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Edge Platform**

Retail Media With Intel® Tiber™ Edge Platform

Introduction

Today, the retail industry stands on the cusp of a profound transformation. Advancements in Artificial Intelligence (AI), Internet of Things (IoT) and data analytics are reshaping the way consumers engage with products and brands. By seamlessly integrating digital and physical realms, retail stores are poised to deliver personalized, immersive experiences that entice and delight customers.

> The Boston Consulting Group (BCG) describes retailers as "racing toward a $100 billion high-margin annual revenue prize in retail media."[1] As advertisers continue to reallocate their communications budgets, BCG sees that retail media is on the way to becoming a major new advertising option, a "once-in-a-generation sea change, not unlike the move from traditional to digital media over the past decade."

Advertising on e-commerce sites has been so successful because brands can instantly see the effect of their marketing spend on sales. And now, brick-and-mortar retailers all over the world have a chance to offer something similar, yet in a far more immersive way. Digital Out of Home (DOOH) advertising uses digital screens to display ads and information at the point of sale, targeting customers when they're most likely to buy. These dynamic ads make shopping more engaging with personalized content. Retail media is the future of retail, where IoT meets media advertising, AI, and big data analytics.
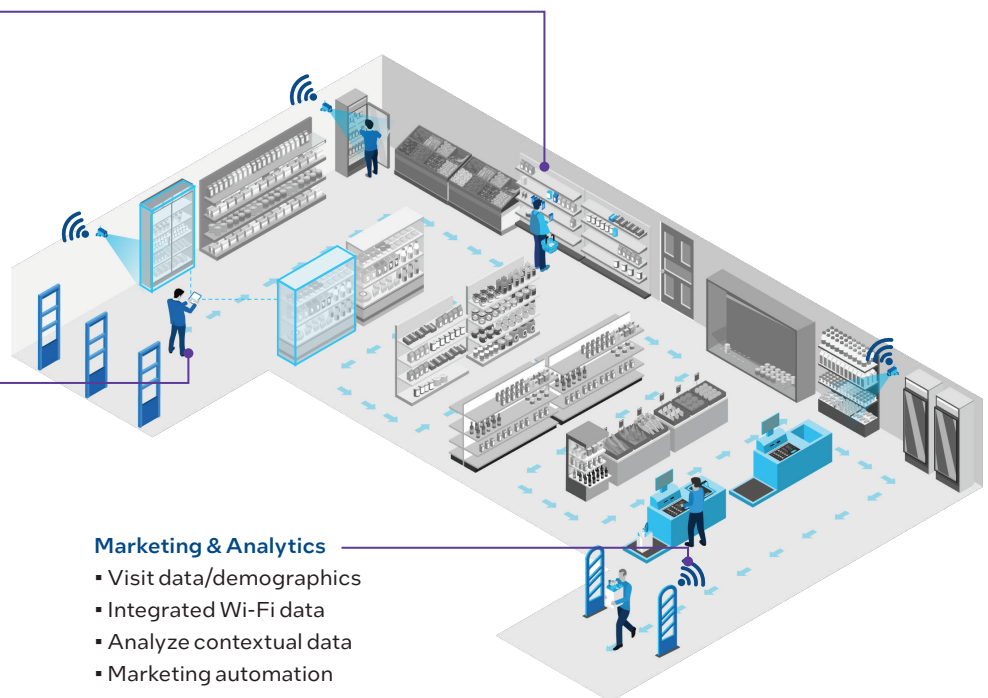
Smart Venue
- Real-time integrated campaigns
- In-venue behavioral data
- Increased revenue
- Monetize retail media network

Better User Experience (UX)
- Personal interaction
- Touchless experience
- Integrated brand exerience

Marketing & Analytics
- Visit data/demographics
- Integrated Wi-Fi data
- Analyze contextual data
- Marketing automation

Challenges

Privacy Considerations

Implementing personalized in-store advertising presents several challenges for retailers aiming to maximize this technology's potential. First are privacy concerns. Collecting and using customer data for personalized advertising requires attention to ethical and legal issues about data security and consumer consent. Balancing customization with privacy is crucial to maintaining shopper trust.

Technical Complexity

There are also technical hurdles to overcome. Integrating a variety of data sources, maintaining compatibility with existing systems and managing the complexities of real-time data processing can be challenging for retailers with limited technical expertise or resources.

Data Management and Analysis

Finally, the vast amounts of data generated by customer interactions must be accurately interpreted and analyzed. Retailers must derive meaningful insights to deliver relevant personalized advertisements effectively.

Increase customer engagement with a tailored solution

Intel, using Intel® Tiber™ Edge Platform along with a partner solution, has built a simple and secure single-stack smart venue edge-based technology to solve the above-mentioned challenges. It enables deployment of real-time programmatic marketing campaigns and network functions incrementally on the same edge infrastructure already deployed in the retail stores.

Intel Tiber Edge Platform

The Intel Tiber Edge Platform enables enterprises such as retail organizations to build, deploy, run, secure, and manage edge and AI solutions from pipeline to production with scale and manageability. Built on extensive edge expertise, it's designed for the most demanding edge use cases and to accelerate edge AI development while reducing costs.
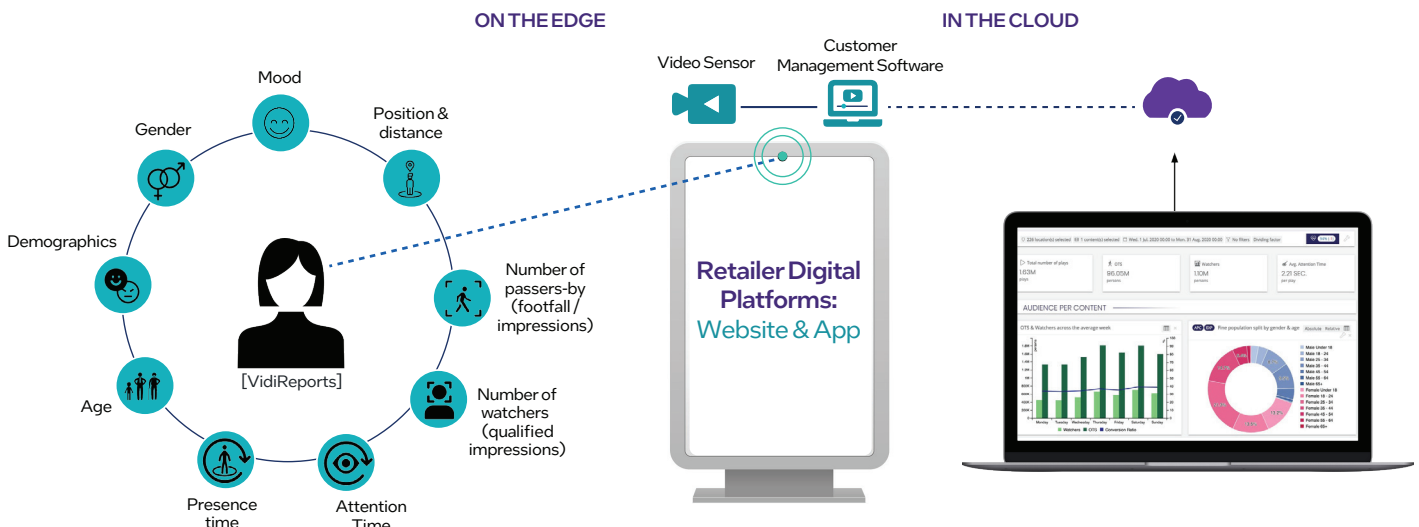
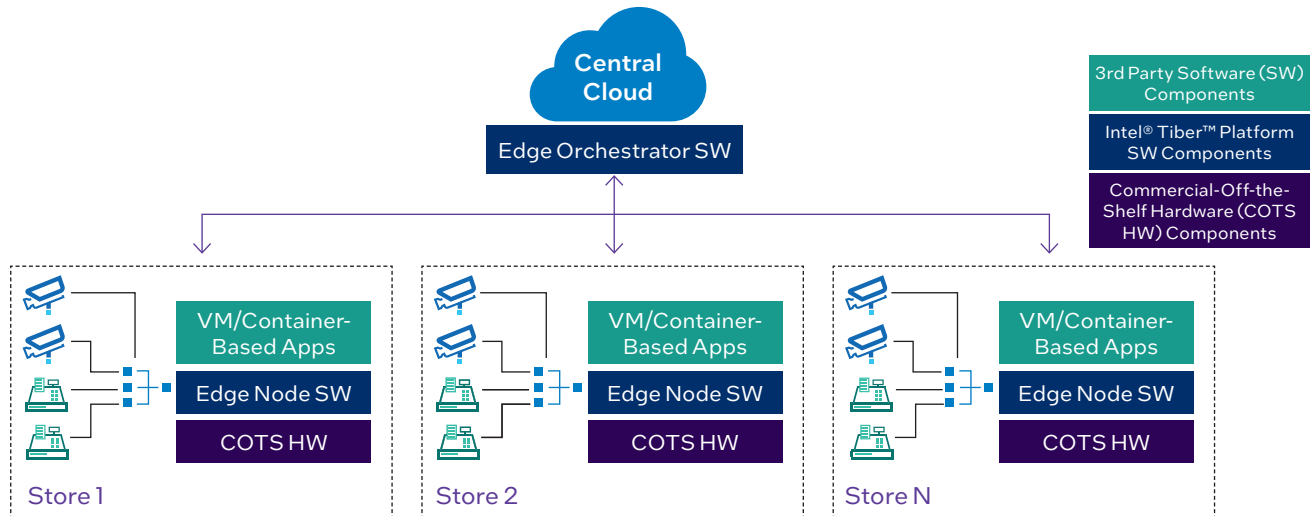The solution leverages the following components from the Intel Tiber Edge Platform:

- **Edge Node Software**: An edge infrastructure software stack with a modular implementation and well-defined APIs that provides a secure and reliable runtime for a variety of edge applications across edge vertical segments.

- **Edge Orchestrator**: A solution for cloud-like management and deployment for distributed edge networks. Its key functionality includes zero-trust and zero-touch secure provisioning, lifecycle management of edge infrastructure and automated software deployment on such infrastructure.

- **OpenVINO™ Runtime**: A core component of the OpenVINO toolkit, designed to optimize and run inference on deep learning models across various hardware platforms. It supports multiple model formats and provides an abstraction layer that ensures seamless deployment across CPUs, GPUs, FPGAs, and NPUs. This versatility makes it ideal for developing and deploying high-performance AI applications in real-time environments.

Partner's computer-vision solution

Our partner's real-time video analytics solution that runs on top of the Intel Tiber Edge Platform can detect, track and qualify faces, bodies and vehicles appearing in the field of view of the video sensor within milliseconds. It can provide unique demographic insights including gender, mood, age range etc. and combine them with insights on presence time and attention time to generate rich KPIs at multiple levels of granularity: across network, over time, per venue, per content, per demographics etc. The solution has various APIs to interact with the local content management system (CMS) in a blink.

This video-analytics solution uses data about shoppers, but without capturing personally identifiable information (PII). The technology "knows" a lot about what is going on in a store but is deliberately configured so it does not know the identity of who is doing what. Even when smart surfaces are linked to geotargeting of mobile phones, it's not people being followed, but devices belonging to

ON THE EDGE — IN THE CLOUD

Mood
Gender
Position & distance
Demographics
[VidiReports]
Number of passers-by (footfall / impressions)
Age
Number of watchers (qualified impressions)
Presence time
Attention Time

Video Sensor
Customer Management Software

Retailer Digital Platforms: Website & App

anonymous owners being detected in different places. The anonymization of data means retailers and brands using this technology are compliant with the European Union's General Data Protection Regulation (GDPR), widely seen as the gold standard on personal privacy.

Overall solution architecture

The figure details the solution architecture across multiple retail stores.

Each retail store will have a commercial-off-the-shelf (COTS) server that will have the edge node software stack installed on it. This edge node server is connected to peripherals such as cameras. All the edge nodes are securely onboarded, configured, and the video-analytics applications are automatically installed and configured onto them through the edge infrastructure and orchestrator software hosted on a central cloud. Once provisioned, all the edge nodes and their applications are observed, updated and managed from a single pane of glass in a central portal hosted on the cloud. All the analytics insights can be viewed in the same portal as well.

Overall, the solution built with Intel Tiber Edge Platform delivers an efficient cloud-like experience in addition to the low latency and data privacy benefits of the edge. It enables:

▪ **Near real-time video analytics**: Utilize video data from multiple cameras to generate near real-time insights and actions including targeted advertisements, virtual shopping guide etc.

▪ **Central management**: Provision, manage and maintain edge infrastructure and all the applications running on it through a centrally hosted orchestrator with a single pane of glass view.

▪ **Site-to-cloud connectivity**: Establish seamless edge-to-cloud connectivity, ensuring efficient and secure data transfer between local edge devices and centralized cloud infrastructure as needed.

Conclusion and outlook

Retailers and their partner brands can generate an instant, measurable effect on sales and brand equity by informing and inspiring shoppers at the key "moment of truth." Retail media is a way to provide an immersive experience that shoppers love, better engagement and sales for brands, and a highly lucrative revenue stream for retailers.

Contact your Intel representative to get started with your edge and AI solutions!

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Intel® Tiber™ Edge Platform at
Intel.com/edgeplatform

Additional resources
OpenVINO toolkit: Intel.com/openvino

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