REIMAGINE RETAIL

CLOUD INNOVATION SERIES

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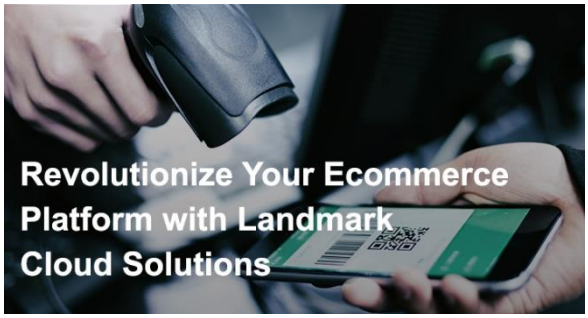

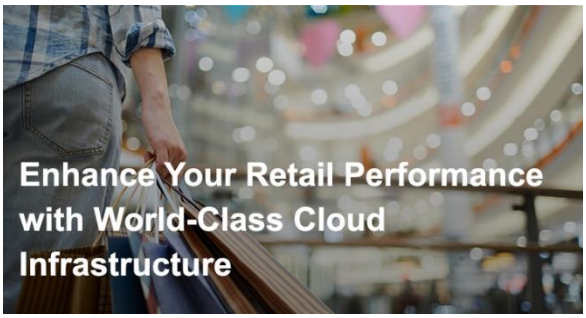

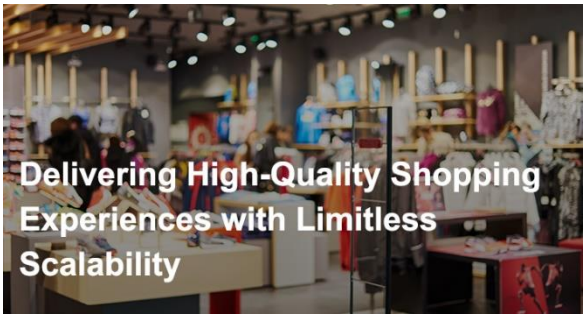

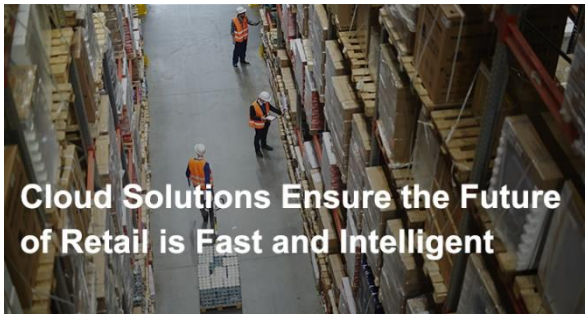

The demand for frictionless and personalized shopping is driving a new age of Retail. Instead of modeling the same layout and merchandise across multiple locations and merely reacting to customer needs, today's retailers are striving to be more proactive and intelligent. The retail industry has experienced a major shift as cutting-edge cloud technologies expand data usage to eliminate much of the guesswork of traditional operations.

In this demand-driven marketplace, success means anticipating trends, providing a seamless shopping experience, satisfying customers with a variety of products, and rapidly adapting to changes in the supply chain. Yet the requirements don't stop there. Retailers face growing pressure to deliver compelling customer experiences with greater operational cost-efficiencies both in-store and online. While the industry is witnessing a surge in online and application-based consumerism, physical stores still account for more than 80% of retail sales, where customers expect tailored product options and personal connections with sales associates. This challenges organizations to gain greater visibility into each area of operations—including customer service, money handling, inventory, supply, demand, and more—across physical and virtual locations.

Transformation is essential to accomplish these goals, particularly for retailers using legacy infrastructures that lack the capacity and bandwidth to analyze streams of store, supply chain, and customer data. Many organizations are investing in cloud-based systems to harness the full power of their data. Next-generation cloud solutions deliver extreme speed, flexibility, and security to gain predictive and real-time insights, utilizing AI and machine learning applications to gain actionable intelligence. These game-changing capabilities empower retailers to derive and act on strategic insights in order to improve store performance and functionality, develop a deeper understanding of the modern shopper, and realize sustainable competitive advantage.

Google Cloud and AMD are building a smarter, leading-edge cloud platform to accelerate Retail innovation. Our customers are utilizing world-class cloud computing technologies to redefine how they operate. These retailers leverage our industry-leading

capabilities to disrupt the industry, by enhancing store operations and uncovering new sales opportunities:

- Capturing digital and omnichannel revenue growth
- Becoming customer-centric, data-driven organizations
- Driving operational improvement

These key benefits are helping Google Cloud and AMD customers pursue cloud innovation quickly and with confidence. In fact, 7 of the top 10 Retail and CPG companies trust Google Cloud to help them evolve into the future.

Together, we are transforming Retail with groundbreaking cloud solutions for the modern enterprise. Google Cloud Confidential Virtual Machines (VMs) powered by AMD EPYC™ 7002 series processors deliver high processing performance and memory bandwidth for intensive data workloads. Google Clo ud Confidential VMs are the largest VMs available on the market, offering organizations a customizable machine type with a range of CPU options to achieve optimal price-performance. And with easy-to-use AI and machine learning capabilities embedded in the engine, retailers can accelerate data-driven decision-making. These next-generation technologies enable retailers to meet their toughest challenges head on, with superior levels of efficiency and higher intelligence to improve their customer insights and experiences, hone high-performance customer targeting and price simulation, and increase overall cost-efficiencies. Additionally, Confidential VMs deliver enhanced data security through AMD Secure Encrypted Virtualization, to help protect your sensitive commerce data.

Cloud adoption is empowering the Retail industry with streaming insights and innovation, while providing a flexible architecture, unmatched scalability, and security for future business growth. Joint solutions from Google Cloud and AMD are paving the road to success, for retailers to deliver superior shopping experiences and fuel ongoing transformation.

Our mission is to help you tackle evolving industry demands and unlock growth opportunities with simple cloud implementations that are tailor-made for your operational needs.

Let’s solve your Retail challenges together. Visit Google Cloud and AMD online today.

The retail industry is changing rapidly in response to escalating product demand and customer expectations. The modern shopper has highly sophisticated needs, which is pushing organizations to find new ways to improve customer satisfaction and create seamless shopping experiences. Retailers are facing immense pressure as customers insist on virtual platforms that deliver the same personalized options and quality service as physical locations. In this unique climate especially, coronavirus mandates are persuading a growing number of customers to shop online and through web-based applications instead of in brick and mortar stores. These developments are causing a paradigm shift in Retail, with organizations racing to innovate and evolve.

Retailers must transform in order to compete and thrive in this dynamic virtual landscape. With troves of customer and operational data to manage, many organizations using outdated technologies are struggling to keep up. Legacy infrastructures lack the high capacity and bandwidth required to quickly execute complex data analytics workloads, including those that rely on AI and machine learning. Legacy technology is quickly overwhelmed, leaving retailers unable to use their data effectively or respond to store, supply chain, and customer needs.

With so much at stake, the industry is increasingly shifting to cloud-based retail. Cloud adoption has changed the game for many organizations. They're now able to harness the agility and flexibility of the cloud to provide a reliable shopping experience across multiple channels, as well as the power of cloud analytics to unlock key business insights. By implementing cloud infrastructure, retailers can migrate workloads off-premises in order to free up compute resources while accelerating intelligent analytics that uncover customer insights and sales opportunities. This more intelligent and streamlined engagement increases operational efficiencies and improves inventory management for retailers, and elevates the overall shopping experience for consumers.

Google Cloud and AMD are equipping retailers with world-class cloud solutions to revolutionize their ecommerce environments. We offer a smarter, leading-edge platform that enables you to boost customer satisfaction and fuel transformation across your organization. Our joint solutions make ecommerce and data warehouse migration easy,

so you can seamlessly grow your operations, backed by the superior productivity and flexibility of the cloud.

Google Cloud Confidential Virtual Machines (VMs) and AMD EPYC™ 7002 series processors are the ideal combination to help retailers improve store operations and sales. These solutions cost-effectively deliver high processing performance and memory bandwidth for intensive workloads. Our groundbreaking technologies feature Google Cloud's easy-to-use AI and machine learning capabilities, making intelligent analytics accessible across retail operations. These valuable insights help our retail customers transform with data-driven decision-making—from learning shopper behavior to create more personalized experiences, anticipating trends, and increasing sales effectiveness, to gaining greater visibility and control over physical and virtual shopping environments.

In addition to extreme agility and scalability, Google Cloud Confidential VMs powered by AMD EPYC processors also provide multiple layers of data security. AMD Secure Encrypted Virtualization lets you operate with confidence, knowing your ecommerce data is protected when in use, when stored, and in flight..

It's time to reimagine how you operate. Visit Google Cloud and AMD online to help you get started.

The retail industry is growing increasingly competitive as organizations flood the market with new and tailored offerings to keep their brands top of mind. The key to being a successful, modern retailer is to provide frictionless, personalized shopping experiences. The ability to anticipate customer needs, deliver popular products, and guarantee high-quality customer service not only boosts sales, but it also improves customer retention and overall brand performance. Keeping customers happy is a huge challenge, particularly as the coronavirus pandemic continues to cause economic uncertainty around the world. Organizations are feeling the pressure to transform in order to drive customer satisfaction and ensure longevity in this volatile market.

Today's retailers must find ways to deliver the shopping experience that modern customers demand, by creating seamless interactions across multiple channels and accelerating operations from end to end. Many in the industry are achieving this by tapping into their data, leveraging the unmatched speed and flexibility of the cloud to enable smarter, faster decision-making.

Retailers produce endless streams of information from sources like product engagement, merchandise uses, advertisements, in-store sensors/cameras, and sales transactions. Yet many organizations lack the processing capacity required to draw value from this vast amount of data. Legacy infrastructure is no longer adequate to execute complex, data-heavy workloads, so savvy organizations are already investing in cloud technologies to harness the full power of retail intelligence. Cloud capabilities provide the optimal compute performance to rapidly derive customer and operational insights, which help organizations take informed action in real time. Retailers that pursue cloud adoption now will be able to drive improvements across brick and mortar stores, online sales platforms, and applications.

Groundbreaking cloud technologies from Google Cloud and AMD are making intelligence more attainable than ever. With solutions designed to accelerate insight and innovation, our customers can enhance in-store and online operations in key ways:

- Identify customer patterns and behaviors
- Rapidly address customers concerns

- Tailor product suggestions
- Predict upcoming sales trends
- Reduce inventory shrinkage
- Increase visibility into the entire supply chain

Together, Google Cloud and AMD are fueling the next generation of intelligent retailers. We've built a smarter, leading-edge cloud platform that helps organizations simplify data management, gain control at every point in the supply chain, and power even the most demanding AI and machine learning workloads.

Google Cloud Confidential Virtual Machines (VMs) powered by AMD EPYC™ 7002 series processors deliver superior levels of agility and efficiency, enhanced data security, and industry-leading cost-effectiveness. This robust pairing offers extensive processing capacity to handle your most complex challenges with ease. AMD EPYC™ processors offer high core counts to give you greater flexibility to create the ideal cloud infrastructure for your retail workloads, including full-socket VM sizes that provide up to 60% better platform memory bandwidth than existing instances. The latest N2D instances offer more than 100% performance improvements over the previous N1 series. With up to 224 vCPUs, Confidential VMs running on AMD EPYC™ processors are the largest VMs available in today's market. Additionally, Confidential VMs offer multi-layered security for cloud analytics, utilizing AMD Secure Encrypted Virtualization to help secure your retail data even while it is in use.

Google Cloud and AMD can help you unlock key insights to improve customer satisfaction and transform the way you operate. Let's build your Retail legacy. Visit Google Cloud and AMD online to get started.

The economic downturn caused by COVID-19 is redefining traditional Retail. Companies have drastically altered their in-store practices to comply with evolving regulations and keep their doors open. Meanwhile, the popularity of retail websites and applications has erupted, and according to the latest data from McKinsey, consumers are likely to continue the behaviors they've adopted during the pandemic for the foreseeable future. This includes a 15–30% increase in online shopping as well as growing loyalty to new brands, as 77% of Americans try new products, places to shop, or shopping methods driven by value and convenience.

In this dynamic landscape, retailers can't afford to compromise on performance. They're searching for ways to operate with the utmost efficiency and care while providing a better customer experience. As rival brands race to adapt to these market shifts, many retailers are transforming their technology environments to ensure top-quality outcomes at every stage of operation.

Retail cloud adoption is on the rise, allowing more companies to manage a deluge of information from physical stores, web-based platforms, and warehouses in disparate locations. Capturing insights in real time is essential to accelerate diverse workloads that enable faster, more informed decision-making. Retailers that invest in cloud capabilities can quickly harness business intelligence in addition to game-changing speed and scalability to quickly respond to consumer and store needs. Cloud technologies provide a flexible architecture to improve effectiveness from end to end, delivering a superior shopping experience and supporting future business growth.

Google Cloud and AMD customers are making the switch to cloud-based retail with ease. As global leaders in cloud innovation, we offer the ideal mix of solutions to ensure high levels of productivity and performance. Our mission is to empower retailers in key areas of transformation:

- **Agility –** Unmatched processing speeds enable companies to adapt to evolving requirements and demands with ease.

- **Productivity –** Cloud computing streamlines how your business works, supporting powerful virtual workstations and access to information from anywhere in the world.
- **Intelligence –** Cloud-based analytics helps you leverage the full power of your data.
- **Culture –** Seamless collaboration redefines how companies work today and innovate tomorrow.

Our world-class cloud infrastructure combines Google Cloud Confidential Virtual Machines (VMs) and AMD EPYC™ 7002 series processors to create compelling customer experiences and accelerate transformation across your organization. Google Cloud powered by AMD EPYC™ processors offers a robust set of technologies that deliver high processing capacity and memory bandwidth for a variety of workloads, so retailers can extract the most value from their operations. As a result, our customers have the ability to rapidly identify consumers' needs, capitalize on spending trends, tailor physical and virtual shopping environments, better manage optimize inventory, and increase sales.

In addition to unparalleled speed and flexibility, Google Cloud Confidential VMs provide multiple layers of data security to protect companies as they grow and expand their retail environments. AMD Secure Encrypted Virtualization encrypts the memory of VMs by isolating virtual points of access from the hypervisor. The VM recognizes when and where changes are made, and it encrypts those pages of memory. This additional security helps to ensure that sensitive retail data is safe when it is stored, in flight, or in use.

The pandemic and its aftermath don't have to be a technology crisis. Let Google Cloud and AMD help you solve your retail challenges.

The biggest challenge for today's retailers is to deliver consistent, high-quality shopping experiences. The modern shopper has great expectations for the types of products and services they receive, and their demands are becoming more sophisticated as a rising number of companies compete for their loyalty. These customers expect physical stores to be organized for their convenience—with products in stock and sales associates standing by to offer personalized recommendations, from when they enter the store to when they reach the sales counter. Online retail must be just as seamless, including tailored products and discounts, easy checkout, and proactive customer service to quickly provide input and resolve problems.

Building a customer-centric brand is essential to succeed. With this goal in mind, retailers are rethinking how they operate to deliver a more compelling shopping experience.

Savvy retailers place a high priority on data insights, speed, and flexibility to help them effectively serve customers and boost retention rates. However, many lack the compute power and scalable data infrastructure necessary to meet escalating industry requirements and customer needs. These companies must innovate now in order to compete in this dynamic marketplace. Those that do will have an unbeatable advantage to improve store operations, gain data-driven insight into their products and services, uncover new sales opportunities, and establish industry-leading shopping environments.

Google Cloud and AMD are driving transformation in each of these areas. We equip retailers with robust cloud infrastructure to turn business, customer, and transactional data into strategic insights. Migrating compute resources to the cloud enables retailers to execute even the most complex workloads—including data analytics and AI—which increases visibility and control across the supply chain. Our world-class solutions scale on demand to rapidly operationalize insights and drive better business outcomes, so retailers can keep their customers happy, cost-effectively.

Google Cloud Confidential Virtual Machines (VMs) powered by AMD EPYC™ 7002 series processors provide a flexible foundation to handle today's tasks and evolve for tomorrow's challenges. Together, our groundbreaking cloud solutions harness extreme

processing power and high memory bandwidth to accelerate a variety of critical workloads, like real-time analysis of shopper behavior, in-store flow, and inventory management.

In addition to helping retailers achieve unparalleled cloud performance, the latest Google Cloud Confidential VMs offer advanced data security unlike anything on the market. These N2D engines utilize AMD Secure Encrypted Virtualization to secure data, even while it is in use. Now, retailers can operate and innovate with ease and confidence, knowing their sensitive information is protected.

Does your brand meet the demands of today's retail industry? Adopting the right cloud technologies can help you improve customer satisfaction and accelerate business growth. That's why 7 of the top 10 retailers trust Google Cloud to empower their transformation.

Visit Google Cloud and AMD online to create your strategy for success.

For today's retailers, meeting the needs and expectations of consumers is only part of being successful. In this changing climate, retailers are struggling to keep up with rising demands for high-quality products, prompt customer service, and seamless shopping experiences. COVID-19 has intensified these challenges, with an increasing number of consumers around the globe utilizing online platforms to shop, collaborate, and connect. Retailers are transforming how they operate to meet escalating business requirements, looking to achieve high levels of agility and efficiency and deliver experiences that build loyalty.

Savvy retailers are investing in a smarter, cloud-based infrastructure that is capable of data analytics using technologies such as artificial intelligence (AI) and machine learning (ML). Advanced analytics provide critical insights to optimize store operations and uncover new sales opportunities. AI and ML models use predictive analytics to anticipate developing trends, extract real-time inventory and behavioral insights, offer personalized shopping recommendations, and allow retail workers to proactively engage consumers. These game-changing applications are key for businesses to boost revenue and gain competitive advantage.

Intelligent retailers leverage massive amounts of data for AI and ML tasks. On-prem technologies are no longer sufficient to execute data-intensive workloads at scale. To become truly data-driven, retailers need a robust infrastructure that is extremely agile and flexible to accelerate today's workloads and fuel tomorrow's growth.

Google Cloud and AMD are equipping retailers for success, introducing the next generation of cloud solutions to drive operational improvements and consumer satisfaction with greater speed and intelligence. Our cloud innovations enable streaming insights and optimal efficiency, so retailers can reimagine how they work and make decisions.

Google Cloud Confidential Virtual Machines (VMs) powered by AMD EPYC™ 7002 series processors empower retailers to modernize their operating environments and achieve better business results. With high processing capacity and memory bandwidth, retailers can unlock superior performance for a variety of analytics workloads. The latest

Google Cloud N2D VMs are the largest VMs on the market, offering up to 224 vCPUs. N2D instances provide up to 13% cost savings and up to 39% greater performance over comparable N1 instances.

Google Cloud Confidential VMs also help to protect sensitive retail data. Using AMD Secure Encrypted Virtualization, a security feature of AMD EPYC™ processors, retailers can leverage unparalleled speed and advanced data security anywhere in the world. Our cloud technologies lead the industry in flexibility, security, and cost-optimization. That's why 7 of the top 10 leading retailers trust Google Cloud and AMD to empower their operations.

The future of retail is fast and intelligent—are you ready? Visit Google Cloud and AMD online to begin your cloud journey.

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