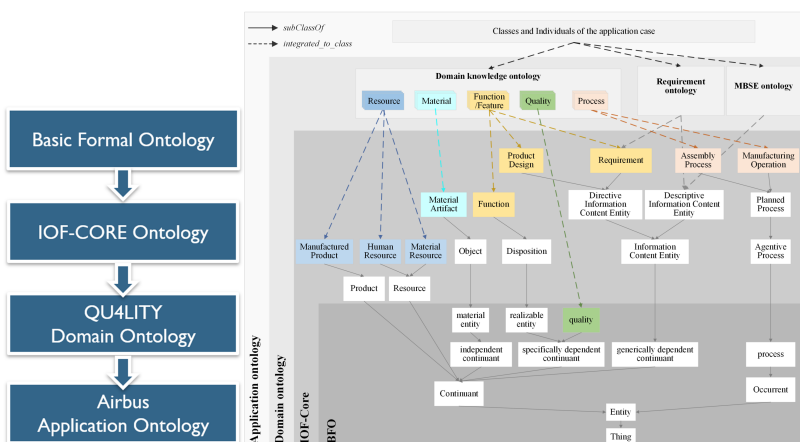


## An Ontology-based Engineering System to Support Aircraft Manufacturing System Design

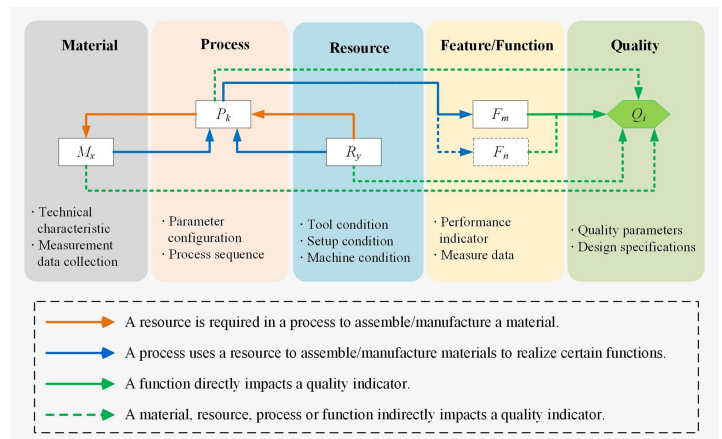
Airbus / UiO

- **Use case description:** During the detailed design of an assembly plant, different domains engage in a design process, being impacted and impacting the design process of other domains. A trade needs to be done between these domains, to find the most suitable design of the plant.
- **Use case goal:** Overcoming bottlenecks concerning interoperability and data standardisation. Enabling different collaborative engineering of different domains using ontology-based engineering method.

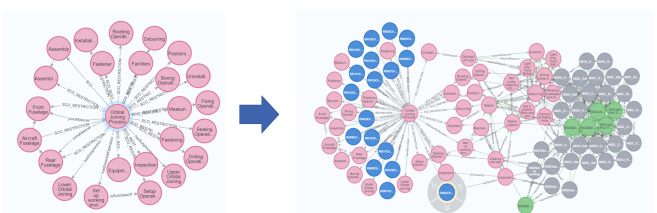
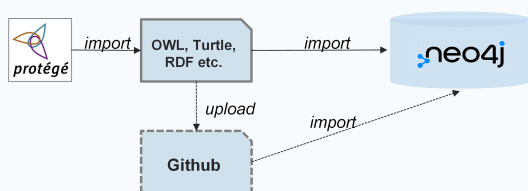


- An application ontology is developed to capture domain knowledge of aircraft manufacturing systems.
- The development of the application ontology follows the hierarchical approach based on the BFO top-level ontology and the IOF:Core middle-level ontology.
- The main knowledge sources include documented knowledge about existing manufacturing systems and domain experts' knowledge.
- A domain-level ontology focusing on the quality management is developed aiming to support the Zero-Defect Manufacturing target.

- The domain-level ontology is developed based on the RMPFQ model aiming to interlink the main influential factors related to product quality during manufacturing processes.
  - Resource represents the devices, tools and means to produce goods and services.
  - Material represents the entities to produce a certain product or product component, which may include raw materials, pre-products, consumables, operating supplies etc.
  - Processes are defined as processing and transforming materials into the final goods by using machines, tools and human labour.
  - Functions/Features represent the characteristics of a product, including functionalities that the product is able to perform; and/or other features like performance.
  - Quality is defined as the degree of conformance of final product functions and features to designed requirements.



- The application ontology is imported to graph database neo4j as basis to create a knowledge graph.
- The knowledge graph can be used to support knowledge reuse, such as automatic generation of new relationships and new system design solutions by customized algorithms.



### References

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