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Unlocking Savings with Omnichannel Article Availability and Sourcing for an Intelligent Supply Chain

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Abstract:
In today's dynamic retail landscape, customers expect a seamless, consistent, and transparent shopping experience across all channels, whether they are shopping online, on a mobile device, or in a physical store. Retailers who fail to meet these expectations risk losing customer loyalty and market share. A critical component of this seamless experience is providing accurate, real-time information about article availability and offering flexible fulfillment options. Traditional, siloed systems often struggle to provide a single source of truth for inventory and to execute complex, multi-criteria sourcing decisions efficiently.
This white paper outlines how SAP's omnichannel solutions, particularly Omnichannel Article Availability and Sourcing (OAA) within the SAP Customer Activity Repository (CAR), empower retailers to overcome these challenges. By centralizing inventory data, leveraging real-time visibility, and employing a flexible, rules-based sourcing framework, businesses can unlock significant operational savings and enhance the customer experience. This paper explores the core capabilities, technical architecture, and business benefits of OAA, providing a roadmap for modernizing the retail supply chain and achieving a truly intelligent, customer-centric operation.

Keywords: Omnichannel, Article Availability, Sourcing, SAP CAR, SAP S/4HANA, Supply Chain, Inventory Visibility, Click-and-Collect, Click-and-Ship, SAP Commerce.

1. Introduction

The rise of digital commerce has fundamentally reshaped the retail industry. Consumers no longer view online and in-store shopping as separate activities; they expect a fluid experience that bridges these channels. For a retailer, this means that a customer browsing a product online should know if it's in stock, where it's available for pickup, and what the best shipping options are, all in real-time. This expectation places immense pressure on the underlying supply chain systems.

SAP Customer Activity Repository (CAR) provides a powerful foundation for this new retail reality. By consolidating transactional data, such as real-time Point-of-Sale (POS) data, from various channels into a single, in-memory platform, CAR establishes a single source of truth. The Omnichannel Article Availability and Sourcing (OAA) module, built on CAR, leverages this unified data to deliver the accurate availability and intelligent sourcing capabilities required for modern retail operations.

This paper details how OAA not only solves the technical challenges of omnichannel retail but also translates into tangible business value by optimizing inventory, reducing fulfillment costs, and increasing customer satisfaction.

2. Problem Statement

Traditional retail supply chains were designed for a single-channel world. As new channels emerged, a patchwork of disparate systems and manual processes was often implemented, leading to a number of critical problems. Disconnected systems for online stores, distribution centers (DCs), and physical stores lead to

inaccurate inventory counts. A customer might see a product as "in stock" online only to find out it's not available in the store, leading to a poor customer experience and inconsistent inventory information. Without a holistic view of inventory across the network, retailers cannot make intelligent sourcing decisions. They may fulfill orders from a distant DC when a closer store has the item in stock, increasing shipping costs and delivery times leading to suboptimal fulfillment decisions. Traditional systems often lack the flexibility to handle complex scenarios like "buy online, pick up in store" (Click-and-Collect) or "buy online, ship from store" (Click-and-Ship), which are now table stakes for a competitive omnichannel strategy. Real-time availability checks on legacy systems can be slow, especially with large product catalogs and high transaction volumes. This results in a sluggish user experience on the e-commerce front end and poor performance.[1] Sourcing rules are often hard-coded and difficult to change, preventing businesses from quickly adapting to new market conditions, such as a temporary store closure or a peak-season surge in demand.
These limitations highlight the need for a modern, integrated solution that can provide real-time, accurate, and intelligent omnichannel services to meet evolving customer expectations and drive operational efficiency.

3. Capabilities and Literacy Review

SAP's Omnichannel Article Availability and Sourcing (OAA) is a core component of SAP CAR that addresses the challenges of modern retail. It provides a comprehensive solution by integrating data and processes across the retail value chain.
Core Components and Functionality is shown in the figure 1 with the following components.

1. **Centralized Inventory Visibility**: OAA leverages the SAP CAR's in-memory data platform to provide a near real-time view of inventory across all locations, including distribution centers, physical stores, and even vendors. The Inventory Visibility with Sales Order Reserved Quantity view in SAP CAR is central to this functionality, combining stock from SAP S/4HANA or SAP Retail with unprocessed sales data from POS transactions to provide an accurate picture of current and projected stock.

2. **Flexible Sourcing Framework**: At its heart, OAA provides a powerful and extensible framework for defining and executing sourcing strategies. It is a modular system where business users can build custom sourcing logic from predefined "building blocks" using SAP Fiori apps. This allows for the creation of strategies that prioritize factors such as:
   - **Distance**: Fulfilling from the closest location to reduce shipping costs and time.
   - **Stock Availability**: Prioritizing a DC over a store, or vice versa.
   - **Cost Efficiency**: Optimizing for the cheapest fulfillment option.
   - **Pick-and-Pack Capacity**: Ensuring that a store is not overloaded with online orders by considering its daily capacity limits.

3. **Availability Calculation**: OAA dynamically calculates availability based on the type of source:
   - **Distribution Centers (DCs)**: Availability is determined by a highly performant, parallelized ATP (Available-to-Promise) run executed in the back-end SAP S/4HANA or SAP Retail system. The results are stored as an ATP snapshot in SAP CAR to enable fast, real-time checks.
   - **Stores**: Availability is calculated using the real-time Inventory Visibility capabilities of SAP CAR, which considers physical stock and real-time sales data from POS transactions.
   - **Vendors**: Availability can be based on vendor stock information uploaded to the system via OData services. If no stock data is provided, the system can be configured to assume unlimited availability.

4. **Rough Stock Indicators (RSI)**: For a quick, high-level view of availability in online catalogs, OAA provides RSI functionality. These indicators, such as "in stock," "low stock," or "out of stock," are calculated asynchronously and replicated to the front-end application, reducing the need for synchronous calls and improving website performance.

5. **Temporary Reservations**: To prevent overselling, OAA creates temporary reservations for items in a customer's cart during the checkout process. These reservations immediately reduce the available quantity for subsequent requests until the order is placed or the session times out, minimizing the risk of unfulfilled orders.

6. **Integration**: OAA is designed for a seamless, out-of-the-box integration with SAP Commerce. However, it also provides REST APIs and IDocs that allow for integration with any third-party e-commerce platform.[2]

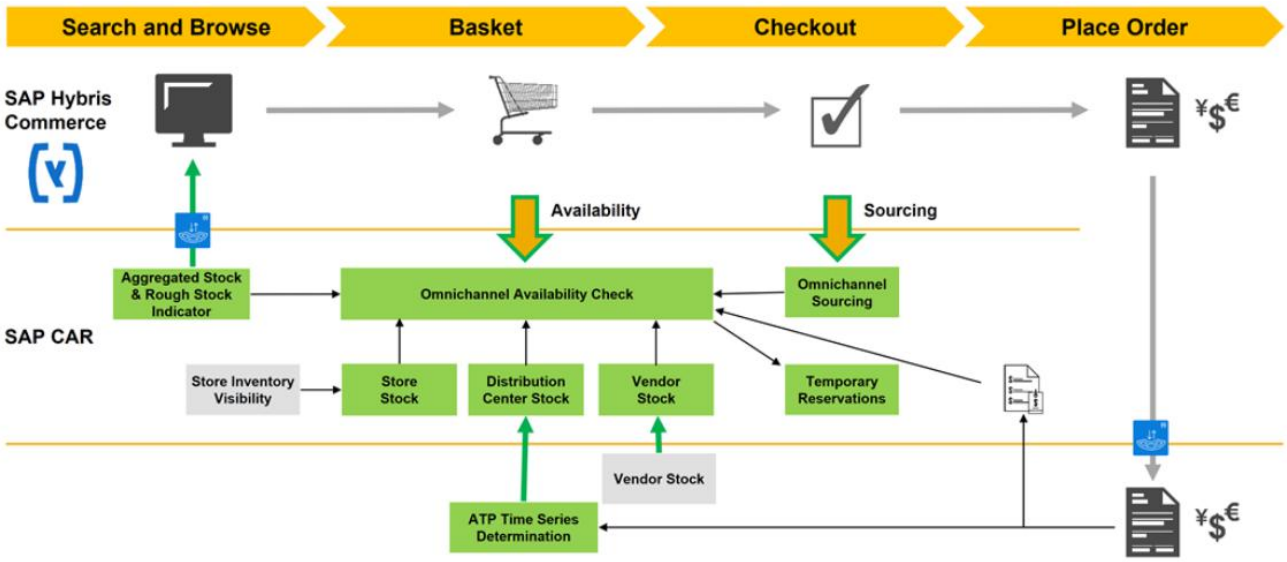

Figure 1 : Omnichannel Article Availability and Sourcing architecture , courtesy SAP

4. Detailed Explanation

OAA operates on a modular and service-oriented architecture, with SAP CAR serving as the central hub. This section delves into the technical flow of a typical omnichannel order.

End-to-End Process Flow

1. **Product Discovery & Rough Availability**: When a customer browses a product catalog on an online store, the system displays a Rough Stock Indicator (RSI). These indicators (e.g., green for "in stock," yellow for "low stock") are calculated asynchronously and stored in the front-end system. This ensures that the page loads quickly and provides a general idea of availability without performing a real-time call to the back end.

2. **Real-Time Availability in Cart**: When the customer adds an item to the cart or enters the checkout, a synchronous REST API call is made from the e-commerce platform to SAP CAR to check for detailed availability.
   - OAA references the configured sourcing network for the customer's sales channel to determine which sources (DCs, stores, vendors) are eligible for fulfillment.
   - It then performs a real-time availability check for each eligible source by querying the ATP snapshot (for DCs/vendors) or the Inventory Visibility view (for stores).

3. **Sourcing & Fulfillment Decision**: During checkout, OAA executes the configured **sourcing strategy** to find the optimal fulfillment option. The strategy, built from modular steps, may:
   - Filter out sources that are too far away or have insufficient stock.
   - Sort the remaining sources by criteria like distance, stock priority (e.g., ship from store first to clear store inventory), or fulfillment cost.

- Apply a business objective, such as One Consignment Today or Apply Rule as Few Consignments as Fast as Possible to determine the optimal sourcing result.

4. **Temporary Reservation**: Once the sourcing decision is made in checkout, OAA creates a temporary reservation for the item in SAP CAR. This reservation holds the stock for the customer's cart, ensuring it's not sold to another customer or a walk-in customer in a physical store before the order is finalized.

5. **Order Placement & Fulfillment**: When the customer submits the order, the front-end system sends the order details to the back-end SAP S/4HANA or SAP Retail system.
   - The OAA functionality ensures that the sourcing decision (the selected source) is included in the order document, typically via IDoc transfer.
   - The temporary reservation in SAP CAR is updated with a synchronization timestamp, indicating that the order has been created in the back end.
   - The backend system, based on the sourcing decision, triggers the fulfillment process, such as a Goods Issue from a DC or a Stock Transfer Order (STO) to a pickup point. The reservation is eventually removed as the order consumes the stock in the back end.[3]

5. Use Cases and Benefits

Implementing OAA delivers a multitude of strategic benefits and enables critical omnichannel use cases.

Use Cases

- **Click-and-Ship**: A customer orders an item online to be delivered to their home. OAA intelligently sources the item from the best location (e.g., the closest DC or a vendor for drop-shipment) based on the configured sourcing strategy.

- **Click-and-Collect**: A customer orders online and picks up the item from a nearby store. OAA provides real-time stock availability for stores in the vicinity, allowing the customer to select their preferred pickup location.

- **Ship from Store**: To optimize inventory and reduce shipping costs, OAA can be configured to prioritize stores for fulfilling online orders. This is particularly valuable for retailers with a large physical store footprint.

- **Vendor Drop-Shipment**: For products that are not held in a retailer's own inventory, OAA can be configured to source directly from a vendor. The vendor stock information is provided via an OData service, and OAA's sourcing logic can select this as a fulfillment option.

Business Benefits & Monetization

By providing accurate, real-time availability information and flexible fulfillment options, OAA reduces cart abandonment and drives sales. A consistent experience builds trust and loyalty, which is invaluable in a competitive market. Intelligent sourcing strategies lead to direct cost savings and optimized fulfillment costs. By prioritizing fulfillment from the closest and most efficient source (e.g., shipping from a nearby store instead of a distant DC), retailers can reduce transportation costs and expedite delivery times. OAA's real-time visibility prevents overselling and reduces the need for safety stock, freeing up working capital.[4] The ship from store capability helps monetize store inventory by selling it through the online channel, reducing markdowns , clearance costs and improved inventory management. Automating complex sourcing decisions and availability checks frees up resources. The configurable, Fiori-based sourcing apps allow business users to quickly adapt strategies without IT involvement, leading to greater business agility and enhanced operational efficiency. Consolidating inventory data and business logic in a central platform like SAP CAR

eliminates the need for multiple, disparate systems and reduces the risk of data inconsistencies to reduce IT complexity.[5]

6. Implementation Considerations

Implementing OAA requires careful planning across business, IT, and data governance functions.

- **Data Foundation**: The success of OAA is entirely dependent on the quality and accuracy of the underlying data in SAP CAR. This includes:
  - **Master Data**: Accurate product, location, and hierarchy master data is non-negotiable.
  - **Transactional Data**: A reliable and timely flow of POS data from stores to SAP CAR is essential for real-time inventory visibility.
  - **Integration**: Robust data replication is required, often using technologies like SAP Landscape Transformation (SLT) to move data from SAP S/4HANA or SAP Retail to SAP CAR.
- **Technical Architecture**:
  - **SAP CAR as the Central Hub**: SAP CAR must be correctly configured to act as the single source of truth for all omnichannel services.
  - **System Landscape**: The OAA solution relies on a well-integrated system landscape, including an SAP S/4HANA or SAP Retail back end, SAP CAR, and a front-end e-commerce platform like SAP Commerce.
  - **Performance Tuning**: Given the real-time nature of OAA, performance is critical. This includes configuring ATP parallelization profiles, sizing shared memory objects, and monitoring the system closely.

- **Configuration and Customization**:
  - **Execution Mode**: SAP recommends using the new "Sales Channel Mode" over the older "OAA Profile Mode" due to its greater flexibility and reliance on user-friendly Fiori apps for configuration.
  - **Sourcing Strategy**: Defining the sourcing strategies is a key business activity. This requires collaboration between supply chain, logistics, and merchandising teams to determine the optimal rules (e.g., which sources to prioritize, how to handle partial shipments).
  - **Extensibility**: OAA provides various BAdIs (Business Add-Ins) and extension points for custom logic, such as integrating a custom filter for sourcing or a custom calculation for available-to-customer time.

7. CONCLUSION

Omnichannel Article Availability and Sourcing (OAA) within SAP Customer Activity Repository is no longer a luxury but a strategic necessity for retailers aiming to thrive in a customer-centric, digital-first world. By providing a single, real-time view of inventory and an intelligent, flexible framework for making fulfillment decisions, OAA enables a seamless customer experience while unlocking significant operational efficiencies and cost savings.

The journey to implementing a truly intelligent supply chain requires a commitment to a modern, integrated architecture and a focus on data quality. However, the benefits from reduced stockouts and optimized inventory to increased sales and enhanced customer loyalty are substantial. By embracing OAA, retailers can transform their supply chain from a cost center into a powerful competitive advantage, ensuring they are well-positioned for future growth and success.

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