

# Bridging Supply Chain Complexity and Customization: An Exploration of SAP Segmentation in S/4HANA

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**Abstract:** *As part of its modern enterprise resource planning (ERP) solutions, SAP offers its client a functionality called 'Segmentation' that helps clients manage diverse market demands by logically categorizing materials based on characteristics such as quality, origin, or customer type. For businesses operating in a dynamic environment, segmentation ensures that supply chain processes align with dynamic market requirements. This article explores the fundamentals of the Segmentation functionality in SAP, its integration with various modules, the types of segments, and how businesses can leverage segmentation for more efficient logistics and production planning. With a focus on simplifying the technical aspects, this guide aims to help business users new to SAP but experienced in business processes understand and implement segmentation effectively.*

**Keywords:** enterprise resource planning, SAP, Segmentation, master data, configuration

## 1. Introduction

In today's customer-centric market, businesses face increasing pressure to streamline their supply chain planning and execution business processes to meet diverse consumer needs. This complexity demands a strategic approach to all aspects of the supply chain viz. manufacturing, logistics, sourcing, and planning to deliver products that match specific market segments. SAP, as a leading enterprise resource planning (ERP) solution, offers a robust functionality called 'segmentation' to address these challenges.

Segmentation in SAP allows businesses to categorize their materials logically, not only by basic attributes but also by more nuanced characteristics like quality level, region of origin/ supplier, or market-specific demands. This categorization is particularly valuable for companies that manage a large volume of data across their supply chain, helping them optimize inventory, meet customer demands promptly, and achieve operational efficiency. Although segmentation can seem like a technical process, it is a powerful tool that business users, even those new to SAP, can harness to improve their organization's performance.

This article breaks down the concept of SAP segmentation, how it integrates into different modules like Material Master, Sales & Distribution, and Production Planning, and provides insights into setting up and using segmentation effectively. The goal is to demystify this functionality, showing how it supports business processes while highlighting its practical application within SAP's various systems.

### What is segmentation in SAP and why is it useful?

Segmentation in SAP is a strategic approach that enables businesses to categorize their materials based on specific attributes, ensuring that logistics, production, and inventory processes align closely with market demands. In essence, segmentation is a method of logically organizing inventory based on characteristics like quality, region of origin, or market requirements. This organization helps in streamlining processes across the supply chain, making it easier to manage large volumes of data and inventory.

Let us consider the business scenario of textile manufacturer. Customers for this firm, which are spread across the globe, might have different preferences for fabric quality, country of origin, or certifications. Segmentation allows the company to create unique categories for these characteristics, ensuring the right product reaches the right customer segment. Similarly, in the pharmaceutical industry, manufacturers have a unique challenge – because of regulatory and compliance requirements laid down by various health agencies such as the U.S. Food and Drug Administration (FDA) in various countries, there are restrictions placed on the active pharmaceutical ingredient (API) material used to manufacture the finished product, the supplier of the API, site of bulk manufacturing, and in some cases, the manufacturer for primary packaging of a product (for example packaging the bulk tablets into bottles). Another market restriction relates to which contract manufacturers are qualified to perform finished goods packaging. As a result, it is critical for pharmaceutical manufacturers to correctly 'segment' materials at all stages of the supply chain to meet regulatory compliance requirements. Businesses can optimize their stock levels, tailor production to meet specific demands, and improve overall efficiency by leveraging the segmentation functionality.

Beyond simply categorizing materials, segmentation offers businesses a way to strategically plan their sourcing, production, and distribution processes. It ensures that the right materials are available at the right time and place, reducing the chances of stock shortages or excesses. However, it's important to note that SAP segmentation requires a dedicated license, separate from the standard SAP S/4HANA enterprise license. This distinction is crucial for businesses looking to implement segmentation as part of their SAP environment.

Segmentation is not a standalone feature; it integrates seamlessly with various SAP modules and, in effect, cuts across the full supply chain. In the Material Master module, segmentation allows for detailed classification of materials that the business deals in. Business users along with the project implementation team can define which stock

segments are appropriate for particular quality levels or specific customer segments. This detailed classification helps maintain accurate stock records, reducing errors in inventory management. In the area of Materials Management which aids in sourcing and procurement, businesses can source materials based on segmented requirements, ensuring that the procured goods align with the quality or market standards. SAP allows segment level control to be placed in purchase requisitions, purchase orders and goods receipts. In the Sales and Distribution module, segmentation plays a pivotal role in subdividing customer requirements at the sales orders level. By aligning sales orders with specific segments, businesses can ensure that customer demands are fulfilled promptly and accurately. Within the Production Planning module, segmentation strategies align production orders with customer requirements. This ensures that the produced goods meet the specific needs of each customer segment, enhancing customer satisfaction and optimizing production resources. In the Product Costing Planning module, segmentation influences cost planning and stock valuation, providing a more accurate picture of financial forecasting. By integrating segmentation across these various modules, SAP helps businesses achieve a more synchronized and efficient supply chain.

### Types of segments in SAP segmentation

In SAP segmentation, there are two primary types of segments: requirement segments and stock segments. Each type serves a unique function within the supply chain, contributing to the overall efficiency of logistics and inventory management.

Requirement segments refer to segments that are associated with customer demands. These segments help subdivide requirements based on demand criteria such as sales orders, planned independent requirements, and stock transport orders. For instance, in a sales order scenario, a customer might demand a product that meets a specific quality standard or originates from a certain region. By using requirement segments, businesses can organize these demands effectively, ensuring that each customer receives the product that matches their preferences. The use of requirement segments helps in planning upstream supply chain aspects such as production and inventory levels, as it provides a clear picture of the various types of demands that need to be met.

Stock segments, on the other hand, are related to the logical distribution of existing physical stock and procurement proposals, including planned orders, production orders, and purchase orders. Essentially, stock segments define how the available stock is categorized based on characteristics such as quality, origin, or customer type. For example, a business can categorize its stock into different quality levels, say Quality 1, Quality 2, and Quality 3, to ensure that specific customer segments are matched with the appropriate stock. By organizing inventory in this manner, businesses can streamline their stock allocation and procurement processes, ensuring a more targeted approach to meeting market demands.

Managing the relationship between requirement segments and stock segments is critical to achieving an efficient supply chain. The SAP segmentation solution allows for assignment

of custom, business defined segments to materials and respective inventory, thus enabling the system to match requirements with the appropriate stock during processes like production planning and order fulfillment. For instance, when a sales order with specific quality requirements is received, the system can identify and allocate the stock segment that meets those quality criteria. This level of detail in segmentation leads to better resource allocation, improved customer satisfaction, and more effective inventory management.

### Setting up segmentation in SAP

The setup process is conducted using specific transactions and involves multiple steps, from creating segmentation structures to assigning segmentation strategies. One of the key transactions used for this purpose is SGT\_SETUP, which provides a centralized interface for managing the configuration of segmentation characteristics.

The first step in setting up segmentation is creating a segmentation structure. A segmentation structure is essentially a combination of different characteristics that define how materials are to be segmented. For example, a company might create a segmentation structure that combines characteristics such as quality, region of origin, material type, manufacturing or packaging locations etc. In this structure, each characteristic represents a segment that can be used to categorize inventory. During the creation of a segmentation structure, SAP allows for defining multiple characteristics, which will later be used to segment materials based on different criteria. This initial setup is crucial, as it establishes the foundation for how segmentation will operate across various business processes.

Once the segmentation structure is created, the next step is to define a segmentation strategy. A segmentation strategy determines how requirement segments are mapped to stock segments within the system. In simpler terms, the strategy specifies the rules that will be used to match incoming customer demands with the available inventory. SAP provides flexibility in defining these strategies, allowing businesses to choose between different scopes to tailor segmentation to their operational needs. There are two main types of scopes that can be set within a segmentation strategy:

- Scope 1: In this scope, both requirement segments and stock segments are considered. This setup is particularly useful when businesses need a detailed mapping of stock to fulfill customer requirements. For instance, a sales order may demand a product of a specific quality (requirement segment), and the system will allocate stock that meets this quality standard.
- Scope 2: Here, only requirement segments are considered, and stock segments are not taken into account during determination. This scope simplifies the process by focusing on customer requirements without directly mapping them to specific stock segments.

After defining the strategy, businesses proceed to generate segment combinations. In this phase, all possible combinations of the characteristics defined in the segmentation structure are created. These combinations form the basis for mapping requirement segments to stock segments. For example, if the segmentation structure includes

characteristics like "Quality 1, 2, 3" and "Region: North, South," the system will generate combinations that cover all quality levels and regions. This process ensures that every possible scenario is accounted for in the segmentation strategy. Another critical part of the setup is maintaining rules for different nodes, such as Available-to-Promise (ATP) checks and Material Requirements Planning (MRP). Within these nodes, businesses can define how requirement segments will interact with stock segments during various processes. The ATP check uses segmentation to evaluate stock pools and determine if the required product is available. Businesses can set up rules that define how the system checks segment pools, ensuring that only stock segments meeting specific customer requirements are considered during the availability check. For instance, in a scenario where different segments represent various quality levels, the ATP check can be configured to prioritize stock segments that match the quality requirements of the incoming order. This process helps maintain a balance between fulfilling customer demands and optimizing stock usage. Sales order processing is another area where segmentation demonstrates its value. When an incoming sales order is received, it might include specific requirements based on product characteristics like quality, region, or packaging type. Using segmentation strategies, businesses can automatically categorize these requirements into segments, ensuring that the right inventory is allocated to fulfill the order. For example, if a customer places an order for products of Quality 1 from a specific region, the system will check the availability of stock that meets these criteria and allocate it accordingly. This level of precision in sales order processing ensures that customer expectations are met, and it prevents mismatches between customer demand and stock allocation [1].

The setup process in SAP may seem complex, but it provides businesses with the flexibility and control needed to manage their inventory and meet market demands efficiently. By carefully defining segmentation structures, strategies, and rules, companies can ensure that their supply chain operations are aligned with their segmentation goals. This alignment ultimately results in improved customer satisfaction and a more streamlined production and distribution process.

#### Common use Cases

The segmentation functionality in SAP provides a versatile framework that can be adapted to various business scenarios. By allowing companies to categorize their inventory and requirements based on different characteristics, segmentation becomes a powerful tool for tailoring supply chain processes to meet diverse market needs. Here, we explore some common use cases that illustrate the practical application of segmentation.

One of the most prevalent examples of segmentation is **quality-based categorization**. Businesses often need to handle products that vary in quality, with different customer segments demanding different standards. For instance, a textile company may classify its fabrics into Quality 1, Quality 2, and Quality 3 categories. Customers who require high-end products might only accept fabrics classified under Quality 1, while others with more flexible needs might opt for Quality 2 or 3. By using segmentation, the company can allocate batches in stock based on these quality levels,

ensuring that the appropriate products are available for each customer segment. This approach not only improves customer satisfaction but also streamlines inventory management by aligning stock levels with specific demand patterns.

Another practical use case is **regional segmentation**, where businesses categorize stock based on the region of origin. For example, a company that sources materials globally may want to differentiate products based on their country of origin, such as India, China, or Germany. In such a scenario, segmentation allows the company to subdivide its stock into regional segments, ensuring that customers receive products from their preferred origins. This regional segmentation is particularly useful for industries like food and beverage, where the origin of the product can significantly influence customer preferences and market value. By managing inventory with these regional segments, the company can meet specific market demands more effectively [1].

To take a more complex example let us look towards the pharmaceutical industry where managing inventory and ensuring compliance with regulatory standards is an elaborate process. Different batches of medications often have varying expiration dates, quality certifications, or even regional restrictions. Pharmaceutical companies must ensure that only batches meeting specific standards are distributed to the appropriate markets or customer segments. This is where SAP segmentation becomes an invaluable tool. For instance, consider a pharmaceutical company producing a medication in multiple batches, each with its own quality control results and expiration dates. Using segmentation in SAP, the company can categorize its stock into different segments based on batch quality levels (e.g., "High Quality," "Standard Quality") and expiration dates (e.g., "Expiring in 6 months," "Expiring in 12 months"). Additionally, segmentation can be used to identify stock that complies with specific regulatory requirements, such as FDA-approved batches for the U.S. market versus EMA-approved batches for the European market. When a hospital or distributor places an order specifying the need for a medication with a minimum shelf life of 12 months, the SAP system can automatically use segmentation rules to identify and allocate the appropriate stock segment that meets the specified expiration criteria. If the customer also requires FDA-approved batches, the system can cross-check this requirement within the segmentation strategy, ensuring that only batches with the necessary approval are considered for fulfillment. This segmentation approach allows the pharmaceutical company to optimize its stock allocation, reduce the risk of distributing non-compliant or expired products, and meet the specific needs of different customer segments. Furthermore, it streamlines the order fulfillment process by automatically selecting stock that aligns with customer requirements, minimizing manual intervention and the potential for human error.

Through these use cases, it becomes clear that segmentation in SAP is not just a technical process but a strategic approach to aligning supply chain operations with market demands. By categorizing inventory and requirements based on characteristics such as quality, region, and customer type, businesses can optimize their stock levels, streamline production, and improve customer satisfaction. Segmentation offers a versatile solution adaptable to various industries,

enabling companies to operate more efficiently in an increasingly complex and customer-oriented market.

### Master data setup and maintenance

Master data configuration is a critical aspect of any project implementing segmentation in SAP. Properly configuring and maintaining master data ensures that segmentation strategies are accurately reflected across various modules and processes. To start with, this activity involves setting up accurate segmentation structures and strategies within the SAP material master. The segmentation structure defines the characteristics used for categorizing materials, such as quality or region of origin. When a segmentation strategy is assigned to the material master (Basic data view), the material is automatically classified based on the specified criteria. This setup plays a vital role in ensuring that materials are managed according to the business's segmentation rules throughout their lifecycle, from procurement to production and sales. For newly created materials, SAP allows the segmentation structure and strategy to be copied from an existing reference material. This feature simplifies the process of setting up new materials, especially in cases where a business deals with multiple materials that share similar segmentation characteristics. For example, a manufacturing company introducing a new product variant can use the segmentation settings from an existing product line, thereby maintaining consistency in how the inventory is managed. For ERP migration or conversion projects, the project implementation team must take special care to ensure that the assignment of segmentation to SAP material master follows the solution design in the new SAP system.

Another important aspect of master data configuration in SAP segmentation is batch management. When a segmentation strategy includes both requirement and stock segments (Scope 1), batch management becomes mandatory. This is because batch management allows for the detailed tracking of stock characteristics, such as production date, quality level, or expiration date. In industries like pharmaceuticals or food and beverage, where precise tracking of stock characteristics is crucial, batch management in conjunction with segmentation ensures that inventory is aligned with regulatory standards and customer requirements. The assignment of accurate stock segment to SAP batch master in the Basic data view is critical for day-to-day assignment of these batches in all supply chain processes [2].

SAP also provides tools for mass maintenance of segmentation-related master data, significantly reducing the time and effort required for configuration. Tools such as LTMC, data migration cockpit or MM17 enable users to update multiple records simultaneously, applying changes to segmentation strategies, characteristics, or segment values across a large group of materials. This is especially useful for businesses managing extensive inventories, where individual updates would be impractical and time-consuming. For example, a retailer introducing a new quality standard across its entire product range can use the mass maintenance tool to apply the new segmentation characteristic to thousands of materials in one process.

In line with the broader scope of data management in any of the organization's systems landscape, maintaining

segmentation relevance for master data is a continuous and ongoing process. SAP provides options to flexibly update segmentation configurations as business requirements evolve. For example, businesses can use tools like such as business application programming interface (BAPI), intermediate document (IDOC), and other transactions to perform batch updates, ensuring that segmentation data remains current and accurately reflects the company's operational strategies. This flexibility is key to adapting to changes in market demand, regulatory requirements, or internal business processes.

### Advanced features in SAP segmentation

SAP segmentation offers several advanced features that allow businesses to fine-tune their inventory management and supply chain processes. These features go beyond basic segmentation, providing companies with tools to handle complex requirements and enhance operational flexibility.

One of the most powerful advanced features is flexible segmentation. This functionality enables businesses to assign segmentation to different plant and material combinations, allowing for a more nuanced control of inventory across multiple locations. For instance, a company can define different segmentation strategies for the same material depending on the plant in which it is stored. This flexibility is crucial for organizations that operate in multiple markets, each with distinct demands and regulations. Using flexible segmentation, a business can tailor its segmentation strategy to fit the specific needs of each plant, ensuring that inventory management aligns with regional requirements and market characteristics. As previously mentioned, SAP provides the capability to configure flexible segmentation using various standard SAP tools, such as BAPIs, IDOCs etc. This flexibility enables businesses to integrate segmentation into their existing workflows and automate segmentation assignments across different data points.

Another key feature in SAP segmentation is the default segment values functionality. This tool allows businesses to pre-define segment values that the system will use automatically during processes like sales orders, purchase orders, planned orders, and production orders. By establishing these default values, companies ensure consistency in how segmentation is applied across different transactions. For example, a manufacturer can set a default quality level for a product line, ensuring that all relevant sales orders default to a specific quality segment unless otherwise specified. This approach streamlines order processing, as users do not need to manually input segmentation details for every transaction.

SAP also supports segmentation data replication, which is essential for organizations using multiple SAP S/4HANA systems. Data replication allows for the transfer of segmentation information between different systems, ensuring consistency and accuracy across the enterprise. This capability is particularly valuable for companies that have complex supply chain networks, where segmentation strategies must be synchronized across various plants, warehouses, and distribution centers. The Data Replication Framework (DRF) within SAP facilitates this process, allowing businesses to define replication models and filter settings to control which segmentation data is transferred. For

example, a company can set up a replication model to transfer only the segmentation structures relevant to a specific market or region. This level of control ensures that each system receives only the data it needs, maintaining a streamlined and efficient data management process. Moreover, the replication framework offers multiple execution modes, including manual, initialization, and parallel processing, to handle different business scenarios. For instance, parallel processing can be used to transfer large volumes of segmentation data in batches, reducing processing time and minimizing system load. By offering such flexibility in data replication, SAP helps businesses maintain accurate segmentation information across their entire systems landscape.

## 2. Conclusion

Segmentation in SAP is a powerful functionality that serves as a bridge between the technical aspects of supply chain management and the strategic needs of a business. It provides businesses with the ability to categorize materials based on a variety of characteristics, such as quality, region of origin, or customer type. By implementing segmentation strategies, companies can align their inventory management, production planning, and distribution processes with market demands and customer requirements. This not only enhances supply chain efficiency but also helps businesses maintain optimal stock levels, streamline order fulfillment, and meet specific market standards.

Setting up segmentation in SAP involves defining structures, creating strategies, maintaining rules for various business processes and continuous master data maintenance. Although this setup can be complex, it provides companies with the flexibility and control necessary for managing inventory across multiple locations and meeting diverse market requirements. The advanced features, such as flexible segmentation, default segment values, and data replication, offer even more tools for companies to fine-tune their supply chain operations and ensure consistency across different systems and business units.

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