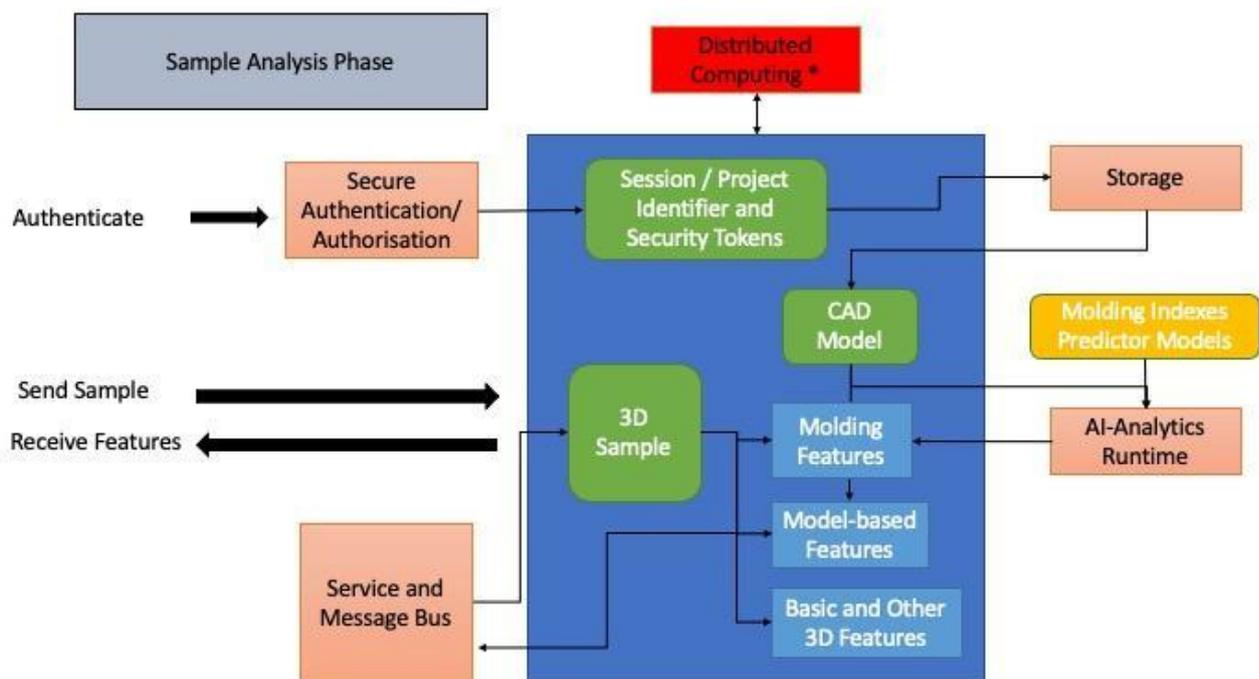


## DataMind 3D Extraction and Prediction Component

By Sebastian Raducci, DataMind Srl

### Project Details and Motivation

In the last decades computer vision has developed many standardised features to describe objects represented in video streams; modern industrial defect recognition systems based on camera sources can thus easily take advantage of machine learning techniques for classification. To the contrary, no such a standardised feature-based description of structural 3D objects is currently available. The goal of the proposed project is to support developing defect classifiers based on both 3D design-time models (CAD) and 3D object data, computing and exposing a complete set of well-defined and manufacturing-oriented 3D object descriptors.

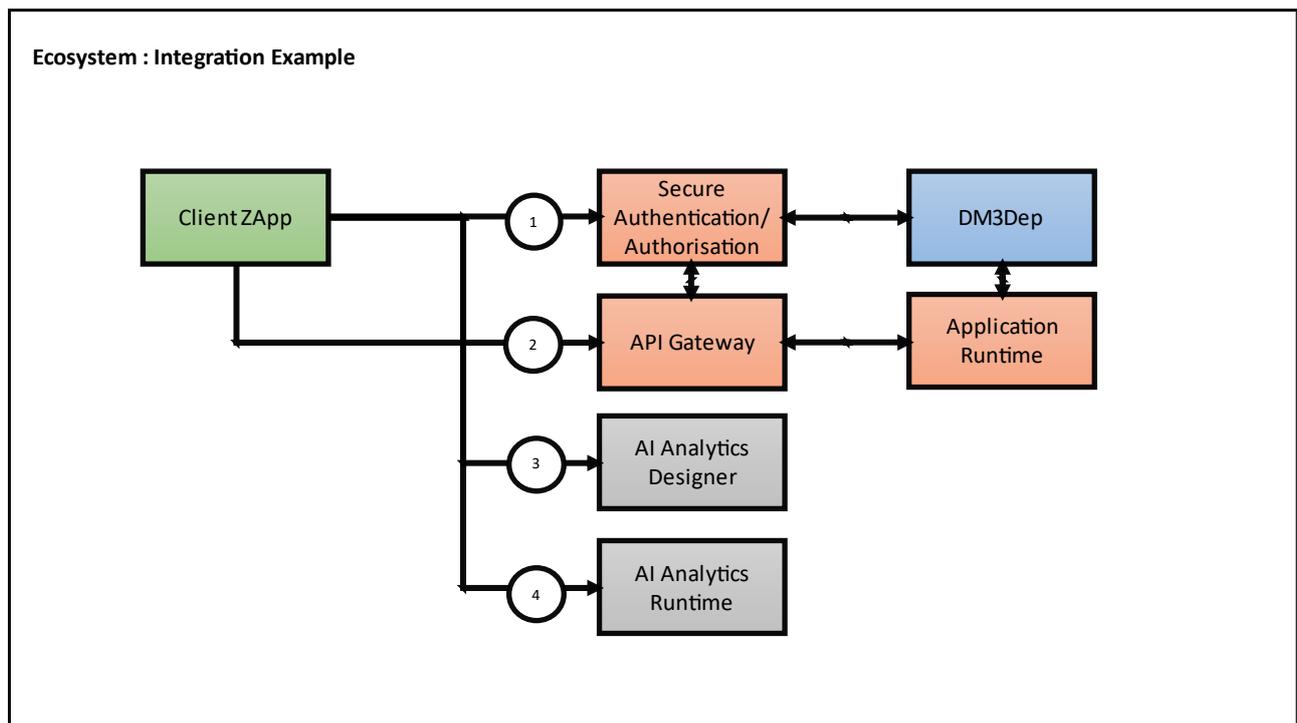


*DM3DEP sample analysis flowchart*

### ZDMP Fit

An important target for the ZDMP DM3DEP subproject is to reach as many users as possible to support a possible process of standardisation of the 3D Feature Packs that will be proposed by the component. The ZDMP components used in the project will allow an easy access to the DM3DEP service to third party companies but also to other ZDMP components and ZApps.

A natural way to include the DM3DEP component in the ZDMP ecosystem is to couple it with the AI Analytics Designer and AI Analytics Runtime as depicted in the following figure.



*DM3DEP Integration example in the Zero Defects Manufacturing Platform*

A client zApp or zComponent can first call the Secure Authentication / Authorisation server to get the authorised credentials and access the REST API service functionality exposed by the Application Runtime through the API Gateway component. After configuration of a DM3DEP project, the client application or component can start loading 3D Samples acquired for a dataset of physical items and obtain their description by means of the configured feature packs. This way it can collect enough information that is ready to be used for training defect prediction or classification models. This can be performed easily using the AI Analytics Designer. Once the defect prediction models will be developed the client application or component can keep sending 3D Samples to the DM3DEP service using the preferred communication paradigm and send the new feature packs to the AI Analytics Runtime to make an in-line prediction of possible objects manufactured with a defect.

This minimal solution can be further extended if the client application plans to use the 3D features coming from the DM3DEP together with other characterising data in a defect inspection system that integrated several sources of information. In the latter case the scheme can be more complex than depicted in the above figure and other zComponents can be involved.

## Participant Details

- **Organisation(s) involved:**
- **DataMind:**
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  - **Profile:** Our mission is to use research knowledge and technology expertise to analyse, design and develop innovative algorithms and flexible software solutions for the analysis and the visual exploration of data and for knowledge extraction in both scientific and industrial environment.

## ZDMP Details

The ZDMP – Zero Defects Manufacturing Platform – is a project funded by the H2020 Framework Programme of the European Commission under Grant Agreement 825631 and conducted from January 2019 until December 2022. It engages 31 partners (Users, Technology Providers, Consultants and Research Institutes) with a mission to “Provide the platform, components, services, and marketplace to achieve the right product,

at the right time, with the right conditions using the right resources.". Further information can be found at [www.zdmp.eu](http://www.zdmp.eu). ZDMP channels 3.2M€ of SME orientated funding to subprojects, such as this one to both facilitate SMEs with their innovations and increase the value of the ZDMP ecosystem

### Links

● <b>Sub project website/blog</b>	<a href="https://www.datamind.biz/pages/science/">https://www.datamind.biz/pages/science/</a>
● <b>Architecture Component(s)</b>	<a href="https://www.zdmp.eu/documentation">https://www.zdmp.eu/documentation</a>
● <b>ZDMP Website</b>	<a href="http://www.zdmp.eu">www.zdmp.eu</a>