

Nutanix Xi IoT Solution for Smart Warehousing

With a staggering **85 million**¹ packages and documents being delivered around the world on any single day, every logistics job has now turned into an express delivery. Both individuals and businesses expect to get goods faster, more flexibly, and – in the case of consumers – at a low or no delivery cost. More industries with close ties to logistics, such as retail and manufacturing, are actively embracing digital technologies, upping the chances of digital disruption flooding the logistics by many folds. The recent boom in online shopping, global supply chains, and last-mile delivery solutions, amongst others, are leading to an outstanding growth of the global logistics market, which is expected² to reach **\$6,300 billion** in 2024.



Demand for in-time deliveries

Consumers expect to receive the products in less than **48 hours**³



Rising competition

- Large industrial or retail customers and suppliers becoming players in the logistics market themselves
- New-age integrators



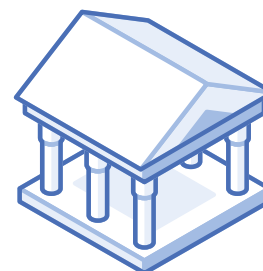
Rising product complexities

Return deliveries in U.S. alone to cost **\$550 Bn** by 2020⁴



Incorrect inventory stocking

Inventory understocking costs retailers **\$630 Bn** annually⁵



SMART WAREHOUSING

¹ World Economic Forum: <http://reports.weforum.org/digital-transformation/the-digital-transformation-of-logistics-threat-and-opportunity>

² Businesswire: <https://www.businesswire.com/news/home/20190703005488/en/Global-Logistics-Market-Reached-4730-Billion-2018>

³ Forbes: <https://www.forbes.com/sites/betsyatkins/2019/05/06/logistics-in-the-e-commerce-era/#30a1a9be574d>

⁴ Statista: <https://www.shopify.com/enterprise/ecommerce-returns>

⁵ Pymnts: <https://www.pymnts.com/news/artificial-intelligence/2019/warehouse-robots-ai-logistics-supply-chain>

About **two-thirds**⁶ of logistics and warehouse managers expect technologies like **artificial intelligence, internet of things (IoT), edge computing, robotic process automation**, and so on to deliver significant productivity gains and help solve challenges in the near future. Artificial intelligence alone can increase productivity by more than **40%**⁷ in the warehouse and logistics industry by 2035. Global warehouse industry stands at the cusp of digital transformation, having the **3rd** highest⁸ automation potential. Research⁹ finds that over **4 million** commercial robots will be installed in over **50,000** warehouses by 2025.

SMART WAREHOUSING

On the face of it, warehousing seems to be the easiest of all logistics activities – counting and receiving incoming goods, storing them, and shipping them to the right place when they are ready to be picked. However, the emergence of multiple sales channels, the need for accurate and real-time inventory management, and increasingly uncertain customer demands require much more than traditional warehousing solutions. With companies spreading their supply chain across geographies, managing them with legacy technologies and infrastructure has become virtually impossible, creating the need for **smart warehousing** solutions.

Smart warehousing requires real-time information on equipment, people, and inventory across warehouses. With this emerging need for efficient and flexible operations, AI and IoT are being implemented across warehouse functions – from storing to picking to sending and receiving products with real-time tracking and tracing of data captured by IoT sensors. However, about **90%** of data¹⁰ created today is processed in the cloud, leading to inefficiency and delayed decision making. The rising demand for real-time information requires **edge computing infrastructure** where data is created, monitored, processed, and stored. It is predicted¹¹ that by 2022, **75%** of the data generated will be analyzed on edge architectures rather than traditional cloud silos.

One of the most prominent benefits that AI brings to warehouses is its ability to find anomalies, patterns, and **predictive insights** in large data sets. It is estimated that machine learning techniques can reduce **forecast error** rates by up to **50%**.¹² With the play of AI and predictive insights in today's smart warehouses, lost sales caused by product unavailability can also be reduced to by **65%**.¹³ Edge computing not only makes warehouses smarter, but also **safer**. Every year, about **100,000** workers¹⁴ are injured due to improper training and forklift misuse. Warehouse managers can drastically reduce the risk of injuries by ensuring that all workers wear **personal protective equipment (PPE)**. IoT sensors embedded in PPEs can monitor the fatigue level of workers, suggesting rest periods and providing real-time monitoring and alerts. Research¹⁵ states that **33%** of workplace injuries are the direct result of PPE failures or non-compliance and can be eliminated through proper monitoring and alerts.

⁶ Forbes Insights: http://info.forbes.com/rs/790-SNV-353/images/Penske_REPORT-FINAL-DIGITAL.pdf

⁷ Accenture: <https://www.accenture.com/us-en/insight-ai-industry-growth>

⁸ McKinsey: <https://www.mckinsey.com/industries/travel-transport-and-logistics/our-insights/automation-in-logistics-big-opportunity-bigger-uncertainty>

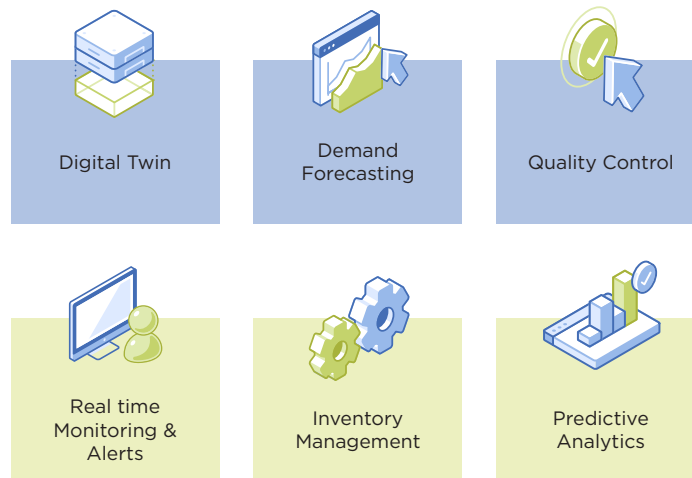
⁹ ABI Research: https://www.logisticsmgmt.com/article/robotics_in_the_warehouse_changing_the_fulfillment_paradigm

^{10,11} Gartner: <https://www.gartner.com/smarterwithgartner/what-edge-computing-means-for-infrastructure-and-operations-leaders/>

^{12,13} Forbes: <https://www.forbes.com/sites/louiscolombus/2018/03/11/10-ways-machine-learning-is-revolutionizing-manufacturing-in-2018/#24ef6d1023ac>

¹⁴ Optimum Safety Management: <https://www.optimumsafetymanagement.com/blog/forklift-safety-infographic/>

¹⁵ Cortexica: <https://www.cortexica.com/ai-on-site-keeping-workers-safe/>



NUTANIX SMART WAREHOUSING SOLUTION

Automation in warehouses is not a new concept and has been transforming logistics for years now. Traditionally deployed automation software solutions might solve the basic problem, but the massive amount of data generated in the process would go unexplored. With millions of requests straining the networks of warehouses, a single cloud solution may not be the best choice; hence, the current demand is to analyze the ever-increasing quantum of warehouse and logistics data at the point where it is being generated. Nutanix's Xi IoT platform improves **warehouse and logistics operations in real-time** by leveraging **AI, IoT, and edge computing**.

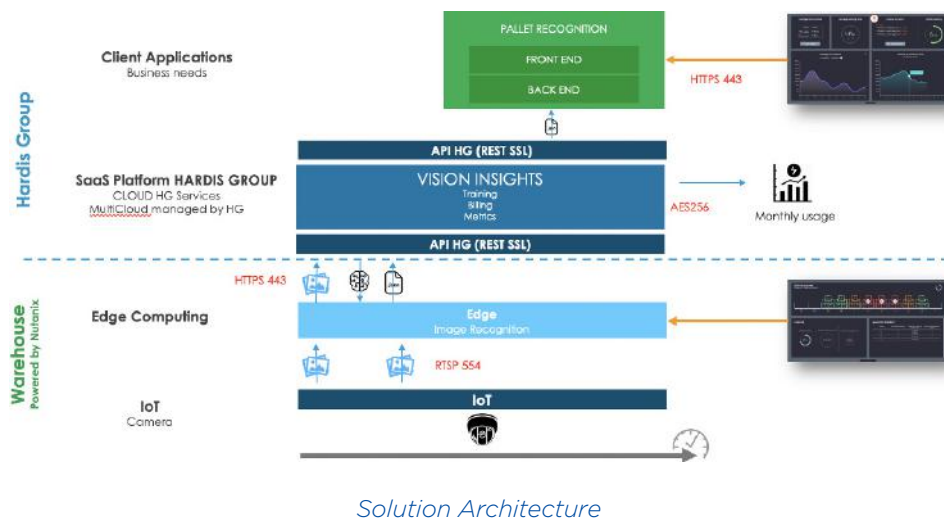
Many enterprises are plagued with optimizing supply chain processes, especially since there is never a good time to interrupt operations. Logistics is at the heart of keeping warehouses functioning – and specifically, tracking tens of thousands of pallets moving through these large warehouses can be quite challenging. However, improving existing processes without disrupting already running factories and warehouses is not always possible. That's why it's important to start with alerting and monitoring solutions that can coexist with existing environments. **Vision Insights** and **Xi IoT** can do just that.

Nutanix, a leader in enterprise cloud computing, in partnership with **Hardis Group**, a consulting, digital services, and software publishing company decided to build an innovative solution to manage supply chain and operational efficiency. Available now, **Vision Insights**, powered by **Xi IoT**, is a supply chain optimization solution comprising Hardis Group's Vision Insights software running as a container on the Nutanix Xi IoT platform. This solution will help companies harness the potential of cognitive services (image and voice recognition), IoT, edge computing, and machine learning technologies to dramatically improve the efficiency, traceability, and safety of logistics and supply chain operations in warehouses, factories, and distribution centers.



Real-time Pallet Tracking

Historically, warehouse and supply chain managers had to rely on manual processes to track warehouse logistics. With Hardis Group's Vision Insight powered by Xi IoT, customers get easy traceability of assets through real-time image monitoring and recognition. For example, sensor data from cameras, fixed or embedded on systems such as an automatic guided vehicle (AGV) or cart, will be ingested into the Xi IoT platform through data pipelines and passed to Vision Insights for AI inferencing at the edge. This enables the creation of a **digital twin** of the warehouse and real-time analysis of the situation, which can include comprehensive visibility into a specific logistics process flow, the number of pallets positioned, wet or damaged package detection, or operator errors, such as not utilizing proper safety equipment. Any anomalies in the image recognition are sent to the Hardis Group's cloud for deep learning purposes, and the entire edge platform is managed by Xi IoT SaaS management.



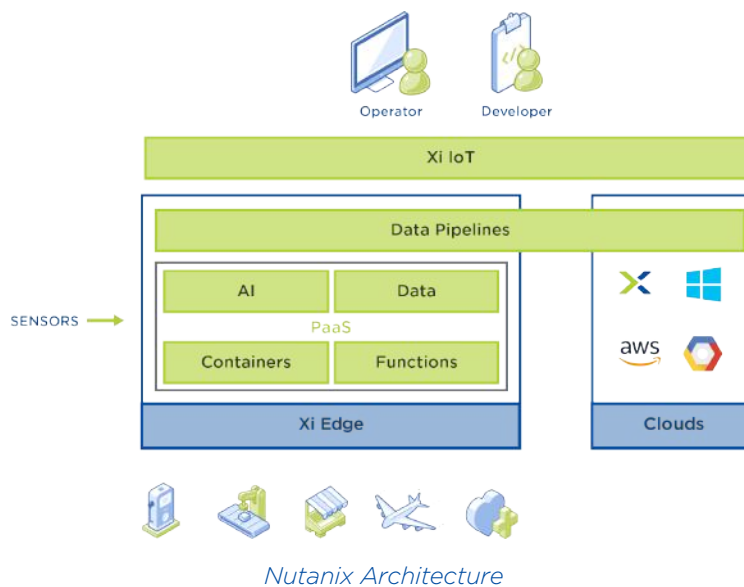
Solution Architecture

The solution aims to provide an end-to-end means for rapidly deploying complex computer vision and AI models to the factory and warehouse floor on a large-scale platform. With this solution, warehouse operators will easily increase efficiency, traceability, and safety in thousands of factories. Key benefits of this solution include:

- The ability to centrally deploy, secure, monitor, and manage the lifecycle of supply chain applications and AI models across thousands of edge locations
- The capability to seamlessly work with existing remote camera deployments for a quick path to ROI
- Support for a large variety of edge hardware devices to accommodate nearly any logistics facility
- Real-time computation of sensor data streams
- AI-inferred data flows securely to the choice of cloud
- Start small and scale fast with a single to multi-location deployment option

XI IOT AND EDGE ARCHITECTURE

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 large scale. Business benefits can range from fast and efficient execution in constrained environments to identifying trends and insights to enhance planning for more forward-looking and future schemes. Nutanix Xi IoT comprises of a SaaS application lifecycle management and Xi Edge software running on a variety of edge hardware. SaaS management provides an end-to-end view that is centrally managed from the cloud through a user-friendly interface for application development and operations to easily deploy thousands of edge locations. You can deploy Xi Edge on bare metal or as a virtual machine (VM) on shared or dedicated nodes.



TRANSFORM YOUR ORGANIZATION TODAY

Not every organization is willing to disrupt their environment, especially when operations are already set and running. Vision Insights powered by Xi IoT makes it possible to enhance the customer's environment without impeding business operations and continue to deliver enhanced business operations to reduce costs and improve productivity. The solution can work seamlessly with existing CCTV camera deployments and does not require special replacements for the existing infrastructure. This, in turn, results in huge cost savings and quicker ROI. Customers can improve the logistics performance in their factories, including the upstream and downstream of their production lines, from the moment their components and raw materials arrive on-site to the storage and shipment of finished products. Nutanix is committed to help leaders modernize their warehouses, datacenters, and edge infrastructure, so IT can shift its focus from maintenance and operations to driving innovation.



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