Retail Simplified: Product and Assortments Management for Enhanced Retail Experiences

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Abstract

Retailers face mounting challenges in managing vast and complex product data as they expand across regions and sales channels. The retail Product master acts as the core repository for product information, including attributes, pricing, inventory, and categorization. This white paper explores the challenges of managing large-scale data, delves into the technical aspects of retail assortments, and outlines strategies for efficient product management. It also examines various forms of assortments and their implementation using best practices and tools like SAP Retail, which we consider as one of the the platforms for study.

Keywords: Retail Product master, Assortments, Seasonality, Listing procedure ,Store, DC, SAP-IS Retail, CAR.

Introduction

The retail Product master is a critical component of retail operations, providing a centralized system for managing product information across diverse channels and geographies. As retailers scale up, the volume and complexity of their data grow exponentially, requiring robust solutions to maintain consistency, accuracy, and real-time synchronization. These were the foundations of a retail company for its future planning and market placement. This white paper examines:

1. The challenges of managing large-scale Product master data.
2. A comprehensive analysis of various forms of assortments and how its done to tackle multi-dimensional changes to product masters in modern retail.
3. Technical solutions for scalability and integration.

Challenges in Managing Large-Scale Product Master Data

1. Volume and Complexity of Product Data

Retailers often manage catalogs with thousands of SKUs, each having multiple variants (e.g., size, color, packaging, pricing, promotions). The complexity increases with frequent product launches, regional variations, and promotional campaigns.

- Traditional databases struggle to handle the high query and write demands of large-scale product data. Because Retail businesses are a dynamic environment, Traditional databases if not designed for

volume scalability and expandability of functions, will reel with clogged backend systems, which results in prolonged time-to-shelf.

- As an industry practice, few large retailers use In-memory computing, as implemented in SAP HANA, significantly reducing latency by processing data directly in memory.

Superior customer engagement comes from a combination of key facts available for retail applications like, for example, inventory levels of online, on-shelf availability, same day delivery, similar products availability, nearby stores availability, dropship and many more. So it's more of a layering interpretation of the same inventory at different levels for consumers. SAP HANA libraries can pull off these voluminous data at different segmentation. (*Hasso Plattner, Bernd Leukert, 2015) 44,132*

2. Data Silos and Integration Challenges

Siloed systems lead to inconsistencies in product information across e-commerce, point-of-sale (POS), and backend systems, impacting the customer experience and operational efficiency.

- Middleware solutions like SAP Process Integration (PI) enable seamless communication between disparate systems.
- Centralized Master Data Management (MDM) platforms, such as SAP MDG, eliminate redundancies and unify data. For all the master data, especially Product master data should be streamed from a central MDM system.
- Usually for Retails, in order to manage the traffic better, that is close to consumers' needs, architects often suggest a separate system for its purpose. Example promotions, pricing, assortments be handled in a separate application. This architecture paves way for bureaucracy that later has to deal with different technology adaptations for integrations.

Whatever the reason for creation of data silos, it can adversely impact a business in several ways. Collaboration of different sections of business like sales, campaign managers, planners, market analyst, product planners will need those data in different forms, unless given completely, it's going to hurt their purpose. Storing data in a database makes it generally available but not necessarily easily accessible. Building the database around an ontology that is built around how we view the world makes the navigation of the database more intuitive. *P. Tormay and H. Drews*(2016)

Real-Time Synchronization

Real-time synchronization is vital for ensuring that inventory and product data are consistent across all sales channels. Delays can result in stockouts, overstocking, or misaligned pricing. This will also hit badly in the customer experience in setting a wrong expectation for prod availabiility.

- Event-driven architectures, such as those built with Apache Kafka, allow real-time data propagation across systems.
- SAP Customer Activity Repository (CAR) enables real-time inventory visibility and synchronization.

A fashion retailer increased online sales by 14% by implementing real-time inventory updates using SAP CAR. *SAP(2018).*

Types of Retail Assortments

Retail assortments categorize products to optimize inventory and meet customer demands. Effective assortment management drives sales, reduces wastage, and improves customer satisfaction. Stores and Ominichanels have the right products at the right time with the consumers. Helps to plan clutter free store fronts.

1. General Assortments: General assortments are standard product groups available across all locations or channels. These often include staple or high-demand items.

- SAP IS-Retail(Industry Specific-Retail) enables bulk creation of general assortments using templates.
- Automated workflows ensure that updates propagate across all stores efficiently.

2. Regional Assortments: Regional assortments address the unique preferences of specific geographic locations, influenced by factors like climate, culture, or local regulations. If certain merchandise makes more sense only to those regions, it's not necessary to extend to other stores/omnichannel, which unnecessarily create planning data.

- Rule engines in SAP IS-Retail dynamically adjust assortments based on regional sales performance and demographic data.
- Predictive analytics tools identify emerging regional trends to fine-tune assortments.

A retailer used regional assortments to focus on heavy winter clothing in northern locations while stocking lightweight apparel in southern stores, increasing regional sales by 24% *A Forrester report, (2018*).

3. Seasonal Assortments: Seasonal assortments include time-bound products for specific events, holidays, or weather conditions. These assortments could be cyclically triggered. Products or Merchandises

- SAP systems use calendar-based triggers to automate the lifecycle of seasonal assortments.
- Integration with inventory systems ensures timely stock replenishment and clearance.

A Fashion retailer activated summer-themed assortments in May and deactivated them by September using SAP's calendar functions, ensuring minimal leftover inventory. *A Gartner report, (2019).*

4. Promotional Assortments: Promotional assortments feature products grouped for discounts, bundles, or special events like Black Friday.

- SAP Promotion Management synchronizes promotional pricing with assortment data.
- Real-time updates ensure consistent pricing across e-commerce platforms and physical stores.

5. Customer-Specific Assortments: Customer-specific assortments are personalized for individual customers or loyalty segments, driven by CRM data and purchase history.

- AI-driven analytics in SAP Commerce Cloud generate tailored assortments for customers.
- Loyalty programs feed data into the system to refine product recommendations.

A telecom retailer boosted loyalty program engagement by 16% by offering personalized assortments through SAP Commerce Cloud. *A Forrester report(2018).*

6. Dynamic Assortments: Dynamic assortments are critical for tailoring product availability to specific store types, regions, or customer preferences. Managing these assortments manually can lead to inefficiencies and errors. Some industry examples are,

- Rule-based engines in SAP IS-Retail automate the creation of assortments based on predefined parameters such as geographic region or seasonal demand.
- Calendar-based triggers ensure timely activation and deactivation of seasonal assortments.

Technical Features for Efficient Product Master and Assortment setup

Considering S/4HANA retail systems as an example to explain the assortment functions: Assortment Management comprises several functions and activities, such as creating assortments, and executing the article listing. An important aspect for many retailers is the implementation of shelf optimization tools, which is supported in SAP Retail through the Layout Workbench. Finally, the article data has to be provided to the individual store systems (POS), usually through the assortment list function. *SAP Learning portal.* Article is nothing but a Product in SAP-IS Retail terminology, as it serves its purpose more than the regular material master.

From the Fig1, When a site (store or distribution center) is created, the system automatically generates a local assortment specific to that site in the background. This local assortment is site-specific and cannot be shared or assigned to any other site. Each site is associated with one unique local assortment. Local assortments are categorized as category A for stores and category B for distribution centers. The technical key for these assortments corresponds to the customer number of the respective site.

Assortment management: Articles are assigned or listed for a specific validity period. The listing conditions defined for an assortment apply exclusively to the designated assortment users. For local assortments (categories A and B), the assigned user is the respective site. In contrast, for general assortments (category C), the assigned users include the relevant sites and customers. *From SAP learning.*

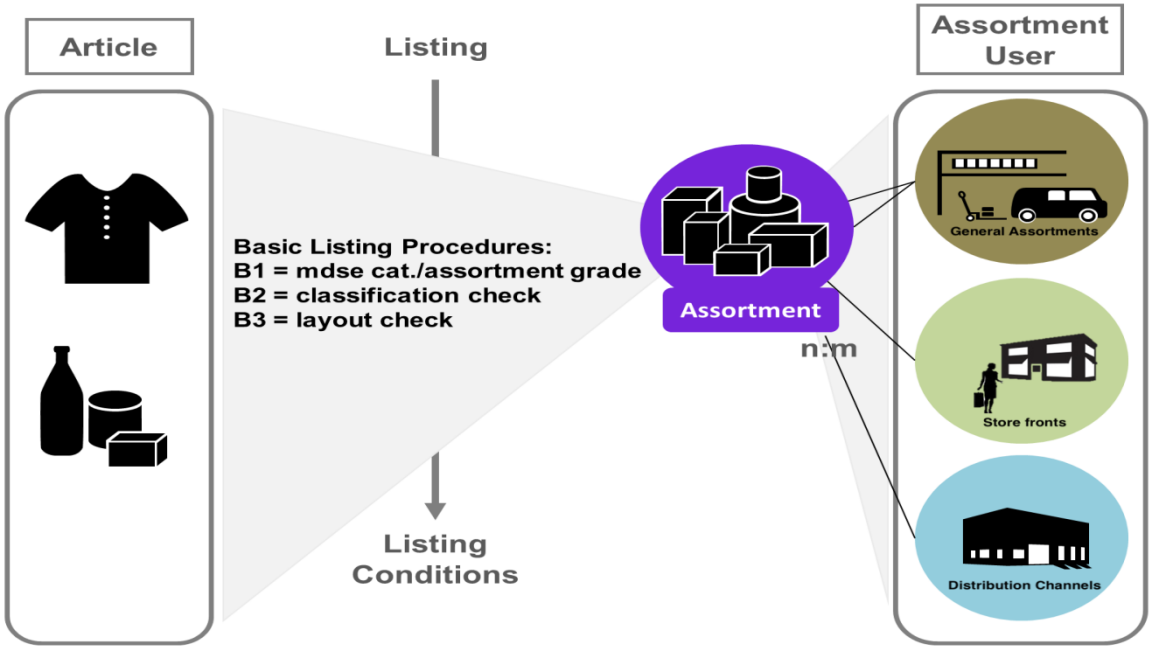

Fig1, Courtesy: From SAP portal, for assortment management.

In the IS-Retail solution, instead of assigning individual assortment users directly to general assortments, you can define reference sites and associate multiple sites with a single reference site. This grouping mechanism simplifies assortment management by reducing the workload associated with assigning sites to multiple assortments. For example, ***Reference sites*** can be structured based on regional or store size criteria. This is one of the key

This is a key step in reducing the voluminous article creation/maintenance in one-go. When using *reference sites*, you assign the reference site to the relevant general assortments, eliminating the need to assign each site individually. A site cannot be assigned to the same general assortment both directly and via a reference site to avoid duplication. However, it is possible to assign a site directly to one general assortment and through its reference site to another. Note that the reference site functionality is designed specifically for site management and is not applicable to customer assignments. Likewise we can use Reference Articles to create the same type of articles. Fig2 shows the Entity relationship of an article, assortment and listing procedural steps, which highly coupled with product management, thereby solving our core problem of Product management in high volume like retail.

Basic Listing Procedures in SAP Retail enable telecom retailers to use automated, rule-based mechanisms to identify appropriate assortments for specific products. These procedures ensure that products, such as smartphones or accessories, are only listed in locations or stores that meet predefined conditions. For example, high-end smartphones may only be listed in flagship stores equipped with demo units and technical support staff.

SAP Retail supports three key listing procedures:

B1: Basic Procedure Merchandise Category/Assortment Grade Check

This procedure validates whether an article's merchandise category is assigned to a specific assortment. Only then will the article be listed. However, relying solely on merchandise categories can be too broad. For instance, while all telecom stores might carry mobile accessories (under the accessories merchandise category), smaller stores in less-populated areas might only stock basic items like chargers and cases, whereas urban flagship stores stock premium accessories such as noise-canceling headphones and branded smartwatch bands. To refine the process, assortment grades can be assigned to articles and assortments. These grades ensure that the appropriate range of products is listed based on the store's size and customer base.

B2: Basic Procedure Classification Check

This procedure checks if the article's classification parameters align with the criteria of the assortment. For example, 5G-enabled smartphones might only be listed in stores located in regions with active 5G network coverage. Articles will only be listed if their classification parameters (such as 5G capability) match the requirements of the assortment. This approach ensures that customers in eligible regions have access to the latest products while minimizing irrelevant inventory in areas without 5G infrastructure.

B3: Basic Procedure Layout Check

This procedure ensures that products are listed only when they correspond to the layout modules assigned to the assortment or site. The product will be listed if, It is assigned to a layout module. The site or assortment

is linked to a layout containing the product's layout module, Alternatively, the assortment is directly linked to the product's layout module.

For example, telecom retailers might use this procedure to ensure that premium smartphones are listed only in stores with display setups that include secure demo units and hands-on experience areas, thereby preventing misallocation to stores without adequate display infrastructure.

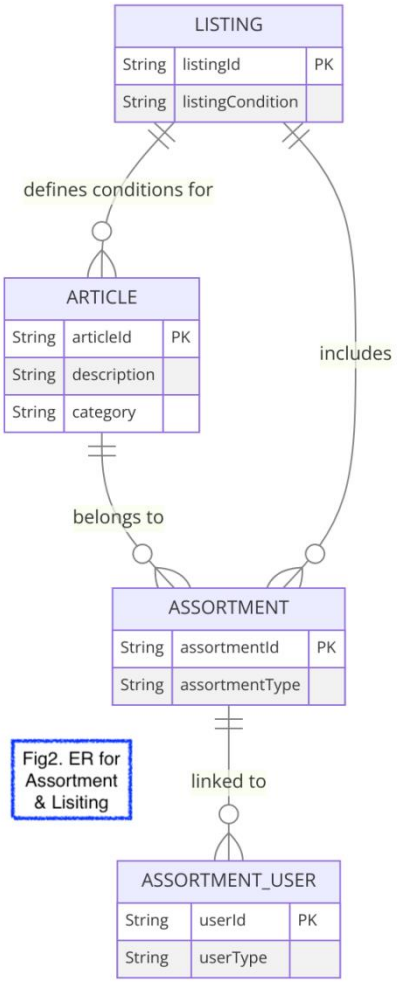

Fig2. ER for Assortment & Lisiting

Customizing and Combining Listing Procedures

IS-Retail allows telecom retailers to combine these procedures or create custom rules tailored to their specific requirements. For instance, combining the merchandise category check with the layout check can ensure that limited-edition phones are listed only in flagship stores with adequate display infrastructure and customer demand. This flexibility enables telecom retailers to optimize inventory distribution, enhance customer experiences, and ensure accurate product availability across their retail network

Technical capability

1. Dynamic Attributes. Support for regional, seasonal, and promotional tags to allow flexible product categorization.

2. Real-Time Synchronization. Tools like SAP CAR ensure real-time inventory updates across multiple sales channels.
3. Scalability. Cloud infrastructure ensures scalability for growing product catalogs and stores.
4. Data Quality Management. Automated validation rules reduce errors and inconsistencies in product data.
5. Integration with Analytics. Predictive analytics tools provide actionable insights for optimizing assortments and improving sales strategies.

Conclusion

Managing large-scale retail Product master data and various assortments requires robust systems, scalable infrastructure, and effective data governance. SAP Retail solutions like IS-Retail, MDG, and CAR provide the tools needed to address challenges and streamline operations. Certainly any other systems can also give the same functionality. But it's very imperative to have all with the same ecosystem and well connected to lessen the silos. Since Retails storefronts or Omnichannel is one of the most demanding things for a change. If organizations don't change the environment, it may lose even their loyal customers. Foundational systems are the bedrock for the Product master management and assortments of various needs. By adopting these strategies, retailers can enhance efficiency, reduce costs, and deliver a superior customer experience.

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