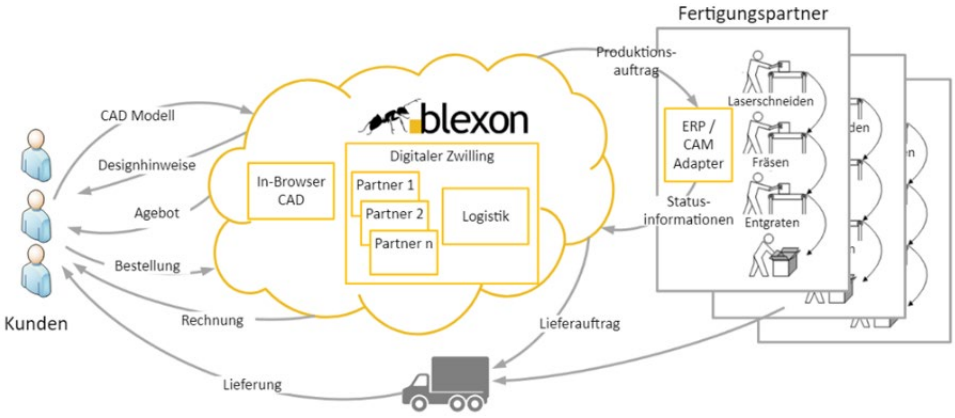
One-Stop-Shop for CNC-Production Parts

Automated from CAD model to manufactured part

This project aims to implement automation from CAD model to finished part in the Blexon portal, incorporating different combinations of manufacturing operations and transport logistics.

Problem Statement

In the procurement of custom manufacturing parts, demands for complexity and delivery speed as well as increasingly smaller batch sizes are rising rapidly. To secure orders and maintain manufacturing in Switzerland, automated order processing directly from CAD models is becoming increasingly important. The Blexon online portal, together with its connected manufacturing partners, already offers an automated process in a partial area of sheet metal processing. This project aims to expand the online portal with automation from model upload, through quote generation and manufacturing, to delivery, and to secure manufacturing in Switzerland through cost savings.



Concept

High-performance and scalable design feature recognition provides the foundation for automation processes and is designed as a two-tier solution. At the lower level, the already established feature extraction from graphs of BRep models is applied. At the upper, AI-based level, patterns in graphs are automatically recognized from annotated BRep models. The recognition of holes, pockets, or undercuts is achieved through abstraction and information reduction. The novel approach is that the system autonomously identifies and compresses the information to be reduced through machine learning. For this purpose, a flexible and learning-capable feature recognition is employed, built on graph-based methods

Novel is the high flexibility in interaction with 3D visualization and interaction in the Blexon portal. If a design feature is not manufacturable, the problem is displayed graphically and the process can be repeated with modified parameters without re-running recognition processes. Very advantageous for the customer is that all possible manufacturing variants are provided, such as sheet metal processing, milling/turning, additive manufacturing, or a combination thereof as serial or parallel operations. Before final pricing, an upstream logistics module optimizes transport costs and selects the most suitable manufacturing partner for the customer.

Contact

Prof. Dr. N. Frei
I3 Institute for Interactive Informatics

OST
Lerchenfeldstrasse 3
9000 St. Gallen

Phone: +41 (0)58 257 32 21
Email: norbert.frei@ost.ch