

KDD004 - Item Identification in Global Track & Trace

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Issue

As a good practice, batch is globally used in Syensqo to track and trace the movements for homogenous partial quantities of required materials /products.

However, in the Composite Materials business, batches are also used to track and trace the movements for individual pieces of materials in some scenarios, even if they have the same characteristics and should belong to the same batch. This is not a standard use of the concept of batches. This KDD assesses the option of using SAP serial numbers to manage the individual pieces of items in the relevant scenarios.

Recommendation

SAP offers serial number functionality to enable detailed tracking and tracing of individual material units throughout their lifecycle. However, for GBU Composite Material, giving the specific business requirements outlined below, Batch Management will still be the recommended approach for managing lot/sublot processes, including both raw materials, manufactured products as well as the tolling products.

- Inventory must be managed using a continuous variable unit of measure (UoM), such as kgs or meters. In this case, a discrete UoM such as each or piece, which is a fundamental requirement for enabling serial number management, is not suitable as the base UoM.
- The conversion between a continuous variable (eg. meters) and a discrete UoM (eg. each) can vary even across different production batches of the same material. Each conversion factor is limited to rounding to the nearest unit with decimal places.
- The customer defines specific rules to generate the required batch numbers linked to particular specifications.

Based on the above requirements, leveraging track and trace functionalities through serial number management would require extensive custom developments and introduce additional complexity. This approach conflicts with the project's principles of standardization and simplification. Therefore, Batch Management remains the recommended solution.

Additionally, the use of embedded intelligent logic in the batch numbering structure can limit scalability and flexibility. It is therefore recommended to decouple this logic from the batch number itself. The approach for achieving this will be further explored during the detailed design phase.

Note - Endorsement#789

Option of decoupling the embedded intelligent logic from the batch numbering has been investigated together with SMEs. However, due to the potential large enhancements and change impacts on current business processes, it has been endorsed to continue use the embedded intelligent logic in the relevant batch numbering.

Background & Context

In the following business scenarios, batch number is used to track and trace the movements for individual pieces of material in Syensqo.

1). Sublot Scenario#1

For example, Sublot Rolls are made from a Master Roll as per steps below:

- A Master Roll is a piece of carbon fabric of 1 meter wide x 100 meters long
 - A SAP batch number, for example MROLL1, is generated and assigned to the Master Roll
- A Process Order is created to manufacture Sublot Rolls
 - The master roll (batch MROLL1) is consumed
 - 5 separate pieces of sublot rolls are produced
 - Each sublot roll is 20 cm wide x 100 meters long
 - Another 5 SAP batch numbers are generated to identify each of the sublots: MROLL1 0001, MROLL10002, ... , MROLL10005

2). Sublot Scenario#2

For example, the production of Parent Tape, Sub-rolls and Slit-rolls can be:

- The 1st Process Order is created to produce Parent Tape with batch# PTAPE1
- The 2nd Process Order is created to produce Sub-rolls from the Parent Tape
 - For example, 3 Sub-rolls are produced with 3 different batch numbers: PTAPE101, PTAPE102, PTAPE103
- The 3rd Process Order is created to produce Slit-rolls from a Sub-roll, and pack into boxes
 - For example, 2 Slit-rolls are produced from Sub-roll batch# PTAPE101, with different batch numbers : PTAPE10101, PTAPE10102
 - Pack 2 Slit-rolls into one box

3). Non-Sublot Scenario

In another case, packed FG (finished goods) are produced from a bulk FG.

For example,

- 500 liters of a liquid adhesive (bulk FG) is produced with SAP batch BATCH1.
- The bulk liquid adhesive then has been packed in 5 liter cans (packed FG).
 - In total, there are 100 cans of the adhesive in BATCH1.
 - Business may number each individual cans by using unique numbers related to adhesive BATCH1, eg. BATCH1 001 for can#1 , BATCH1 002 for can#2 , etc.
 - Those unique can numbers look like sub-batch numbers, in some cases, they're stored in SAP, but in other cases, they are only being used to physically identify the cans and not stored in SAP.
 - If business need to track & trace each individual can movements, they can't do so in SAP currently since the can number is not stored in the system. In this case, we need to bring the information back to SAP to match with the physical activity.

In those scenarios, business will print the Master and/or Sub Batch depending on the requirement. Batch numbers are limited to 10 characters. Most are 6+4 or 6+3, but other schemes are also possible.

Also, in the above scenarios, relevant raw materials are following the same batch naming rules as the manufactured products.

Assumptions

1. Business needs to track & trace the historical movements of the relevant materials at the individual item level.
2. Master Roll and Sublot Rolls use different material numbers.
3. Bulk finished goods and related packed finished goods use different material numbers.
4. Inventory must be managed using a continuous variable unit of measure (UoM), such as kgs or meters, instead of a discrete UoM such as pieces.

Constraints

Using one batch number per item to mimic serial number tracking is technically possible, but it introduces several key constraints and challenges that often make it impractical.

1. Intelligent logic embedded in the batch numbering structure limits its scalability and flexibility.
2. Assigning a separate batch to each individual item results in a significant increase in batch master records, leading to higher master data maintenance efforts.
3. Processes designed for batch handling, such as inspection lot usage decisions, become excessively granular and unnecessarily complex.
4. Batch numbers do not offer the same out-of-the-box track and trace capabilities provided by serial numbers. Custom reports need to be built to fulfill the corresponding requirements.

Impacts

In SAP, Batch Management is designed to manage groups of homogeneous material (e.g. lots or production batches), whereas Serial Number Management is specifically designed to track individual items uniquely throughout their lifecycle. Assigning one batch number per each material piece to mimic serial number functionalities is technically feasible, but it introduces several important implications.

1. Deviation from Intended Use

SAP batch management and serial number management are designed for different purposes. Repurposing batch functionality can lead to potential inconsistencies. For example, SAP allows to merge batch numbers which contradicts the intention of a unique identifier. This can also create confusion when both functionalities are used in the company. User trainings are required. To mitigate these risks, user training is essential, and clear business rules must be established to ensure proper control and governance.

2. Performance and Data Volume

Assigning a unique batch to each material piece will significantly increase the number of batch master records and the overall database size. This can potentially slow down batch-related transactions, such as inventory movements, batch searches, and reporting.

3. Data Maintenance Efforts

Maintaining a large number of individual batches will require greater effort, increasing the risk of human error and adding complexity to automation processes.

Business Rules

- When batch number is utilized to mimic serial number, transactions such as batch change and batch merge should not be performed.

- Information such as customer specifications should be stored in the relevant batch characteristics.

Options considered

Option A: Introduce Serial Number (SN) combined with Batch Management

With this option, during goods receipts from production, relevant Serial Numbers (SNs) will be generated and assigned to each of the material items. It is also possible to generate the required SNs in advance and prepare the relevant labels before goods receipt. SN and relevant Batch number should be printed on the label with the scannable barcode to streamline the downstream transactions such as stock transfer, stock take, picking/packing and goods issue etc.

1. Sublot Scenario

For the above Sublot scenario, with introducing SN, the Sublot Rolls will be received into the same batch number as the one for Master Roll, and with serial numbers generated for each of the Sublot rolls.

Note: a development may be required to force receiving Sublot Rolls with Master Roll batch number. Otherwise, discipline will need to be established to follow the batch rule.

Master Roll/Sublot Roll	Option A (SN + Batch)
Master roll (which is consumed to make the following...)	Batch only: MROLL1
Sub-lot roll 1	Batch/SN: MROLL1/SR0001
Sub-lot roll 2	Batch/SN: MROLL1/SR0002
Sub-lot roll 3	Batch/SN: MROLL1/SR0003
Sub-lot roll 4	Batch/SN: MROLL1/SR0004
Sub-lot roll 5	Batch/SN: MROLL1/SR0005

2. Non-Sublot Scenario

Similarly, for the above Non-Sublot scenario, packed FG (Finished Goods) will be received using the bulk FG (eg. 500L liquid adhesives) batch number. If business needs to track the movement of each individual cans, serial numbers can be generated for each of the packed FGs (eg. 5L cans).

Bulk FG/Packed FG	Option A (SN + Batch)
Bulk liquid adhesive 500 L	Batch only: BATCH1
Packed liquid adhesive 5 L - Can# 1	Batch/SN: BATCH1 /CAN001
Packed liquid adhesive 5 L - Can# 2	Batch/SN: BATCH1 /CAN002
...	...
Packed liquid adhesive 5 L - Can# 100	Batch/SN: BATCH1 /CAN100

Option B: Replicate As-Is Batch Number Logic

With this option, one batch number will be assigned to each piece of sublot rolls or packed FG items. Custom developments are required to automate the processes:

- Automatically generate the batch number in process order based on the pre-defined rules.
- Automatically generate the batch number in IPA during goods receipt of sublot rolls.

1. Sublot Scenario

For the above Master Roll example:

Master Roll/Sublot Roll	Option B (Batch Only)
Master roll (which is consumed to make the following...)	Batch: MROLL1
Sub-lot roll 1	Batch: MROLL1 0001

Sub-lot roll 2	Batch: MROLL1 0002
Sub-lot roll 3	Batch: MROLL1 0003
Sub-lot roll 4	Batch: MROLL1 0004
Sub-lot roll 5	Batch: MROLL1 0005

2. Non-Sublot Scenario

For the above liquid adhesives example, sub-batch numbers can be generated in or outside SAP depends on the business track and trace requirement.

Bulk FG/Packed FG	Option B (Batch Only)
Bulk liquid adhesive 500L	Batch: BATCH1
Packed liquid adhesive 5L - Can# 1	Batch: BATCH1 001
Packed liquid adhesive 5L - Can# 2	Batch: BATCH1 002
...	...
Packed liquid adhesive 5L - Can# 100	Batch: BATCH1100

Evaluation

Based on four different criteria, the below matrix compares the pros and cons of above 2 options when tracking and tracing the movements for individual piece of materials. Each option is assigned with a Harvey Quarter to indicate the extent of alignment with each criteria. A four quarter  means fully aligned, whereas a zero quarter  means not aligned at all.

Although option A - serialization combined with batch management - is a standard SAP solution with better traceability of individual item movements, it requires extensive custom developments to meet specific inventory management business requirements. This reduces its overall score against the evaluation criteria outlined below.

Criteria	Option A (SN + Batch)		Option B (Batch Only)	
Standardization	 Cons Although serialization combined with batch management is a standard SAP solution with better traceability of individual item movements, to fulfill specific business requirements, it requires multi-dimensional unit measure conversion and extensive custom developments, which contradicts with the standardization and simplification principles.		 Cons - Non-Standard SAP solution In standard SAP S/4HANA, batch number is used to track groups of items with unique number and common characteristics. So to utilize the batch number for individual tracking, either discipline or development is required to guarantee the batch number generation for each of the items rather than one batch for the whole goods receipt quantity. - System does not reflect physical activity It's a workaround solution by assigning different batch numbers to the same batch of material, eg. 5 different Sublot Rolls are produced from same Master Roll in the same process order. They're the same batch. Similar to packed liquid adhesives. So in this case, using different batch numbers in SAP system does not match with the physical activity.	
Traceability	 Pros SAP serial numbers can be used in various business procedures within Logistics. In each case, a transaction history is created for the individual serialized material item and its status is maintained automatically. Serial number is also integrated with many other business procedures and objects, such as production orders, inward movements from repetitive manufacturing, equipment and refurbishment order in plant maintenance. Standard SAP reports are available to list the required serial numbers, check the statuses, track and trace all the transactions related to particular serial numbers for relevant materials and batches.  Cons QM inspection at serial number level in conjunction with EWM is not (yet) supported in S/4HANA. In this case, if EWM is in use, the inspection will be performed at the material batch level.		 Pros Batch Management is integrated in all applications of the SAP system. It supports the management and processing of batches in all of a company's business processes, such as inbound, outbound, quality management and warehouse management etc. The batch where-used list shows the path of the batch from its procurement/manufacturing to its delivery to the customer or other sites within company.  Cons Since the link between original batch and each individual subsequent batches relies on the numbering rule, the track and trace ability relies on the correct batch numbering and usage when performing relevant transactions.	

Change Management	 Cons New concepts and processes related to serial number will be introduced to business and users. Training is mandatory. Note: Serial number has already been used in Syensqo but only in plant maintenance. So business may already have some basic understandings serial number management.	 Pros Users are familiar with batch/sub-batches concept and processes, so no extra training is required.	
Future Proof	 Cons Extensive custom developments are required to meet specific inventory management business requirements, which constrains the solution adaptability and upgrade ability.	 Cons The solution is tied with batch numbering. Considering batch contains only 10 characters, and 6 or more characters are fixed for original/master batch, this limits the subsequent batch capacity, which constrains the solution adaptability.	

See also

KDD Endorsement



Glossary

Abbreviation	Acronym / Term
KDD	Key Design Document
IM	SAP Inventory Management
WM	SAP Warehouse Management
EWM	SAP Extended Warehouse Management
HU	Handling Unit
SN	Serial Number

File	Modified
PDF File KDD004 Approval.pdf Approval from Composite Materials heads of functions Industrial @Stephen Lutter and Supply Chain @John Parker below. Plus endorsement from CM Entity Experts.	Nov 12, 2025 by CHI EW-ext, Yock Sang
PDF File DA offcycle endorsement KDD004.pdf DA offcycle approval	Sept 08, 2025 by CHI EW-ext, Yock Sang
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Change log

Version	Published	Changed By	Comment
CURRENT (v. 76)	Jul 30, 2025 07:26	HE-ext, Cindy	
v. 75	Jul 14, 2025 07:07	HE-ext, Cindy	
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v. 73	Jun 30, 2025 16:12	HE-ext, Cindy	
v. 72	Jun 30, 2025 16:11	HE-ext, Cindy	
v. 71	Jun 30, 2025 16:02	HE-ext, Cindy	
v. 70	Jun 25, 2025 14:53	HE-ext, Cindy	
v. 69	Jun 25, 2025 14:47	HE-ext, Cindy	
v. 68	Jun 24, 2025 20:21	WENNINGER-ext, Sascha	
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Nov 12, 2025	Actor	Type	Activity	Version
Approved	 CHIEW-ext, Yock Sang	State	changed state to Approved at 6:56 am	v76
Pending SteerCo Review	 CHIEW-ext, Yock Sang	State	gave <i>Final Approval</i> approval at 6:56 am	
Sept 16, 2025				
	 CHIEW-ext, Yock Sang	State	changed expiry date to '30 Sept, 2025 03:26 pm' at 3:26 pm	
		State	changed state to Pending SteerCo Review at 3:26 pm	v76
Pending Stakeholder Review	 CHIEW-ext, Yock Sang	State	gave <i>Stakeholder Review</i> approval at 3:26 pm Marked as endorsed based on evidence	
Sept 08, 2025				
	 CHIEW-ext, Yock Sang	State	changed expiry date to '15 Sept, 2025 11:57 am' at 11:57 am	
		State	changed state to Pending Stakeholder Review at 11:57 am	v76