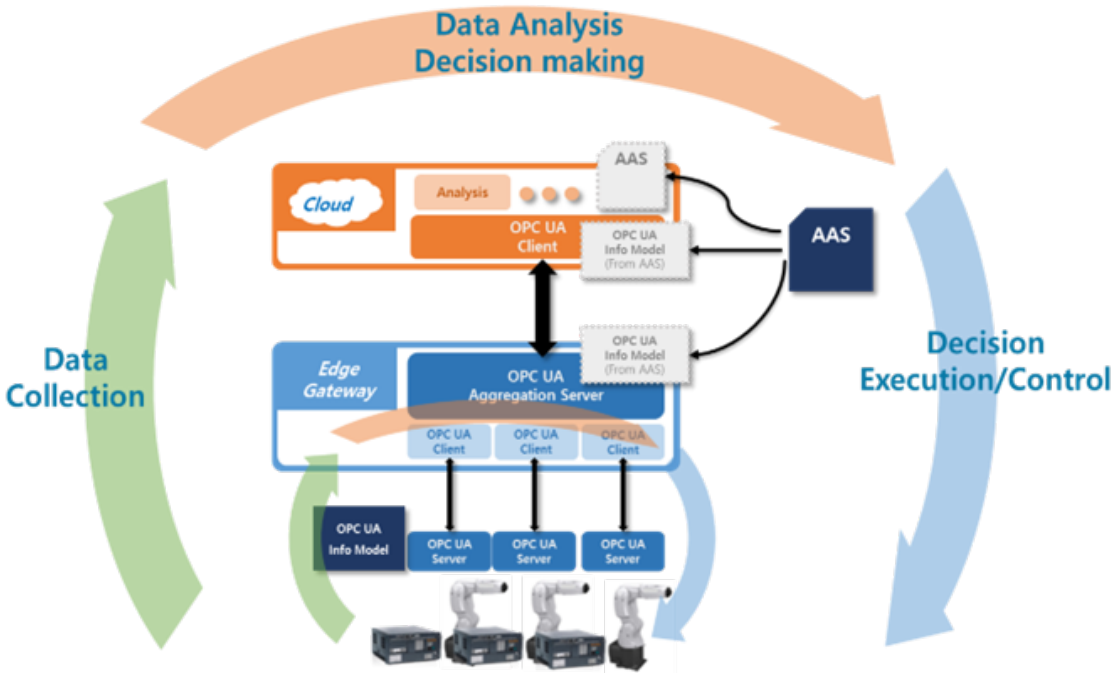
# Factsheet AAS-based Pilot Plant – the 2nd stage




# Covering the entire life cycle of production

- Reduce costs for installing, maintaining, and building additional equipment and facilities
- Costly high-end solutions become affordable to SMEs and startups
- SMEs reduce follow-up service costs by managing and maintaining the product remotely via AAS interface
- Improving the competitiveness of the products of Korean SME manufacturers

After the success of the 1st stage of the PPP, the necessity to expand the advantages of AAS to the whole life cycle of production has been noticed. As shown in the figure above, manufacturing data must be collected/stored first, then analyzed, and finally executed in the manufacturing fields. In the 2nd stage of the PPP, an AAS-based standard interface that allows different kinds of data-driven services to access manufacturing data and share their data was implemented. The cycle of collecting and storing manufacturing data was completed, using it in various data-driven services, and finally applying the results to the production process.

## Standardized AAS technology for independent solutions

The Ministry of SMEs and Startups in Korea launched AAS (Asset Administration Shell)-based PPP (Pilot Plant Project), and Nestfield Co. Ltd. was selected to undertake the project. During the 1st stage of the PPP in 2020, an AAS-based data acquisition and storage system was developed and successfully installed in two pilot plants named Shinwoo Costec and Huons.

**Industrial Digital Twin Association e.V.**
Lyoner Straße 18 — 60528 Frankfurt am Main
Germany

Phone +49 69 6603 1939
Email info@idtwin.org
**www.industrialdigitaltwin.org**

## Collaboration of two assets with their AAS

A testbed where two different assets collaborate is demonstrated. An injection molding machine and collaborative robots were selected from this point of view. AAS models were developed for the injection molding machine TE110 from WOOJIN PLAIMM, and the commercial collaborative robot model Indy7 from Neuromeka. With equipment suppliers' participation, more detailed and extensive data for the asset could be included.

A scenario where two assets with their own AAS cooperate in executing a collaborative production process were designed. After the injection molding machine manufactures the product, the collaborative robot puts it on an electronic scale to measure the weight and classify good and defective products. Unlike the existing integration work between facilities, all information for the assets is in their AAS and machine-readable. Thus, it was straightforward to understand the asset's technical characteristics and operation.

Since the direct interaction between assets is not yet generalized, a kind of data-driven service that exchanges some data between the two assets was implemented. Before the production process, the service transfers 'mold information' from product AAS to the injection molding machine to check the validity of the injection molding machine setup. And service also transfers the 'normal range of product weight' from product AAS to the collaborative robot to be used in classification later.

When the production process starts, the data acquisition/storage system developed in the 1st stage of the PPP collects every data in real-time. An integrating service gets manufacturing data from the system, performs condition monitoring, and makes some decisions such as emergency stop in alarm detection. This decision is applied to each asset using an AAS-based standard interface. A collaborative robot arm gets weight measurement from an electronic scale and determines good/defective according to the normal weight range.

When the product is changed, the 'mold' in the injection molding machine and 'normal range of product weight' in the collaborative robot also change. In this scenario, this information is included in product AAS so that it can be maintained independently and efficiently. With the change of the parameters in properties, the integrating service can be used as it is without changing even when product or production facilities are changed.

The following figures show the collaborative testbed. As shown in Fig. 1, a collaborative robot arm and injection molding machine have their AAS, and these two assets are integrated into a single production process, as shown in Fig. 2. Fig. 3 shows the Nestfield-developed AAS Package browser that manages the Integrated asset. All the manufacturing data is monitored, stored, visualized, and exchanged in real-time using the 2D and 3D dashboards shown in Fig. 4.

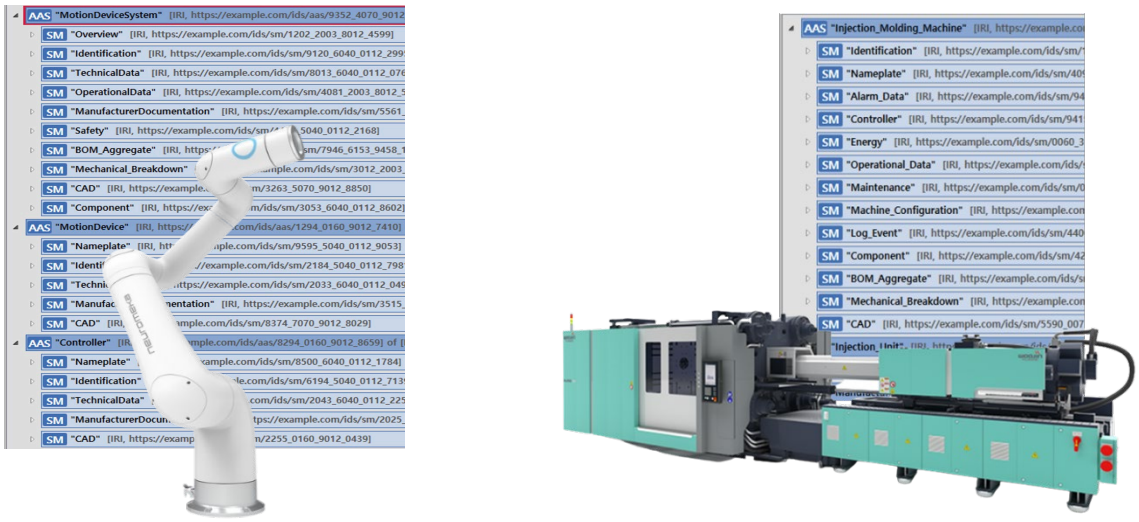



Fig. 1 AAS of the collaborative robot arm and injection molding machine

Fig. 3 A testbed that integrates two assets into a single production process (Video: https://youtu.be/0vsm2wu_gVU)

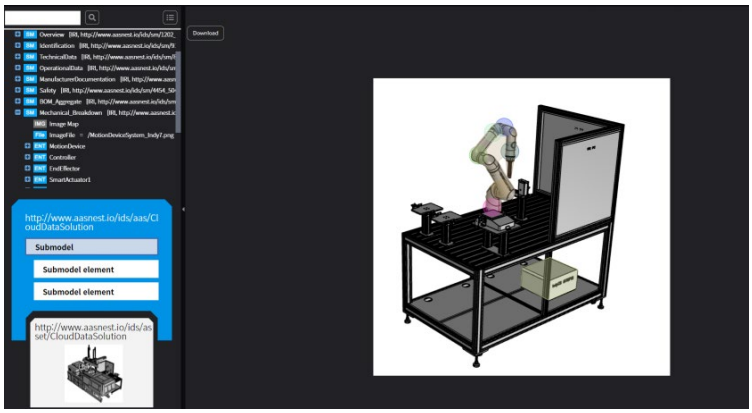



Fig. 4 Nestfield-developed AAS Package browser