

# KDD082 - Solution for Plants without an MES

|              |                                                                                                                                                 |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Status       | Approved                                                                                                                                        |
| Owner        | NICASTRI-ext, Michele                                                                                                                           |
| Stakeholders | GERVAIS, Pascal ROSSE, Jean-Luc GONZALVEZ-ext, Antonio COUDRY, Arnaud Emmanuel Xavier LEIGHTON-ext, Dean NARAH ARI-ext, Bhargavi THEORET, Alain |

## Issue

Several Manufacturing Plants in the current scope for project SyWay are not using AVEVA PI nor Aspentech. Therefore, we must define a common solution for Manufacturing Control and Actual Production Postings for these plants.

In the case of composite we also need to consider that even plants with MES, we will remain with well over 60% of the workcenter across Composite GBU where production declaration is performed without any MES capabilities. 80% plus of Composite plants will be using Mixed solution of MES and no MES

The list of plants completely without any MES includes:

| GBU                 | Plant             |
|---------------------|-------------------|
| Specialty Polymers  | Newark            |
| Specialty Polymers  | Rheinberg         |
| Novecare            | Dhaymers (Taboão) |
| Novecare            | Méréville         |
| Novecare            | Levin             |
| Novecare            | Roha              |
| Composite Materials | Rock Hill SC      |
| Composite Materials | Orange CA         |
| Composite Materials | Kalamazoo MI      |

As per the information collected in Conceptual Design, the Newark plant is currently in SAP ECC, but it is not using any Manufacturing SAP functionality.

## Recommendation

The Project Team recommend Option B: use one single Production Confirmation Dashboard to fulfill with one object three requirements coming from different directions:

- Provide a flexible and easy to use tool for production confirmations. This is going to be the new Syensqo standard for all production operators who need to book their time tickets and the goods movements directly in S/4HANA, either because they do not have an MES system or their MES is not integrated yet.
- Substitute the current IPA custom development in Composite with a new Dashboard that provide the same functionalities with a better user experience and a modernized technology
- Provide a Validation/Confirmation Tools for the plants and production lines served by the MES integration, to allow the supervisors to check, edit, validate the proposals from MES interface.

Option A (Neptune Apps) will be anyway available for all cases where Syensqo decide to privilege mobility confirmations.

## Background & Context

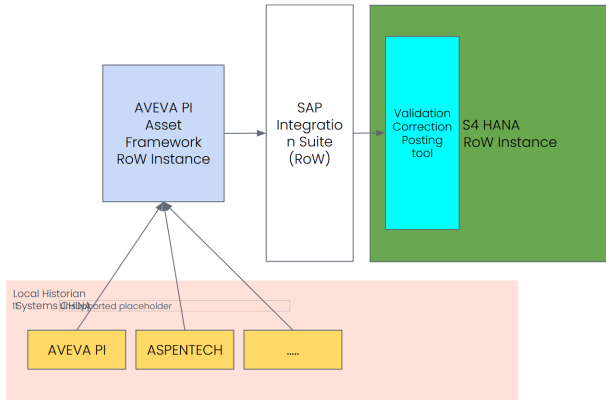
There are some requirements to be considered in context together with the topic of this KDD:

- Composite Materials GBU is using a custom App to book production confirmations in the current SAP ECC WP2. It is commonly known as "IPA" and these are the main features it provides:
  - associate multiple Sales Order Items to a single Process order
  - allow the production confirmations for each combination Process Order-Sales Order Item
  - Show in a single Dashboard multiple Process Orders / Sales Orders and their target quantities, with relevant production information: Customer Spec, position of the target product in the Semifinished roll, etc.
- The MES integration with S/4HANA will features 5 main Data Flows:
  1. Process Order Data at Release

2. Process Order Changes
  3. Consumption of Process Order Components, including by-products Goods Receipt
  4. Time Tickets
  5. Main Products and Co-Products Goods Receipts by Process Order
- The last three listed data flows, which are from MES to S/4HANA, will require a Validation/Editing Tool in S/4HANA, as per the architecture we agreed on, there is no enough confidence on the accuracy of the data that S/4HANA will receive from the MES systems for several reasons. The proposed postings must be visible, editable by the Production Supervisors before they are booked in S/4HANA.

This is the representation of the agreed architecture:

#### TO-BE AVEVA PI AF → SAP S4 Integration Design TO BE Architecture MES to S4 Rest Of the World



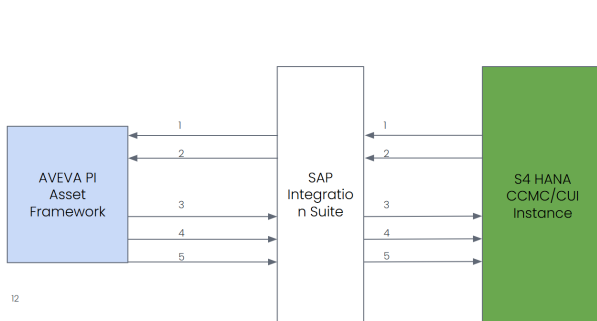
PI\_AF acts as a Global MES, it collect and standardise the data from the Local MES systems and send them to S4/HANA systems.

The attributes of each data flow must be sufficient to steer them to the right instance (e.g. plant based)



And this is the Recap of the Data FLoWs in scope for Sy-Way Project:

#### TO BE Functional Data Flows



ONLY 5 standard Data Flows will exists, they must be able to manage all business cases.

1. Process Order Release
2. Process Order Changes (including Status Changes)
3. Production Goods movements for components / by-Products
4. Production Confirmation (Time Ticket)
5. Production Goods Movements for Main product and Co-Products

We do not create dedicated data flows for specific business case, each data flow must be functionally complete to be used for different business cases (Mass balance of chemical plants, component declaration with S/N for Composite, etc.)



## Assumptions

1. The MES integration Model will be implemented as agreed
2. We will build a new "IPA" for Composite to fulfill the same requirements
3. The possible variants that the proposed solutions will need to manage are:
  - a. EWM and not-EWM managed Storage Locations, HU-managed and not-HU-Managed Storage Locations for Components Consumptions
  - b. EWM and not-EWM managed Storage Locations, HU-managed and not-HU-Managed Storage Locations for Goods Receipts
  - c. Only Time Tickets by Operation/Phase for Activity Confirmations, Confirmations by Event and Order Confirmations are not in scope

## Constraints

N/A

## Impacts

The implementation of the proposed Option B will require a clear definition of the business rules and Apps to be used in confirmations for the different cases of integration with LO and EWM:

HU vs not-HU managed storage locations for consumptions

EWM vs not-EWM managed storage locations for GR

The development of the proposed Dashboard must happen in collaboration between Production, Logistic and EWM teams.

## Business Rules

Components' consumptions will rely on the BOM used by the process orders, therefore it is worth mentioning here a business rule that has been defined in the Production Master Data Workshops:

"The BOM will list all components which are used in the production process, in the production line or immediately nearby, used before or simultaneously with Production Goods Receipt". Only Packing materials added in the Warehouse won't be in the BOM.

To put this rule in context, here are some examples:

- all Raw Materials used in the process must be in the BOM, including the cases of current BOMs which are missing the Monomers
- all Packing Materials which are an integral part of the product, like separators, carton boxes, aluminium bags, etc. will be part of the BOM
- Materials used in extra packing activities executed in warehouse, like the transparent film used to wrap the pallet, won't be part of the BOM

## Options considered

### Option A: Mobile Apps on Neptune for Production Confirmations

The following Apps are already defined in scope, to be used as possible Production Confirmation Tools in case there is no MES, or there is MES but no interface:

- Goods Issue of Components per Process Order
- Goods Receipt of Target Products per Process Order
- Confirm Time Ticket per Process Order
- Material Staging per Process Order

They are a viable and simple solution to confirm production on mobile devices, however, they are less suited for plants and production lines where Wi-Fi connectivity is poor or absent.

### Option B: Validation / Confirmation Tool built for the MES integration used also for non-MES cases

To discuss this option, we need a look at the integration model we are going to build with the MES systems.

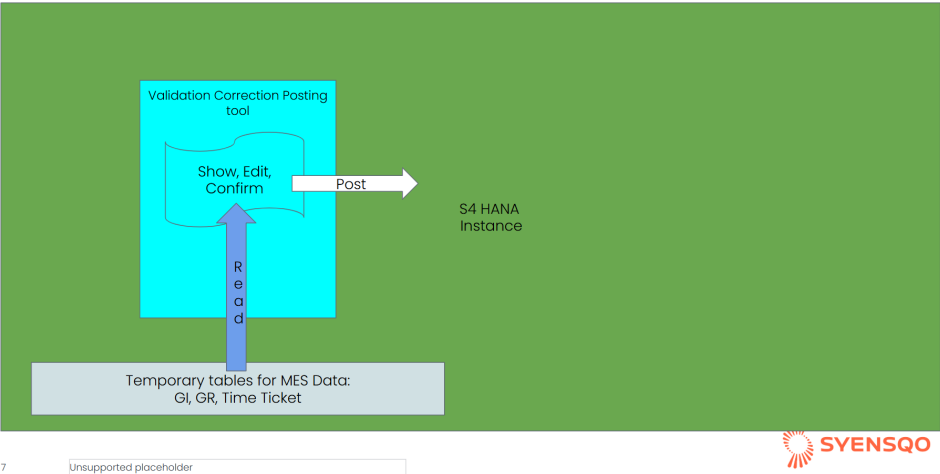
From S/4HANA to AVEVA Asset Framework, we will send the Released Process orders, with the full set of data. This will happen at Release and for any subsequent change.

From AVEVA Asset Framework to S/4HANA, we can receive Components GI (including by-products GR), Time Ticket, Target Products GR (including Co-Products).

**These last three data flows won't post immediately in SAP, a validation tool will be developed to allow the user to check, approve, edit and post the data arrived from MES.**

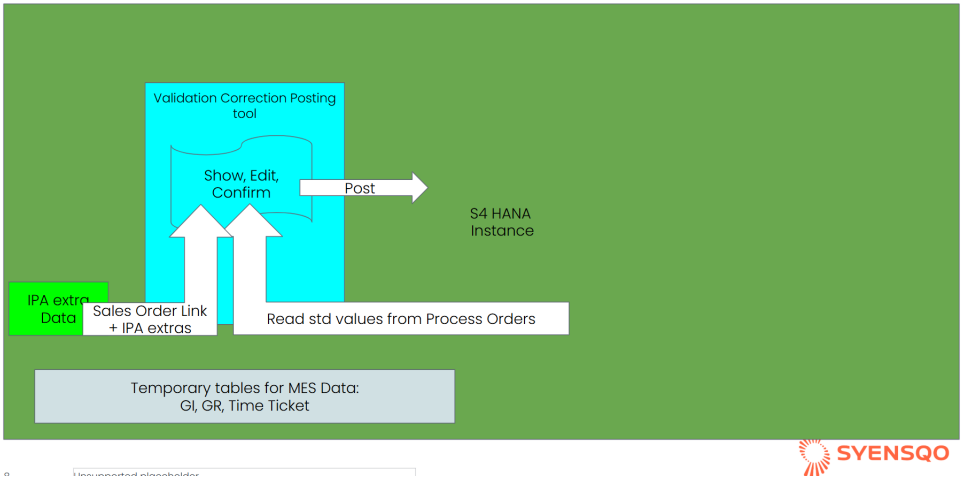
The Validation tool will work as described by this model:

How the Validation-Correction Tool will work



The same tool, with the same layout and features, can be used also for cases without MES integration and can be extended to fulfill IPA requirements as per this model:

How the Validation-Correction Tool can also work for cases without MES



This is a first Draft of the Mian Cockpit we will design:

How the Validation-Correction Tool - Layout Draft Example

Show, Edit, Confirm

| Selection Criteria                    |               | Process Order | Start-End Dates  |           | Material       | Plant         | Target St. Location | Target Batch | Sales Order (like IPA) | etc...              |               |                    |                   |                   |              |                  |                  |          |             |             |                |                  |
|---------------------------------------|---------------|---------------|------------------|-----------|----------------|---------------|---------------------|--------------|------------------------|---------------------|---------------|--------------------|-------------------|-------------------|--------------|------------------|------------------|----------|-------------|-------------|----------------|------------------|
| Global Actions on all selected lines: |               |               |                  |           |                |               |                     |              |                        |                     |               | View BF comp.      | BOOK CONFIRMATION | GI Non-BF Comp.   | GR By Prod.  | Post Manual GI   | Update Batch Cls |          |             |             |                |                  |
| SELECT                                | Process Order | Phase         | Sales Order Item | Milestone | MES auto conf. | Lead Duration | Var. Duration       | Yield        | Scrap                  | Backflush Component | View BF comp. | BF comp. Pre-Check | Auto GI           | BOOK CONFIRMATION | Non-BF comp. | Non-BF pre-check | GI Non-BF Comp.  | By-Prod. | GR By Prod. | Final phase | Post Manual GI | Update Batch Cls |
|                                       | 10001234      | 0020          |                  | NO        | N/A            | 2 H           | 2 H                 | 1200 KG      | 50 KG                  | YES                 | View BF comp. | OK                 | NO                | BOOK CONFIRMATION | NO           | N/A              | GI Non-BF Comp.  | YES      | GR By Prod. | NO          | Post Manual GI | Update Batch Cls |
|                                       | 100001234     | 0040          |                  | NO        | N/A            | 1 H           | 2 H                 | 1200 KG      | 50 KG                  | NO                  | View BF comp. | N/A                | NO                | BOOK CONFIRMATION | NO           | N/A              | GI Non-BF Comp.  | NO       | GR By Prod. | YES         | Post Manual GI | Update Batch Cls |
|                                       | 100001240     | 0100          |                  | YES       | 0020: 0080     | 5 H           | 3 H                 | 10 TON       | 5,23 TON               | YES                 | View BF comp. | OK                 | YES               | BOOK CONFIRMATION | YES          | OK               | GI Non-BF Comp.  | YES      | GR By Prod. | YES         | Post Manual GI | Update Batch Cls |
|                                       | 100001340     | 0020          |                  | NO        | N/A            | 5 H           | 3 H                 | 20 TON       | 10 KG                  | YES                 | View BF comp. | OK                 | YES               | BOOK CONFIRMATION | NO           | N/A              | GI Non-BF Comp.  | NO       | GR By Prod. | YES         | Post Manual GI | Update Batch Cls |
|                                       | 100000044     | 0020          |                  | NO        | N/A            | 5 H           | 3 H                 | 20 TON       | 10 KG                  | YES                 | View BF comp. | OK                 | YES               | BOOK CONFIRMATION | NO           | N/A              | GI Non-BF Comp.  | NO       | GR By Prod. | YES         | Post Manual GI | Update Batch Cls |
|                                       | 65000001      | 20            | 12345000/001     | NO        | N/A            | 2 H           | 3 H                 | 400 Ft       | 20 Ft                  | NO                  | View BF comp. | N/A                | NO                | BOOK CONFIRMATION | YES          | OK               | GI Non-BF Comp.  | YES      | GR By Prod. | YES         | Post Manual GI | Update Batch Cls |

Navigation Button to dedicated screens:

View BF comp.

BOOK CONFIRMATION

GI Non-BF Comp.

GR By-Prod.

Post Manual GR

Update Batch Cls

SYENSQO

In case of MES interface, the tool will post directly Consumptions, GR and Time Tickets as soon as the user validate, proposing the data received from MES.

IN case of not-MES productions, the tool will propose standard value, allowing their editing, then will immediately post them or navigate to specific Apps depending on the context. For instance, in case of Production into a HU-managed location and HU already created, the button Post GR will navigate to the App "Goods Receipt Process Order by Handling Unit".

The most significant advantages of option B are:

1. We provide a single tool that will become the Syensqo Standard for Production Confirmations in all different cases: with/without MES, Composite/other GBUs, HU and not HU managed, EWM and IM managed.
2. We fulfill multiple custom requirements with a single object, optimizing the costs and effort.

The most important disadvantage is that the proposed tool is a complex custom development that will require a deep analysis and abundant tests.

## Option C: Roll Out current MES systems + AVEVA PI Asset Framework to activate MES integration

On a plant / production line that does not use any MES at the moment, updating the solution to a fully integrated model would require:

- Implement one of the current "field MES" solutions: Aspentech or AVEVA PI
- Implement AVEVA PI Asset Framework as "Global MES" that collects their data, standardize them, associate them to the logical objects required by S/4HANA (e.g. Process Order)
- Activate the [Integration Model described here](#)

While this is something that is going to happen for several plants, fully or partially for some production lines, for sure at Sy-Way go-live only a subset of the global Syensqo production will work on this model. Option 3 therefore is seen as a future TO-BE model but is not a viable solution in the project timeline.

## Option D: SAP DM

SAP Digital Manufacturing is complete suite that provides all functionalities of an MES system and of a Production Data Collection and Analysis: Flexible Operator Dashboard, Execution and Confirmation Tools, Resource Orchestration, Production Analysis and KPI calculations, Integration with Quality and Plant Maintenance, Edge functionalities to work offline, etc.

More information is available [in this presentation](#).

While it acts as a real MES; it is in significant overlap with Aspentech, AVEVA PI, Aveva Asset Framework and other functionalities already existing in Syensqo as part of the Star Trek program and heavily invested on.

Considering the significant functional overlap, despite SAP DM would provide a real MES system while the current solution is just part of it, and the significant investment already done on Star Tek program, plus the fact that the program itself is still ongoing, there is no willing in Syensqo at the moment to invest in SAP Digital Manufacturing

## Evaluation

|                       | Option A                                                                                                                                                                                   | Option B                                                                                                                                     | Option C                                                                                                                                                                                                                                                                                               | Option D                                                                                                                                                                                         |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standardization       | ⊖ Neptune Apps have the potential to become a Syensqo Standard for Production and WH activities, but they cannot cover the IPA requirements nor the validation required for MES interfaces | ⊕ ⊕ The proposed Dashboard will be the new Syensqo standard for all plants and production lines: with /without MES, COMposite and other GBUs | ⊖ in the long term this could become the Syensqo Standard, but it requires anyway a validation /confirmation custom tool to be developed, therefore it is anyway dependent on a solution similar to Option 2. Furthermore, in an optic of real standardization, Option D should be the long term goal. | ⊕ ⊕ ⊕ This is the only full std SAP and fully integrated option and in a different context should be the way to go.                                                                              |
| Timeline              | ⊕ This option is feasible in project Timeline                                                                                                                                              | ⊕ This option is feasible in project Timeline                                                                                                | ⊖ ⊖ ⊖ This Option is NOT feasible in Project Timeline                                                                                                                                                                                                                                                  | ⊕ This option is feasible in project Timeline                                                                                                                                                    |
| Technical Constraints | ⊖ ⊖ Option not available in case of missing/poor Wi-Fi connection in Production area                                                                                                       | ⊕ No specific technical constraints.                                                                                                         | ⊕ Technical constraints already addressed by the ongoing Star Tek Program                                                                                                                                                                                                                              | ⊕ The EDGE technology would allow this option to work both on strong and reliable and on poor and unstable Wi-Fi connection and to easily bridge over system outages and programmed maintenance. |

|                            |                                                                                                |                                                                                                                                                |                                                                                                                                                                                                                                     |                                                                                                                                                                                           |
|----------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cost<br>s<br>and<br>effort | ➖ Neptune Std does not provide these Apps Out of the Box, they need custom development.        | ➖ Significant RICEF                                                                                                                            | ➖ Significant cost to extend and standardize the current model which is limited to a subset of data flows and to a very small subset of plants and production lines                                                                 | ➖➖➖ In Syensqo due to the past and current big investment on Star Tek program, this option would require the destruction of a significant work already done and the loss of a huge CAPEX. |
| Scal<br>ability            | ➕ This option can be implemented easily wherever the mobile devices have a reliable connection | ➕➕ The proposed Dashboard can be used immediately everywhere in Syensqo and activated in each new plant / production line with no extra effort | ➖ Need to extend the current integration model to include further business cases and data (for Instance, the IPA model is totally not managed by the current MES integration, the same applies for actual time ticket declarations) | ➕➕➕➕ Native solution fully scalable                                                                                                                                                       |

IN this table, the 3 ➖ are considered a "veto", therefore option C and D are immediately excluded. The Project Team consider Option B the primary way to go for all plants without MES, for the current plants using IPA and as validation tool for all the MES integrated plants and production lines.

Option A will be anyway available for all cases where Syensqo decide to privilege mobility confirmations.

## See also

Deck used in the first discussion on this KDD:

AVEVA vendor Engagement draft for the MES integration:

MES integration proposed model:

## Change log

| Version                | Published                  | Changed By                   | Comment             |
|------------------------|----------------------------|------------------------------|---------------------|
| <b>CURRENT (v. 24)</b> | <b>Sept 08, 2025 09:41</b> | <b>NICASTRI-ext, Michele</b> |                     |
| v. 23                  | Sept 03, 2025 19:39        | NICASTRI-ext, Michele        | Reverted from v. 21 |
| v. 22                  | Sept 03, 2025 15:43        | GALANT, Pierre               |                     |
| v. 21                  | Aug 13, 2025 10:28         | WENNINGER-ext, Sascha        |                     |
| v. 20                  | Aug 12, 2025 18:59         | WENNINGER-ext, Sascha        |                     |
| v. 19                  | Aug 12, 2025 18:56         | WENNINGER-ext, Sascha        |                     |
| v. 18                  | Jul 09, 2025 00:00         | NICASTRI-ext, Michele        |                     |
| v. 17                  | Jul 08, 2025 11:38         | NICASTRI-ext, Michele        |                     |
| v. 16                  | Jun 30, 2025 09:03         | THEORET, Alain               |                     |
| v. 15                  | Jun 30, 2025 06:47         | THEORET, Alain               |                     |

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## Workflow history

This view shows the 5 most recent entries. The complete workflow log is available from the 'Document Activity' menu item.

| Sept 17, 2025              | Actor                                                                                                  | Type  | Activity                                                                                                | Version |
|----------------------------|--------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------|---------|
| Approved                   |  CHIEW-ext, Yock Sang | State | changed state to <span>Approved</span> at 1:11 pm                                                       | v24     |
| Pending SteerCo Review     |  CHIEW-ext, Yock Sang | State | <div>gave <i>Final Approval</i> approval at 1:11 pm</div> <div>HoD/ Substitute Approval Attached.</div> |         |
| Sept 15, 2025              |                                                                                                        |       |                                                                                                         |         |
|                            |  GERVAIS, Pascal      | State | changed expiry date to '29 Sept, 2025 06:33 am' at 6:33 am                                              |         |
|                            |                                                                                                        | State | changed state to <span>Pending SteerCo Review</span> at 6:33 am                                         | v24     |
| Pending Stakeholder Review |  GERVAIS, Pascal      | State | gave <i>Stakeholder Review</i> approval at 6:33 am                                                      |         |
| Sept 08, 2025              |                                                                                                        |       |                                                                                                         |         |
|                            | NICASTRI-ext, Michele                                                                                  | Edit  | updated the page at 9:41 am                                                                             |         |