



Smarter Steel Shelves for Enhanced Customer Experience

Technical
Whitepaper

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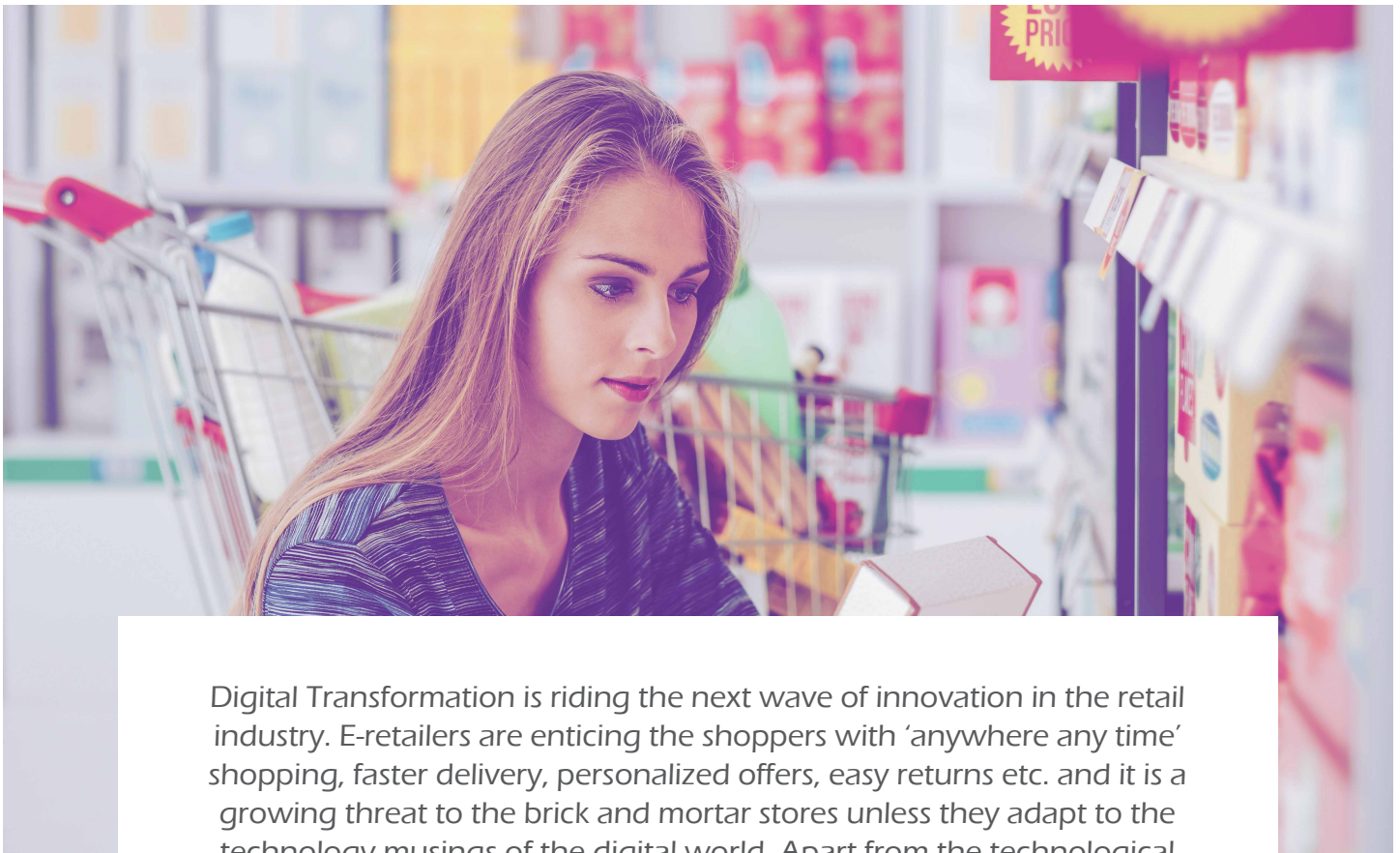


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Next Generation
Integration Platform





Digital Transformation is riding the next wave of innovation in the retail industry. E-retailers are enticing the shoppers with 'anywhere any time' shopping, faster delivery, personalized offers, easy returns etc. and it is a growing threat to the brick and mortar stores unless they adapt to the technology musings of the digital world. Apart from the technological advancements, the shoppers' expectations are also evolving at a blinding pace, when the demand for more efficient, personalized and omni channel retail shopping experiences are ever increasing.

The \$15 trillion retail sector is about to undergo a major round of disruption as it experiences a second wave of digital transformation. Retailers will need to learn new skills, embrace new technology, and take big risks

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To keep pace with the technology advancements and increasing competition from the online space, retailers are now rethinking in-store strategies. Since the visual and sensory experience that the shoppers will get through the physical stores cannot be replicated in ecommerce space with even the most sophisticated technology, retailers are exploring ways to optimize the in-store experience by enabling innovative technologies like Smart Shelves in retail.



INTRODUCTION

At the center of all this innovation is the smart shelf, able to facilitate the conversation between manufacturers and shoppers and actively participate in the selling process. The smart shelf will revolutionize the level of service retailers are able to offer to manufacturers and shoppers alike. They will interact with the shopper in a way that is natural, comfortable, and fully respectful of shopper privacy.

STORE SHELVES WILL DELIVER PERSONALIZED EXPERIENCES TO THE SHOPPER, REWARD SHOPPER LOYALTY, CREATE DATA-LED SALES AND MARKETING OPPORTUNITIES FOR MANUFACTURERS, AND MAXIMIZE PROFIT FOR THE RETAILER BY OPTIMIZING PRICING DYNAMICALLY

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Shelves will understand natural human language, context, and even sense emotional states. They will serve shoppers intelligently by assessing whether they are stressed, relaxed, in a hurry, confused, in discovery, or close to making a purchase decision. Like any good sales person, the shelf will have a personality that combines deep product knowledge, trustworthiness, great shopper insight and strong selling skills. It will navigate a wide range of conversations, make choosing easier for the shopper and move them towards purchase.

The retail sector is about to be disrupted by a set of technology and business forces that will reshape the retail landscape in the next decade. Winners in this era will partner broadly and make the short term and long term investments necessary to embrace these disruptive forces and create new value for their customers, their suppliers, and their shareholders. Losers will fight or ignore these unstoppable trends and ultimately, they will disappear from the high street forever.



BENEFITS

- Real-Time Engagement
- Automatic Replenishment Alert
- Misplaced Item Alert
- Item Position Transparency
- Customer Comfort
- Added Product Information for Customers
- Store Space Optimization
- Product popularity insights
- Increase in sales
- Enhanced Customer Experience

To unlock maximum value, smart shelves will need to be supported by a sophisticated back-end server infrastructure and Enterprise grade IoT specific middleware platform to gather, store, and analyze data, and deliver intelligent content and other digital services back to the shelf.

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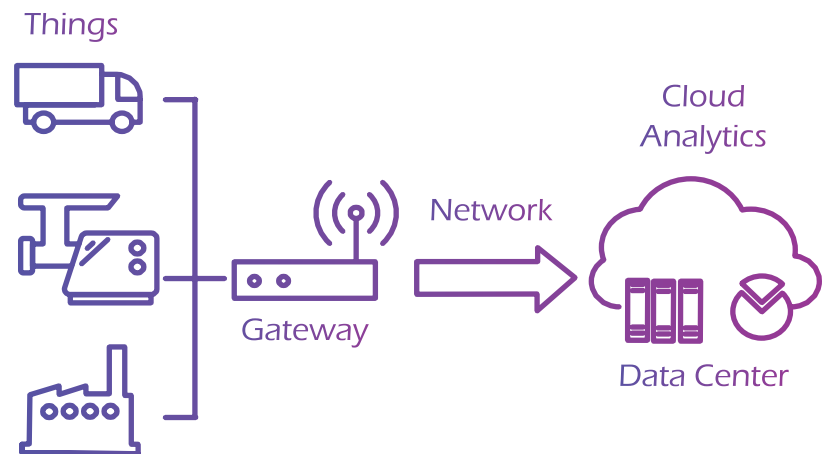
TECHNOLOGY BEHIND

IOT PROTOCOLS

A smart shelf is a shelf in a store that has been equipped with various IoT based sensors and actuators. By continuously scanning and sensing the objects on the shelf, the readers consistently notify the back-end system about the existing items and their movement.

Major Blocks of IoT / Smart shelf

- End device
- Connectivity
- Gateway
- Cloud application



Communication Protocols:

Bluetooth, Wi-Fi, Cellular – Traditional communication technologies.

Zigbee - Bluetooth like light weight protocol used widely in Industrial automation.

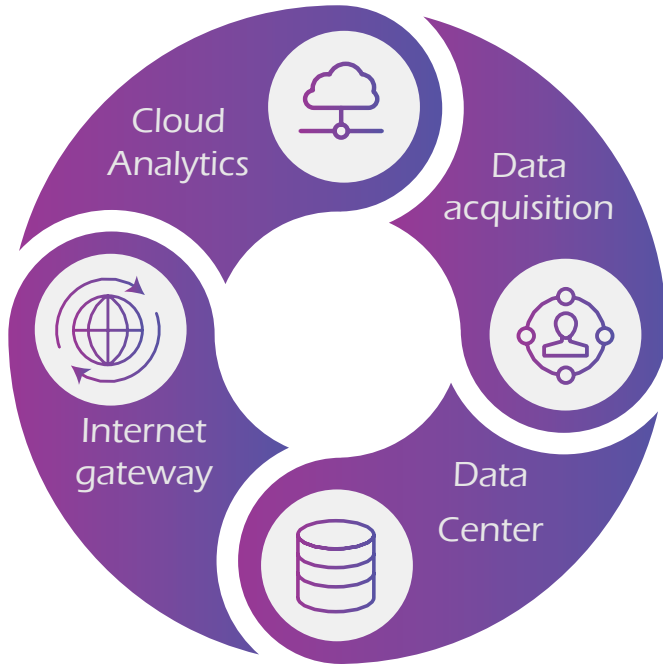
Data / Application specific Protocols:

MQTT - It's a light weight IoT messaging protocol. It enables a publish/subscribe messaging model in an extremely lightweight way.

CoAP - Constrained Application layer Protocol which is Specialized Internet Application Protocol for constrained devices.



STAGES OF AN IOT SMART SYSTEM



Data Acquisition:

Sensors/Actuators collect data from the environment or object under measurement and send it to an IoT gateway. Data is of the critical value, so need to choose between immediacy and depth of insight when processing that data.

Internet gateway:

The Internet gateway receives the aggregated and digitized data and routes it over Wi-Fi, wired LANs, or the Internet for further processing.

Data center:

The IoT connects remote assets and provides a data stream between the asset and centralized management systems. Those assets can then be integrated into new and existing organizational processes to provide high-valued insights.

Data Processing & Analytics:

Data that needs more in-depth processing, gets forwarded to analytics engine which can execute a more in-depth analysis, as well as combine sensor data with data from other sources for deeper insights.



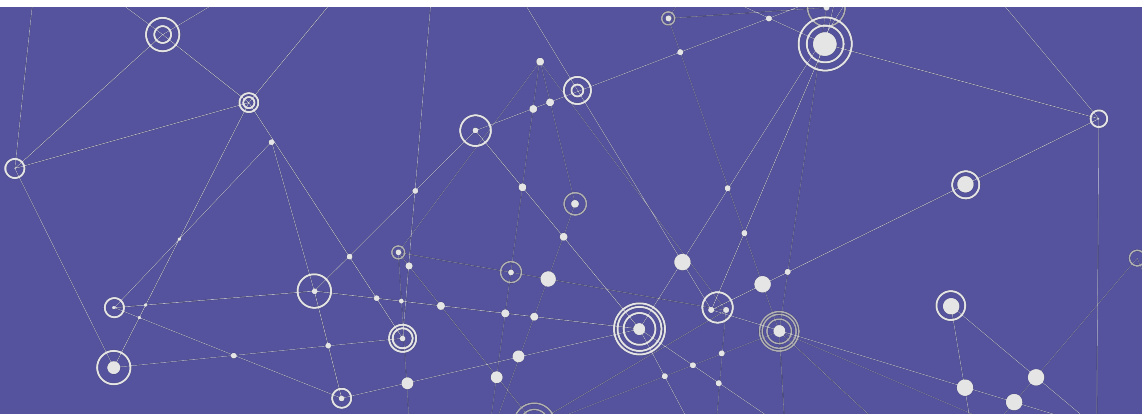


NEED FOR ENTERPRISE IOT MIDDLEWARE

As IoT evolves in the enterprise, organizations are encountering a new set of challenges among integrating data between sensors, smart devices and enterprises.

- Thousands of endpoints
- Stream messaging
- Dynamic number of endpoints
- Message volume
- New protocols
- Real time integration
- Embedded and brokered integration

Quickly enterprises are discovering a new reality: IoT requires a new type of middleware platform.





AURAS-OMNI FOR IOT INTEGRATION

AURAS (Aspire Unified Reference Architecture Solution) is the next generation integration platform which resolves the above practical IoT specific challenges through unified channel Digital services. In addition to solving IoT integration challenges AURAS also enables accommodation of POS, Ecommerce, Smart-store and Streaming Analytics specific advantages.

Unified Architecture

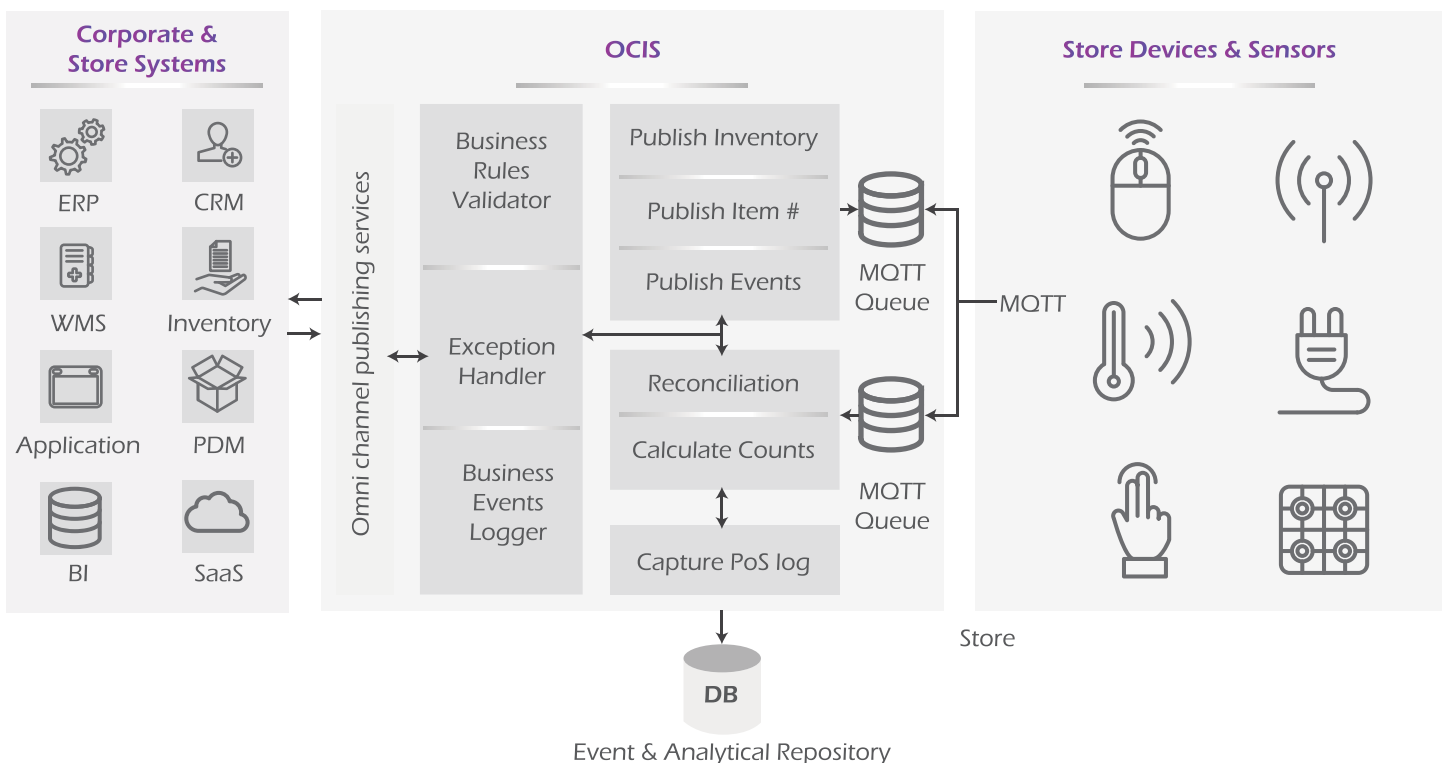
AURAS is a truly unified architecture approach that combines the best of breed technologies from SOA, ESB, MoM, API, BAM, CEP, Predictive Analytics, Cloud and the futuristic IoT (Internet of Things).

Pre-Built Framework

AURAS comes with pre-built components and services for Corporate Application Integration, Omni-Channel Integration (Stores, eCommerce and Marketplace) and Store specific service bus for POS, Smart-Shelf and Mobile Devices Integration.

Rapid Implementation

With its pre-defined documentation templates, iterative methodology, service registry and techno-functional expertise, AURAS helps to reduce implementation efforts and costs by up to 50%.



IoT Readiness

AURAS is capable of addressing emerging IoT (Internet of Things) challenges. Whether it is tracking devices at Store (Beacons, RFID, Smart Shelf, Mobile Customer Experience Improvement, Digital Carts etc.) or corporate level Supply Chain Tracking, Inventory moments etc., AURAS can be easily integrated with any of these devices through API interfaces.

Reusable MQTT Services

This Platform is built on top of messaging architecture model to accommodate MQTT message services. A federated queue model helps to dynamically scale and re-usability, thereby ensuring reduced TCO and greater ROI realization at an early stage.

Data Driven Architecture

Its data driven architecture supports greater customization and enhancement. The entire platform is built on top of metadata repository where data persistence is managed with all functional and technical artifacts.

NRF & OCF Schema and Data Models

Built based on NRF (National Retail Federation) ARTS XML Schema, IoT based Open Connectivity Foundation (OCF) and Data models, AURAS can support all retail business operations (apparels, grocery or restaurants).



CONCLUSION - A VISION FOR THE FUTURE OF SHOPPING



The ideas explored in the retail future casting session illuminated an exciting array of possibilities for the future of retail. In isolation, each idea is compelling. But put them together and the opportunities to create incredible new value, amazing new experiences for shoppers, and to totally remake the face of retail are truly compelling;

AURAS is a comprehensive, multi-layer architecture pattern to accommodate various technology initiatives in an ever-changing environment. It is based on industry proven design pattern, reusable components and best practices that rapidly accelerate the development cycle. In addition to meeting technology standards, AURAS also comes with Governance processes to manage service ownership, administration and life-cycle management



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