdated IT—making it possible to achieve high levels of performance on demand, which can save time, labor, and resources.

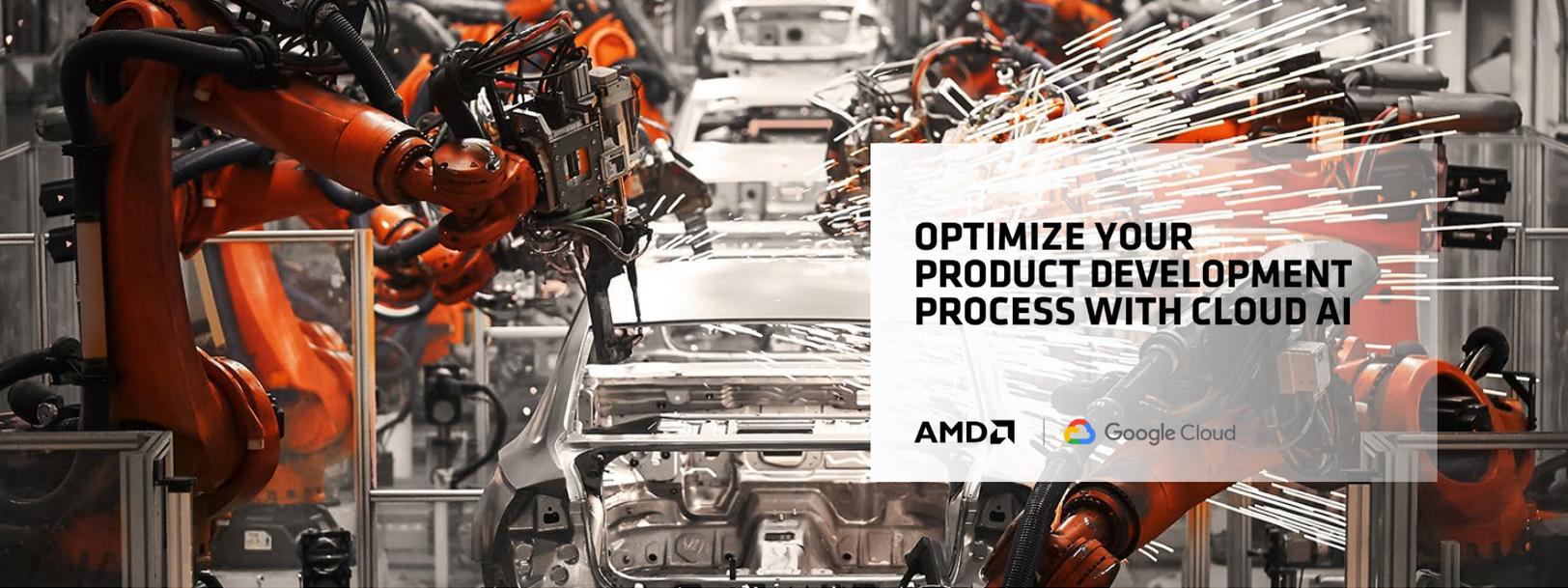
Google Cloud and AMD are now enabling a new age of sustainable manufacturing. Built on Google Cloud's scalable global infrastructure, our comprehensive cloud solutions are enhancing innovation and driving sustainability in key ways.

[Google Cloud Confidential Virtual Machines \(VMs\)](#) powered by [AMD EPYC™ 7002 series processors](#) deliver high processing capacity and memory bandwidth to handle the most demanding workflows. Robust cloud technologies enable overall cost-efficient computing performance for applications like predictive analytics, anomaly detection, quality control, and automation. Google Cloud Confidential VMs are now built on N2D series VMs. Driven by 2nd Gen AMD EPYC™ processors, N2D instances offer up to [39% better performance](#) for intensive manufacturing workloads compared to previous N1 instances. N2D series VMs also offer up to [13% cost savings](#) compared to N1 and N2D non-confidential VMs. These platforms make it possible for companies to fuel innovation across the manufacturing value chain, driving revenue growth today and evolving quickly to take on tomorrow's challenges.

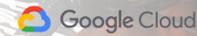
Confidential computing makes it possible for manufacturers to share confidential data sets and collaborate on research in the cloud — without sacrificing security. AMD adds another layer of data security through [AMD Secure Encrypted Virtualization](#). AMD SEV is a breakthrough security feature of AMD EPYC™ processors which encrypts sensitive data even while it's being used.

These cutting-edge technologies enable manufacturers to meet their toughest challenges head on, with superior levels of efficiency and intelligence. Our commitment to ongoing development allows companies to reimagine and lead their industries.

Visit Google Cloud and AMD to [discover new capabilities](#) to empower your sustainable future.



OPTIMIZE YOUR PRODUCT DEVELOPMENT PROCESS WITH CLOUD AI



[Cloud adoption](#) is a growing reality across the manufacturing industry. The transition to [off-premises infrastructure](#) has transformed how many companies think, learn, collaborate, and make decisions about bringing products to market. In such a vast and complex industry, cloud computing presents valuable opportunities for manufacturers to enter new markets, uncover operational efficiencies, mitigate risk and safety issues, and accelerate innovation. Today, the extreme elasticity of the cloud provides greater access to vast amounts of critical data.

With cloud-based artificial intelligence (AI) and analytics, companies are able to convert their critical data into real-time or predictive insights, enabling greater visibility and control across every stage of production. [Cloud AI](#) is helping companies operate faster and more intelligently, optimizing manufacturing operations through data center consolidation and simplification, predictive analytics, anomaly detection, and quality control automation. Smart manufacturers benefit from increased visibility into operations, substantial cost savings, faster production times, and the ability to provide excellent customer support.

By using cloud AI, these companies can develop a better understanding of systems operations, identify potential risk factors, and proactively make changes to optimize product design and development. The ability to predict when maintenance should be performed saves valuable time and resources. In fact, the adoption of [predictive maintenance technologies enabled by AI](#) could decrease a company's maintenance costs by 20%, reduce unplanned outages by 50%, and extend machinery life by years.

Google Cloud and AMD are empowering a new age of smart manufacturing. [Our comprehensive solutions](#) enable a seamless transition to the cloud so that manufacturers can remain focused on their business goals with a strong foundation to unlock deeper insights for real-time decision-making and strategic actions.

[Google Cloud Confidential Virtual Machines \(VMs\)](#) powered by [AMD EPYC™ 7002 series processors](#) deliver high memory bandwidth to execute the most demanding AI workloads. Latest-generation AMD EPYC™ processors have broken [170 world records and counting](#) by delivering the highest levels of performance in a variety of scenarios.

When combined with Google Cloud Confidential VMs, AMD processors offer manufacturers overall cost-efficient computing.

Easy-to-use AI and machine learning capabilities developed by Google Cloud are embedded in our cloud infrastructure, making it simple for manufacturers to deploy and access smart applications everywhere. Google Cloud and AMD have strategic partnerships with leading open source providers in data management and analytics, which allow us to tightly integrate AI into Google Cloud Confidential VMs. To secure these critical apps and data, AMD EPYC™ processors provide enhanced security unlike anything on the market. [AMD Secure Encrypted Virtualization](#) encrypts data even while it's in use so that manufacturers can innovate and grow with confidence.

Cloud AI is inspiring a new era of smart manufacturing. [Contact our experts](#) to begin your journey to greater insight.

