

Nutanix Xi IoT Solution for Smart Checkout

XI IOT HIGHLIGHTS

Manage Large Set of Structured and Unstructured Data Volumes:

Use AI at the edge to intelligently process IoT sensor data from connected devices.

Secure Connections:

End-to-end security from the edge to the cloud thus strengthening data security and privacy.

Increase Reliability:

Continuous operations even with unreliable low-bandwidth links.

Planet-scale Deployments:

Manage thousands of locations with one-click operations.

Freedom to Choose Your Cloud:

Built-in cloud connectors with no manual API scripts.

Freedom to Select Sensors and Devices:

Connect any sensor (e.g. Cameras) or device using multiple protocols, MQTT or IP-based systems, improving interoperability.

The Retail industry has a massive headroom for growth when it comes to merging technology with brick-and-mortar stores. As the e-commerce giants continue to grow, evolve and make their platforms smarter to suit the consumers' demands, there is a compelling need for the traditional retailers to evolve and match the expectations of today's smart consumer. With the global Retail market anticipated¹ to reach **~\$30 Bn** by 2022 growing at a CAGR of **5.3%** annually, the need for the Retail industry to transform is further cemented.

Whole slew of choices offered by online e-commerce and aggregators are changing the dynamics of the retail industry by diminishing the brand loyalty amongst consumers, evident from their continuous switch of brands. Large retailers are no longer immune to this trend and face a pressing demand to better their in-store experience and keep their customers loyal. Studies reveal² that **86%** of consumers are willing to pay more for superior customer experience. However, long checkout queues, product unavailability, lack of personalized services etc. are posing as major roadblocks for enhanced in-store experience resulting in stressed bottom-line. Lack of proper surveillance technologies and infrastructure adds to the growing woes of retailers contributing to the global retail shrinkage rate³ of **1.82%**.

To overcome these challenges, new-age technologies like **Artificial Intelligence (AI)**, **Edge Computing**, and **Internet of Things (IoT)**, need to be integrated into the traditional store components. This integration augments the overall experience for today's smart customer and has the potential to optimize whole of the retail industry encompassing multi-product supermarkets, electronic stores, restaurants and cafeterias and so on. Retailers planning to leverage IoT stand to benefit in three major ways – better customer experience across both the online and offline touchpoints, supply chain optimization, and new revenue opportunities. AI can help retailers save **\$340 Bn**⁴ annually by 2022, by increasing efficiency in several processes and operations. Estimates⁵ put the retail automation market at **\$19 Bn** by 2023, growing at a CAGR of **10.96%**, as companies look to reduce operational costs and enhance customer experience.

¹ Business wire, Zinnov analysis <https://www.businesswire.com/news/home/20190102005213/en/Global-31.88-Billion-Retail-Industry-Analysis-Outlook>

² Superoffice Blog: <https://www.superoffice.com/blog/customer-experience-statistics/>

³ PR Newswire: <https://www.prnewswire.com/news-releases/tyco-retail-solutions-releases-the-new-2018-sensormatic-global-shrink-index-in-partnership-with-planetretail-rng-300651038.html>

⁴ Capgemini <https://www.capgemini.com/research/building-the-retail-superstar-how-unleashing-ai-across-functions-offers-a-multi-billion-dollar-opportunity/>

⁵ Markets and Markets <https://www.marketsandmarkets.com/PressReleases/retail-automation.asp>

44%

CIOs believe complex legacy technologies are a significant barrier for the company's digital transformation¹⁶

14%

Increase in annual business revenue with modernised legacy systems¹⁷

13%

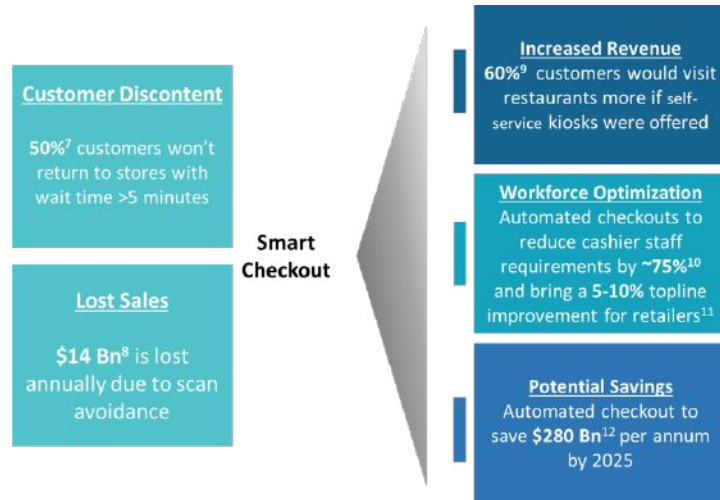
Reduction in cost of overall business operations by modernising legacy systems¹⁸

40%

Increase in developer productivity by modernizing legacy applications¹⁹

As the above technologies finds extensive application in the retail market, the retailers will need meticulous planning, and investment in edge computing to ensure efficient interaction between technology and people. This is justified by the estimate that **45%** of the data created by IoT devices will be stored, processed, analysed, and acted upon, close to, or at the edge of a network by 2020⁶.

THE FUTURE OF CHECKOUT LIES WITH AI, SCAN AND GO



With an average of 2 minutes spent on billing out of 5 minutes at stores, **Frictionless checkout** systems are seen as the only rescuer. While the large retailers are already making use of AI based smart checkout technologies, unending queues at restaurants, cafeterias, stadiums, exclusive canteens etc. remain a key bottleneck faced by today's consumers. Technology leveraging AI that can detect anything ranging from fruits & veggies to whole platters & shakes based on image recognition, tagging and classification is high in demand. According to a study by Walker, by 2020, **customer experience will overtake price and product** as the key brand differentiator. Apart from easing the checkout congestion, Frictionless checkout solution can also increase the effectiveness and productivity of the workforce and lead to improved customer satisfaction. Further, the freed-up talent and resources can be used to ensure optimal customer experience. Automating time consuming processes like checkouts can enable cashiers to increase the time they spend on more strategic activities, creating value for the organization. Cashiers can reallocate the added time towards higher-margin activities like personalized offerings to the consumers. Analysis by Mckinsey state that checkout lines could bring about a **5-10%** topline improvement for the retailers.

^{16, 17, 18} Imaginovation statistics <https://www.imaginnovation.net/blog/why-businesses-should-modernize-legacy-applications/>

¹⁹ Forrester: <https://www.ibm.com/blogs/cloud-computing/2019/04/17/forrester-study-roi-application-modernization/>

⁶ IDC <https://innovationatwork.ieee.org/how-the-edge-computing-layer-helps-with-latency/>

⁷ Forrester <https://medium.com/swlh/whats-new-in-smart-checkout-66c56bd2d452>

⁸ National Retail Federation <https://www.pymnts.com/news/retail/2018/nrf-orc-crime-fraud-scan-avoidance/>

⁹ Foodtech solutions survey: <https://foodtechsolutions.com/blog/2018/10/03/self-ordering-kiosks-are-revolutionizing-the-restaurant-industry/>

^{10,11,12} Mckinsey <https://imagine.next.ingrammicro.com/iot/why-your-retail-customers-are-losing-in-store-traffic-and-what-to-do-about-it>

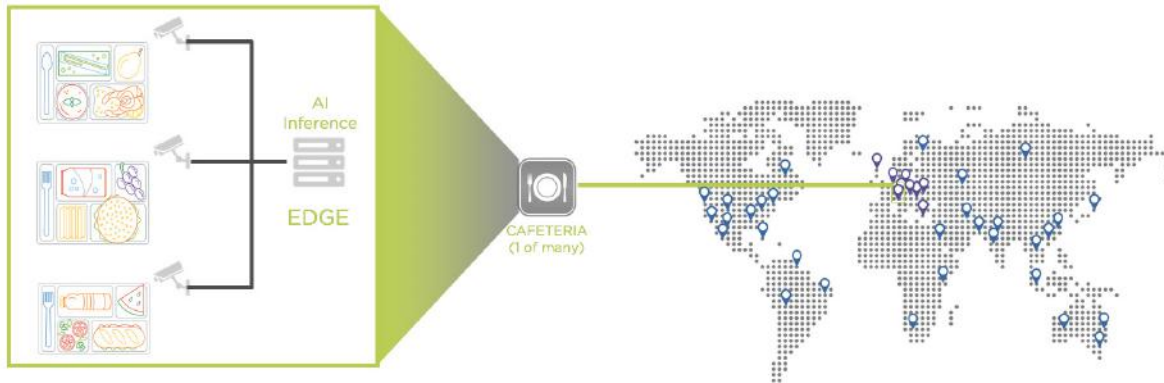
NUTANIX SMART CHECKOUT SOLUTION

With lunch time getting squeezed by ever increasing work pressure, time spent at lunch break has fallen from an average¹³ of **33 minutes in 2012 to 22 minutes in 2018**. Employees are spending¹⁴ as much as **one-third** of their lunch breaks in just choosing and billing their meal trays. With queuing time putting off **a quarter**¹⁵ of employees, there is a jarring need for convenient ways of checkouts at workplaces and canteens. Smart checkout solution powered by Nutanix Xi IoT, its edge computing platform ensures smooth and effortless checkouts and aims to ease the frustration born out at everyday eating locations like restaurants, cafeterias, university canteens and so on. Customers can simply put their loaded trays under the camera equipped with **AI** and **computer vision** technology which scans the food items placed at any angle, preparing the bill to be paid. Nutanix checkout solution provides the complete architecture to serve multiple use cases in contrast to point products catering to single use cases. With Nutanix, achieve:



Smart-Checkout solution allow the customers to scan the meal tray under a camera that recognizes the food items using **Computer Vision** and creates the bill automatically. However, these components create high volumes of data that risk overloading the networks. Consistently storing the substantial quantities of data on the cloud for long term requires extremely high bandwidth in a centralized cloud network. Processing this data on existing infrastructure can cause significant IT and business challenges, such as bandwidth congestion, lack of scalability, processing delays, limited security, and compliance and privacy issues. Further, the millions of sensors will need to consistently stream data to the cloud. **Nutanix Smart-Checkout** technology based on its **Edge Computing** platform, **Xi IoT** offers a solution for smart checkout that can help retail organizations reap the complete benefits of becoming smarter. In the case of Edge Computing, the data received from sensors and other connected devices is not sent back to a centralized data store but goes through automated analytical computations locally. Any anomalies detected are sent to a central cloud of your choice (Azure, AWS, Google or Private Cloud) where Machine learning models can be deployed. As new models are created in the cloud, they can easily be pushed to the edge store locations. Although, smart checkout can encash added benefits for retailers, it is difficult to do away with the traditional Point of sale solutions completely. The need of the hour is to run the traditional systems parallelly with the new smart-checkout systems with edge computing on Hyperconverged infrastructures (HCI) which provides on-premise IT services with the speed and operational efficiency of the public cloud.

¹³ UK employee survey by Sodexo: https://www.telegraph.co.uk/news/2018/10/20/average-lunch-break-now-last-just-22-minutes-third-six-years/?cid=registration_eng_nba158433_static
^{14, 15} Preoday blog (UK Survey) : <https://www.preoday.com/blog/employees-wasting-lunchbreaks/>

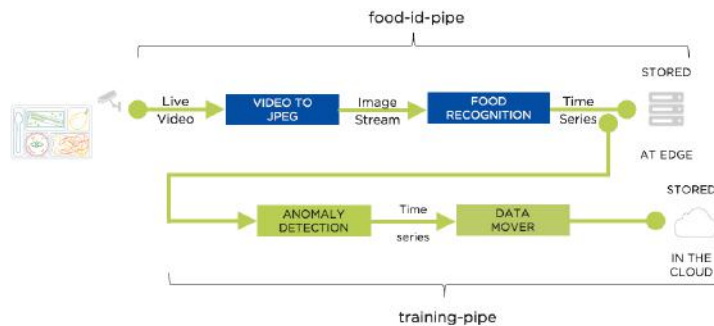


The Nutanix Xi IoT platform delivers local computation and ML solutions for the IoT edge devices, facilitating the following enhancements:

- **Eliminate complexity**
- **Achieve scalability**
- **Real time computation of sensor data streams**
- **AI-inferred data flows securely to the choice of cloud**
- **Analysis of new and existing data streams**
- **Start small, scale fast with single to multistore deployment option**

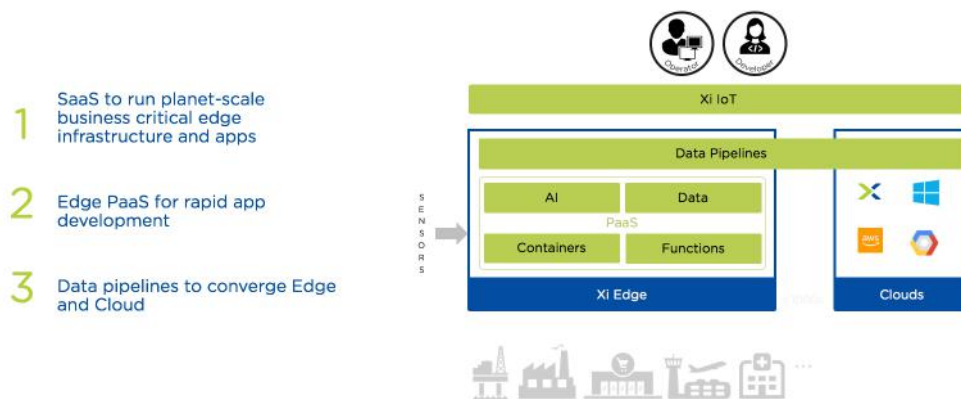
Xi IoT delivers AI-driven processing at the edge with a zero-touch software platform that powers real-time business insights and simplifies operations at a global scale. The business benefits can range from fast & efficient execution in constrained environments to identifying trends/insights to enhancing planning for more forward-looking and future schemes.

- 1 Run planet-scale business critical edge infrastructure and apps
- 2 Edge PaaS for rapid app development
- 3 Data pipelines to converge Edge and Cloud



XI IOT AND EDGE ARCHITECTURE

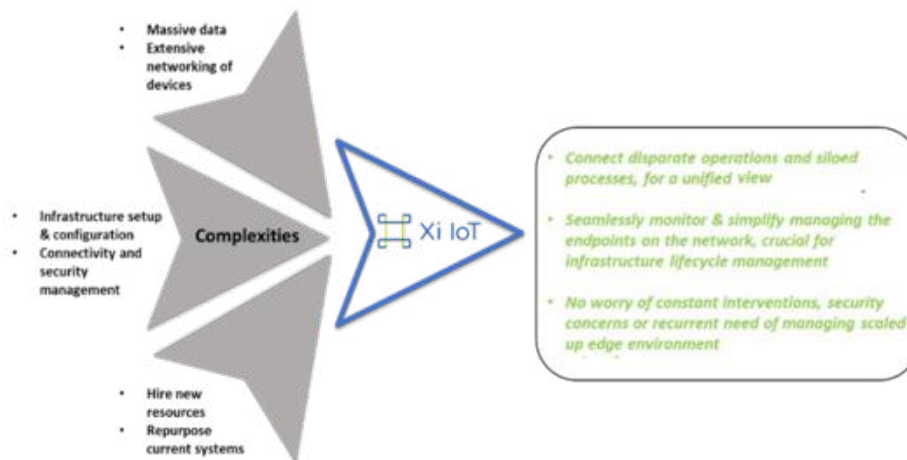
The Nutanix Xi IoT platform is highly flexible which can deliver multiple use cases on a single architecture. While automated checkout solutions are easily deployed, the platform can extend to serve multiple customer/partner applications. The Xi IoT platform is comprised of a SaaS infrastructure, an application lifecycle management plane, and an Xi Edge software running on a variety of edge hardware. The SaaS management provides an end-to-end view that is centrally managed from the cloud through a user-friendly interface and can be used for application development and operations to easily deploy at thousands of edge locations. Xi Edge can be deployed as bare metal or as a virtual machine (VM) on shared or dedicated nodes.



- 1 SaaS to run planet-scale business critical edge infrastructure and apps
- 2 Edge PaaS for rapid app development
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SUCCESSFUL EDGE COMPUTING MANAGEMENT

Smart checkout systems run a high risk of becoming obsolete vending machines, if run in isolation. With retailers no longer confined to their primary geographies, it becomes complicated to manage hundreds or thousands of smart checkout systems across diverse locations. The distributed nature of edge computing can bring along added complexity, more sensors/machines, making it extremely complex to analyze store level data at the corporate level, leading to a greater need for a coordinator. Nutanix platform-powered smart checkout can fill this vacuum and take on the role of an intermediary between consumers and retailers. Xi IoT platform has the potential to incorporate the whole retail chain into a proprietary solution allowing smart checkouts to actually become “Smarter”.



TRANSITIONING FROM LEGACY INFRASTRUCTURE TO A MODERN RETAIL ARCHITECTURE

With the speed of technological developments, bridging the gap between the conventional systems and the modern infrastructures is becoming an expensive challenge faced by organizations. By the end of 2020, every dollar invested in digital innovation will require organizations to spend at least three times the investment to continuously modernize their legacy applications. With maintenance costs exceeding the original development budget of enterprise IT software in just 5 years²⁰, cost of redeveloping solutions for industries like retail or food services is becoming simply too high. Hence, moving legacy applications onto a modern infrastructure holds a great promise for businesses that want to reduce IT spending and convert their costs into a competitive advantage.

²⁰ Altexsoft <https://www.altexsoft.com/whitepapers/legacy-system-modernization-how-to-transform-the-enterprise-for-digital-future/>

While there is a clear benefit to move away from the legacy systems, these infrastructures have been in place for decades and hence, a direct replacement to modern systems becomes unfeasible. For example, when **220 Bn**²¹ lines of Common Business Oriented Language (COBOL) code currently being used in production and **80%**²² of the financial transactions are run in it, how can the infrastructure be modernized at such a massive scale? Most organizations deal with the ocean of data by processing it all in the cloud, an approach that causes significant IT and business challenges, such as bandwidth congestion, lack of scalability, processing delays, limited security, and compliance and privacy issues. Traditional IT architectures weren't built to accommodate edge cloud workloads, and efforts to employ them in this new context often result in poor performance, increasing complexity, and untold lost opportunities.

The current demand is to identify ways to deliver on-premise IT services and a comprehensive enterprise cloud platform to bridge the gap between traditional infrastructure and public cloud services. With hundreds or even thousands of microservices constituting an application, making sense of this hefty volume of data in real-time requires the systems to be distributed and scalable. With this problem statement, IT leaders are now turning to Nutanix Hyperconverged infrastructure (HCI) to deliver on-premise IT services with the speed and operational efficiency of the public cloud. Circling back to the frictionless smart checkout systems, it has now become vital for retailers to run their legacy point of sale software alongside Xi Edge on the same Nutanix HCI stack. This will integrate the common datacentre hardware using on-premise storage infrastructure into software to create flexible building blocks helping them overcome the problems of legacy infrastructure and achieve scalability.

TRANSFORM YOUR ORGANIZATION TODAY

Together, Nutanix Xi IoT and its HCI technology enable easy accommodation and analysis of new and existing data streams contributing major digital transformation in organizations. Xi IoT enables the complete realization of the potential of data and allows the organizations to focus on core business logic. Nutanix HCI extends the simplicity and agility of public cloud combined with the performance, security, and control of private cloud. The insights from the intelligent edge running on HCI can provide a variety of benefits, including the reduction in overhead costs, reduction in service interruptions, and decrease in overall stock loss; all of which helps an organization to identify trends long before the competition, differentiate the brand, and maximize revenue.

Nutanix is committed to helping organizations modernize their data centers and edge infrastructure, so that IT can shift its focus from maintenance and operations to driving innovation.

²¹The News stack: <https://thenewstack.io/cobol-everywhere-will-maintain/>

²² Reuters: <http://ingfx.thomsonreuters.com/gfx/rngs/USA-BANKS-COBOL/010040KH18J/index.html>



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