

A grayscale photograph of a person from the waist down, wearing a light-colored, short-sleeved top and a skirt, holding several large, full shopping bags. The person is wearing dark high-heeled shoes. The background is a blurred outdoor setting with a light-colored wall or fence.

**By 2020**, customer experience will overtake price and product as the key brand differentiator. New technologies like the Internet of Things and Edge Computing help the retailer prepare for this dramatic change in buying behavior. Technology needs to support the demand of a more flexible, reliable, secure, scalable, and resilient in-store infrastructure.

# BY 2020, CUSTOMER EXPERIENCE WILL OVERTAKE PRICE AND PRODUCT

*Just a few years after the internet became a reality, Jeff Bezos founded Amazon and started to sell books online. He knew from the beginning that he wanted more. He wanted to sell everything.*

Like many other innovators, Amazon started in a garage. The servers of the company required so much power that Bezos and his wife couldn't run other electrical equipment without blowing a fuse.

Amazon's first crazy Christmas came in 1998. Today they sell millions of products per day in the weeks before Christmas. Bezos is now one of the top 5 wealthiest people in the world and Amazon is one of the 5 largest global companies.

Over the last decade, every retailer has followed the behavior of Amazon; what they do and how they do it. For many, Amazon is the innovation leader for online shopping.

The news in 2017 that Amazon was going to buy Whole Foods for \$13.7 billion was something most could not believe. Every retailer in the world was amazed by Amazon's bold move. Amazon was going physical!

## CUSTOMER EXPERIENCE

For two decades, Amazon operated online. During this period, Amazon learned a lot about customer buying behavior and how quickly consumers change the way they shop. Amazon learned that customers who shopped online also wanted to shop at physical locations. Amazon believes that the best customer experience is driven by the delivery of a combination of online and physical shopping.

Customers are continuously searching for the best combination of online shopping and an in-store experience. It will be the retailers who master that combination that will become the leaders for the coming decades. It's interesting to see what acquisitions Amazon has in mind to expand the number and type of physical stores they manage.

## CONTINUOUS INNOVATION IS REQUIRED

Many shops have closed their doors because they did not anticipate the quick changes in customer buying behavior. Traditional retailers complain they cannot fight the online retailer anymore, and they are right most of the time. They indeed lost business to the online retailers, however their lack of innovation is largely to blame.

Today's retail innovation is driven by digitalization. Retailers must innovate to provide the customer experience required to survive. Innovative retailers not only survive, they thrive, outperforming others in the same market segment. The fight for the customer has just begun.

Most retailers still use the same technologies as a decade ago: A number of Point-of-Sale (PoS) systems, one or more servers, and some external storage. Some more innovative retailers have digitized, offering in-store Wi-Fi, have a security appliance installed, or use in-store digital promotion, among other innovations.

To enable continuous innovation, in-store IT infrastructures must become flexible, scalable, and secure. Such an infrastructure is ready to support in-store innovation and promote the new applications driving tomorrow's customer experience. New technologies such as Edge computing and IoT devices will help to facilitate the needs of the modern retail store.

*The retail world is dramatically changing.*

*Customers change their buying behavior rapidly, searching for the ultimate combination of the online and in-store shopping experience.*

# INNOVATION BEYOND A CASH REGISTER AND A SERVER IS A MUST



*It is inevitable that as Edge computing matures there will be a very broad adoption in the retail market.*

## EDGE COMPUTING WILL SEE BROAD ADOPTION

In the last few years, we've enjoyed a wide variety of options for IT infrastructure including public cloud, private cloud, hybrid cloud, hyperconverged infrastructure, and more. Despite these many options, a new need has arisen in the form of edge computing.

## WHAT IS EDGE COMPUTING AND WHY IS IT NEEDED

Edge computing is the necessity for on premise IT infrastructure resources outside of the typical datacenter. These edge computing resource needs are small, not requiring a full datacenter or even a small datacenter implementation. Edge computing may require infrastructure as small as an IoT device, or infrastructure as large as a micro-datacenter of multiple compute appliances.

If you are imagining edge computing in the context of remote office/branch office computing, you aren't wrong, but edge computing can also be adjacent to manufacturing systems, medical equipment, point of sales, IoT devices, and more. The needs of edge computing are widespread across every industry.

But why edge computing and not simply cloud? Cloud computing has many benefits, especially scalability and elasticity, however the almighty cloud is not without its limits. Chief among these limits are internet connectivity and latency. On-prem infrastructure assets for edge computing provide more reliable performance and connectivity to keep systems operational even if internet connectivity fails.

Unlike full datacenter implementations, edge computing is small enough to not warrant dedicated IT staff. Due to this, the infrastructure needs to be easy to implement and manage, and easily connected back to the primary datacenter or even the cloud as needed. These requirements are what make hyperconverged infrastructure (HCI) technology well-suited for edge computing.

The problem, however, is that not all hyperconverged infrastructure solutions are created equal. Some solutions are not economically viable given their high demand for resources like processor and RAM. These solutions are too expensive to buy and too expensive to operate for edge computing.

Edge computing, particularly in retail where retail locations are abundant, requires a lightweight solution that can operate efficiently at low cost. Ease of use and operational efficiency must be combined with cost effective hardware. Not every solution can scale down to be cost effective.

It won't be long before edge computing become a common or even required feature for retailers. For instance, out-of-the way server closets in a warehouse will house the infrastructure and applications that enable real-time processing of supply chain systems without the latency or cost that might occur if the data resides remotely.

At the stores, IoT-driven backroom technology such as RFID, realtime point of sale (POS), and smart shelving systems will improve the accuracy of inventory tracking throughout the supply chain. Automated inventory management can reorder items when needed without requiring humans to take inventory, making it easier to prevent shortages of popular items at peak times such as the holidays.

# TOMORROW'S RETAIL APPLICATIONS ARE CONNECTED

## IoT

*The Internet-of-Things (IoT) is a network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors and network connectivity.*

Retailers must innovate and adopt new applications to stay ahead of the game. Retailers have to start looking at applications as a game changer, driving better customer experience.

Historically, application development in retail has produced large, monolithic applications designed with a specific functionality in mind (warehouse management systems, scanning and pricing, etc.).

These systems are traditionally interconnected through a complex web of point-to-point interfaces. Such non-flexible infrastructure configurations constrain retailers from responding rapidly in a dynamic, digital-physical environment.

## INNOVATIVE APPLICATIONS ARE CONNECTED

Retailers who don't innovate enough may end up in troubled waters. There are many examples of once mighty retailers who no longer exist or who are just one step away from disaster.

Of course, these retailers have invested over the years in monolithic applications. These applications are no longer innovative. Among these traditional applications are point-of-sale applications, scanning and stock management applications. Today however, these same applications won't drive better customer experience. New applications must be added and applications must become interconnected.

## OPERATIONAL APPLICATIONS

In principal, there are two different types of software applications. The first are operational applications. As mentioned earlier, think about software and devices for pricing (the traditional way) and labelling. Software pushing the price/weight data to the scales, inventory management, and security software belong in that category.

Another example of an operational application drives energy management. Today most stores still use conventional heating and air-conditioning systems. New innovative solutions are already in use or currently considered by innovative retailers, driving the overall energy cost down. Such applications however often rely on black box, in-store devices rather than on a VM (Virtual Machine).

Last but not least, and very high on the agenda of most retailers, is security. More IoT devices and other intelligent in-store systems mean more risk of being hacked. To overcome this growing problem, retailers must re-think they way how they secure their stores and exposure to these types of security risk.

## APPLICATIONS DRIVING CUSTOMER INTELLIGENCE

Retailers are afraid of smartphone-wielding shoppers who browse products, check pricing in-store and then purchase online. They need to explore new ways to connect with the customer while in-store. One way is through location-based beacon technology. This technology uses sensors to track customer paths through a store so that store layout can be improved.

Electronic shelf labels are intelligent labels placed on a shelf or product allowing the retailer to track if a customer, for example, takes a look at a product on a rack for a closer look. These labels can drive intelligent micro digital signage (MDS) devices at point-of-decision. Once the customer places a product back on the rack, a customized "special offer" is displayed near the item to promote that specific product.

Consumer apps make it possible to prepare your shopping list at home. Once done, in store, the customer is shown the most efficient way how to pick up the products from the shopping list that was created at home. Together with check-out technologies, the retailer can also see the different shopping behaviors from planned shopping to impulse purchases.

Other applications design and model. Think about the in-shop design of a cabinet at IKEA, or paint color design applications at home improvement stores. These applications and many, many more, are all interconnected, and most are connected with the consumer. These gather data and drive the push for more in-depth customer analytics.



# INNOVATION ON THE EDGE REQUIRES INNOVATIVE INFRASTRUCTURE

We talked before about hyperconverged infrastructures being high on the wish list of most retailer, however that decision being blocked by high acquisition cost. What if we can overcome these objections?

## WHY HYPERCONVERGED?

Hyperconverged infrastructure (HCI) is simple and easy to use. An HCI solution can be deployed more rapidly versus traditional infrastructures. It also allows better streamlining of IT operations, and reduces the management footprint by automating management tasks.

Hyperconverged infrastructures are highly availability. This typically reduces planned and unplanned downtime as well as mitigating disasters.

Hyperconverged systems are scalable. Once implemented, expanding compute and storage capacity is easy and done in minutes.

## WHAT ABOUT THE ECONOMICS?

Well this is where Scale Computing HC3 Edge comes into play. Scale Computing was not only one of the first to provide HCI solutions, but also became a market leader by providing solutions small enough and at a low enough cost to satisfy the needs of some of the smallest businesses. HC3 systems are not only known for being low cost, but also for being extremely easy to manage and easily scalable.

## SCALE COMPUTING AND LENOVO RETAIL INFRASTRUCTURE

HC3 Edge is a range of customized HC3 systems that can be as small as an IoT device with an Intel Atom processor or range up to a multi-appliance micro-datacenter. Together with Lenovo, Scale Computing delivers a customized, highly flexible, and economically viable full blown hyperconverged infrastructure for an unprecedented price point.

The advantage of HC3 for edge computing is a combination of the efficient performance, ease of use, and integration with public cloud and private cloud HC3 systems.

Not a stripped-down system, HC3 Edge has all of the features and functionality of mainline HC3 systems and can be managed along with HC3, HC3 Cloud Unity, and other HC3 Edge systems from a single multi-system management interface. HC3 Edge is the edge computing component for your complete hybrid IT infrastructure.

*“We got rid of all chaos infra in the stores, cleaned up the infrastructure, provided a template for ALL stores, able to manage all stores from one PC....*

*Consolidated the number of vendors and contracts driver better economics.*

*We created a Store-as-a-Service for ourselves and our franchisees.”*

IT Architect  
Design & Innovation  
Top 25 Global Retailer

## BENEFITS OF THE SOLUTION

The Scale Computing-Lenovo solution has many advantages over other solutions. It provides a unique performance ready to host the “store-of-the-future” workloads.

**RESOURCES** – With unique, patented software, a Scale Computing HC3 hyperconverged cluster can run on very lean hardware. As for the data handling, the Scale Computing HC3 hyperconverged solution requires less resources than any other hyperconverged solution.

**UPTIME** – A true hyperconverged cluster with built-in replication, cluster-wide redundancy, and automated rolling updates secure the best possible uptime available in the market today.

**VIRTUALIZATION** – Still uncommon for in-store retail IT caused by high reoccurring cost for the visualization software. Scale Computing HC3 hyperconverged solutions comes standard with embedded KVM-based virtualization. There is no additional hypervisor license cost and a new VM can be created quickly and easily, even automated, from the central IT organization down to the store level. The build-in virtualization software is easy to run and manage through the HC3 unified, web-based management console.

**BUILT IN DATA PROTECTION** - The Scale Computing HC3 solution offers integrated replication and failover capabilities and optional off-site cloud protection. Additional, optional security technologies are available such as UPS systems from APC by Schneider or F5 security solutions, running on the hyperconverged cluster as a VM.

**MANAGING 1000s OF STORES** - With the web-based management interface, thousands of stores can be managed from a single location in a single interface.

**ECONOMICS** - The Scale Computing-Lenovo HC3 cluster for retail offers the most economical, expandable, resilient solution available in the market today. Besides a very attractive initial price point, implementation and ongoing management cost are very low. Typically 60-80% lower versus other solutions.

## MORE INFORMATION

If you would like to know more about the Scale Computing-Lenovo HC3 solution for retail please contact your local Scale Computing representative or send an email to [info@scalecomputing.com](mailto:info@scalecomputing.com).

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