



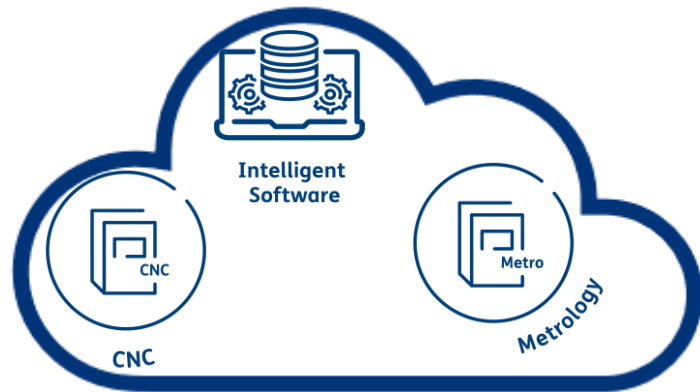
# SWAP – Ideas from a seamless optics manufacturing

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# asphericon – think digital since 2001



Starting as an optics fabricating IT company...

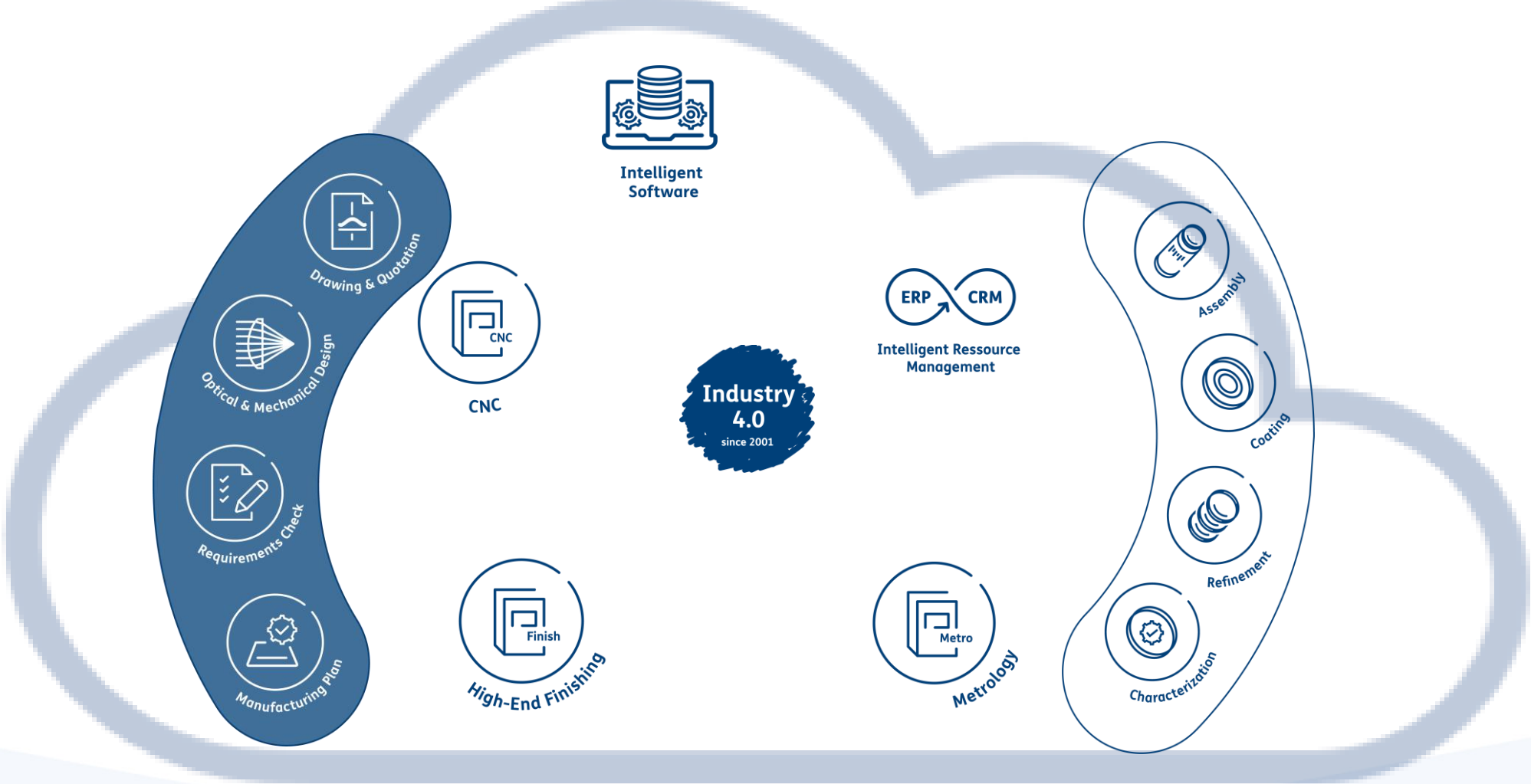


- On-premise data
- No external cloud providers
- physically separated server locations
- 24/7 mirroring
- Two million lines of own software code from an internal IT department

# asphericon – think digital since 2001

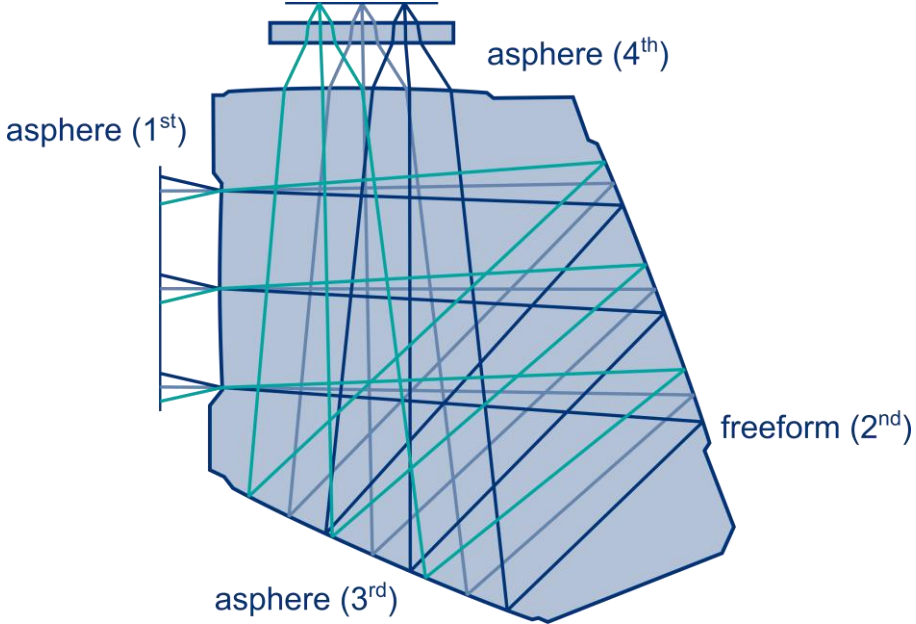
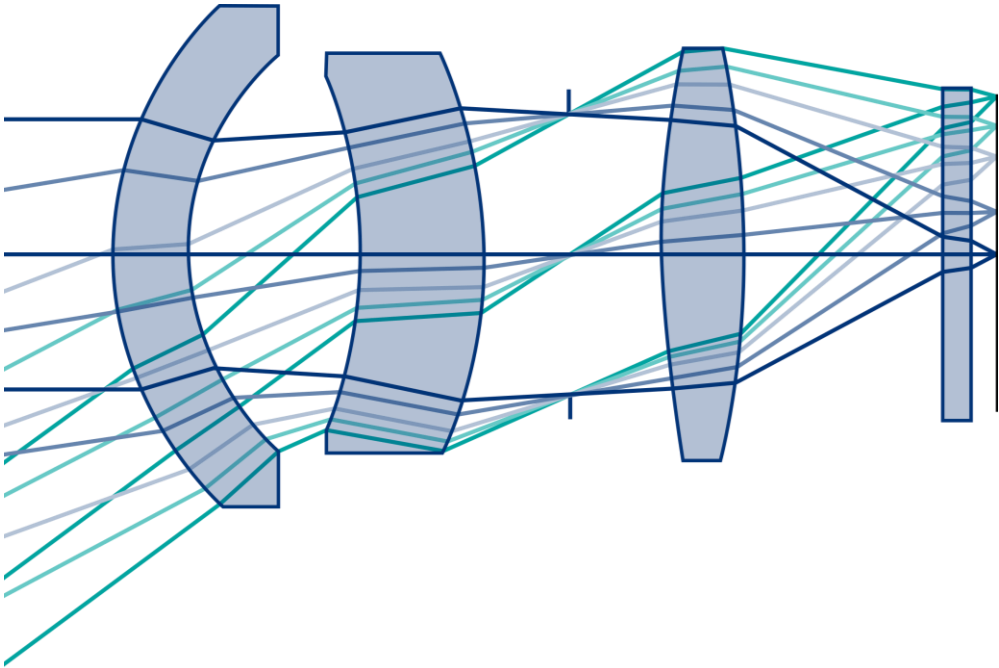


... combines 2024 value chain for optics manufacturing and assembly in a digital landscape



# Monolithic optical system

THE INTRODUCING IDEA



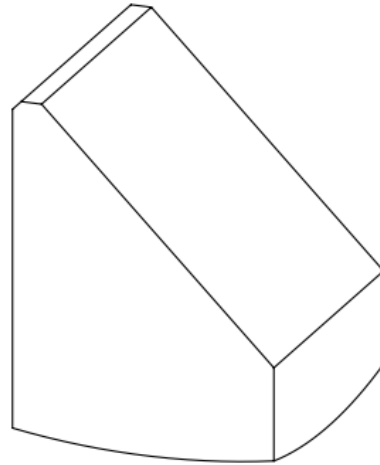
# The main advantages

REDUZING SIZE, WEIGHT, PREFERENCE

**Miniaturized**  
(decreased  
optical path)

**Reliable**  
(decreased tolerance chains  
and processing steps)

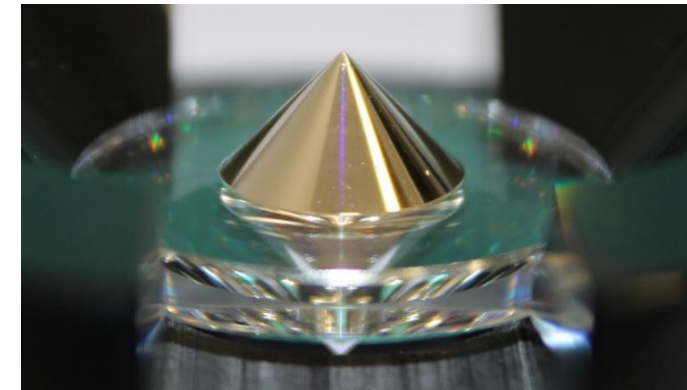
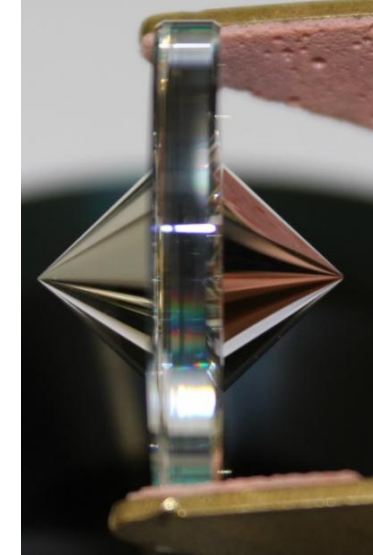
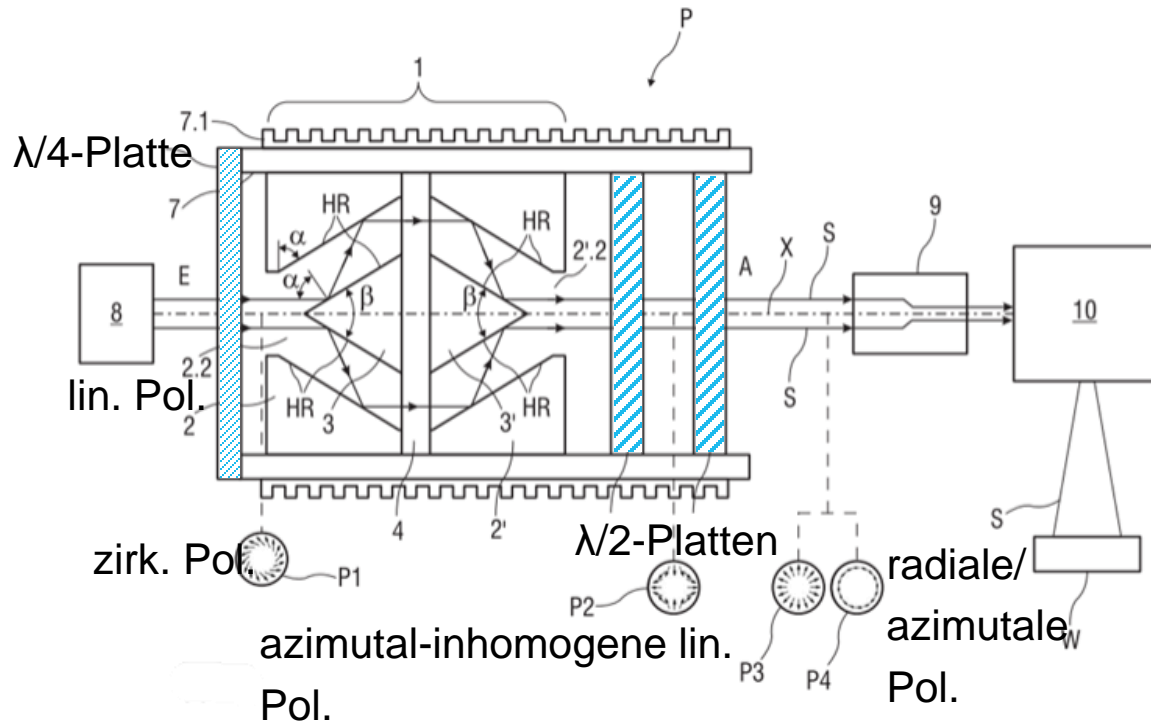
**Robust (monolithic material)**



**cost effective**  
(automatable, scalable,  
less integration effort)

# Monolithic double-sided axicon

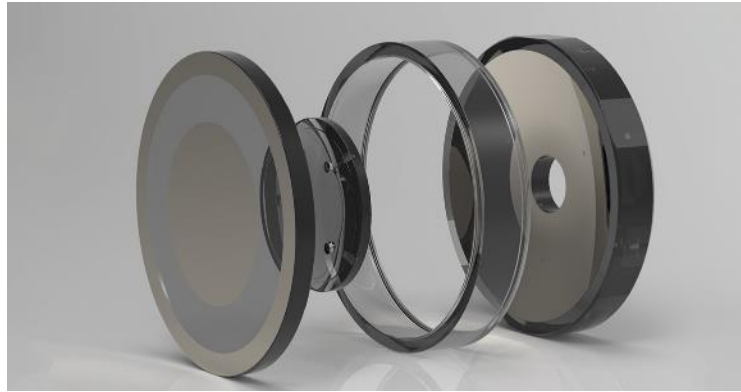
DEMONSTRATOR POLARIZATION-TUNED LASER MATERIAL PROCESSING



# One-dimensional folded Cassegrain telescope – Astro XP



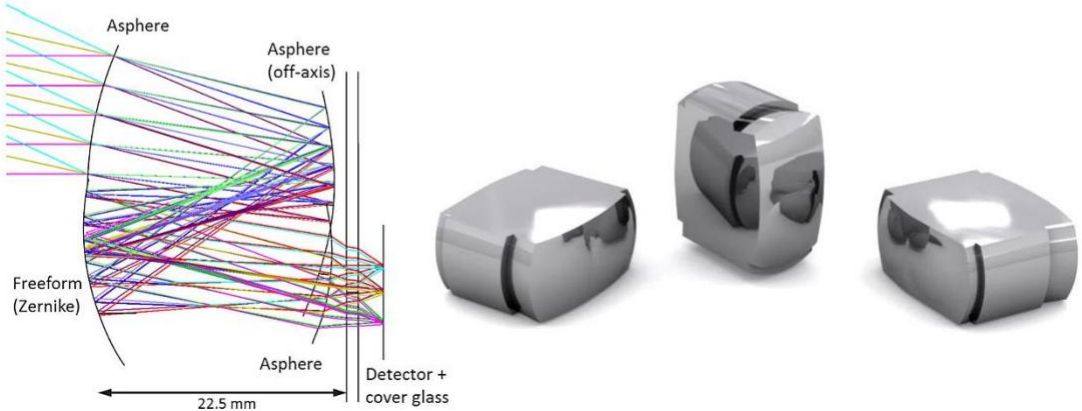
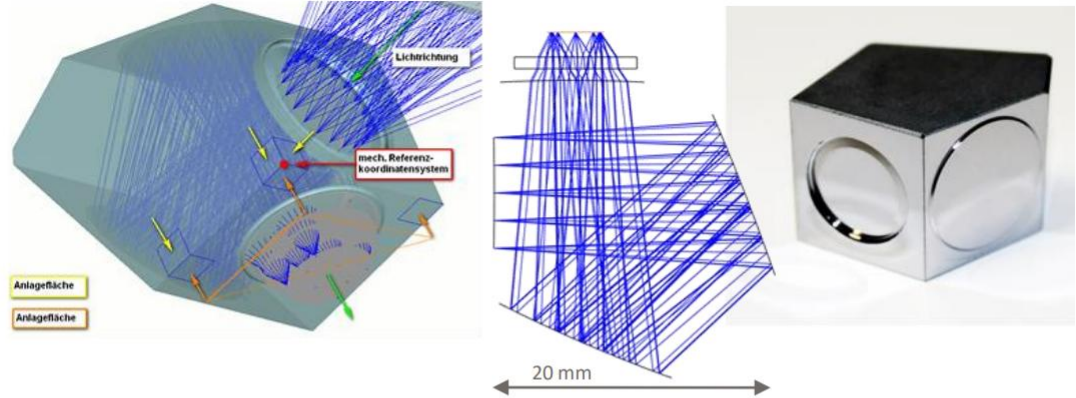
ULTRA-PRECISE OPTICS FOR A STAR SENSOR



- = Manufacturing of two purely reflecting bi-aspherical mirrors (diameter 77 and 140 mm) with ring-shaped input aperture and a 140 mm wide spacer made of fused silica
- = Surface quality of the mirrors:  $PV < 150 \text{ nm}$

# Infrared monolith

READY FOR VOLUME PRODUCTION



(taken from "Ultraprecision manufacturing of aspheres and freeforms" workshop 2018 of fo-Regional Growth Core)

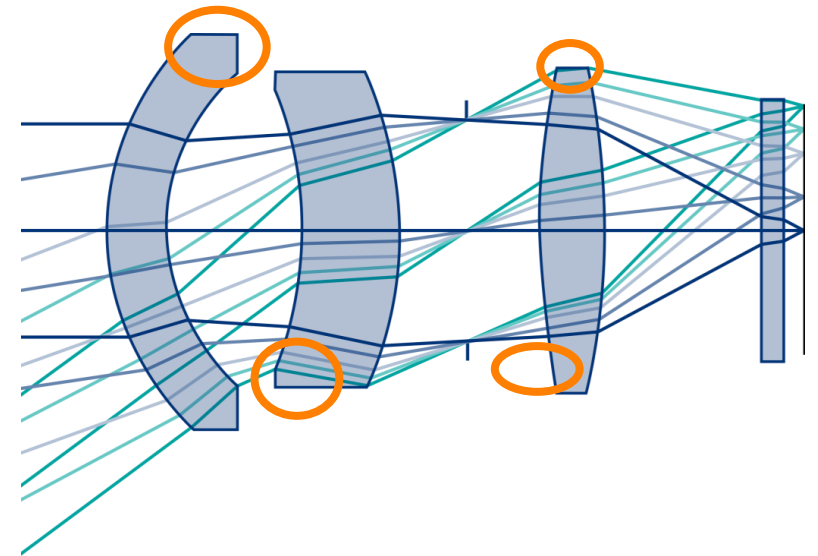
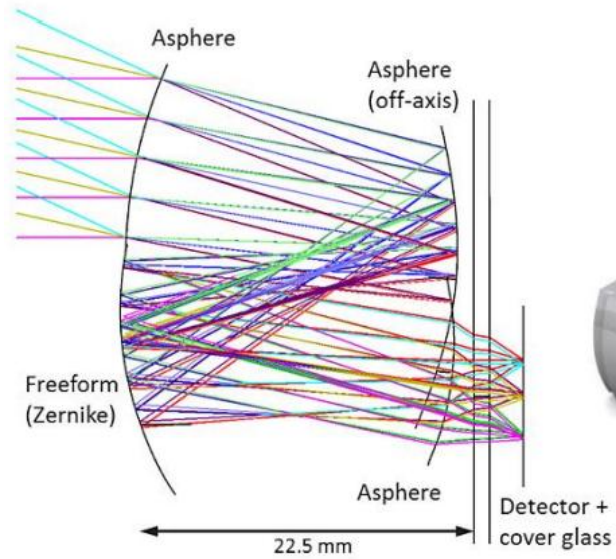


# The Challenge

There's no free lunch

# Infrared monolith

ZERO DEVIATIONS



Mechanical references for alignment position and tilt in at least 3 orientations.  
(Without taken housing tolerances into account!)

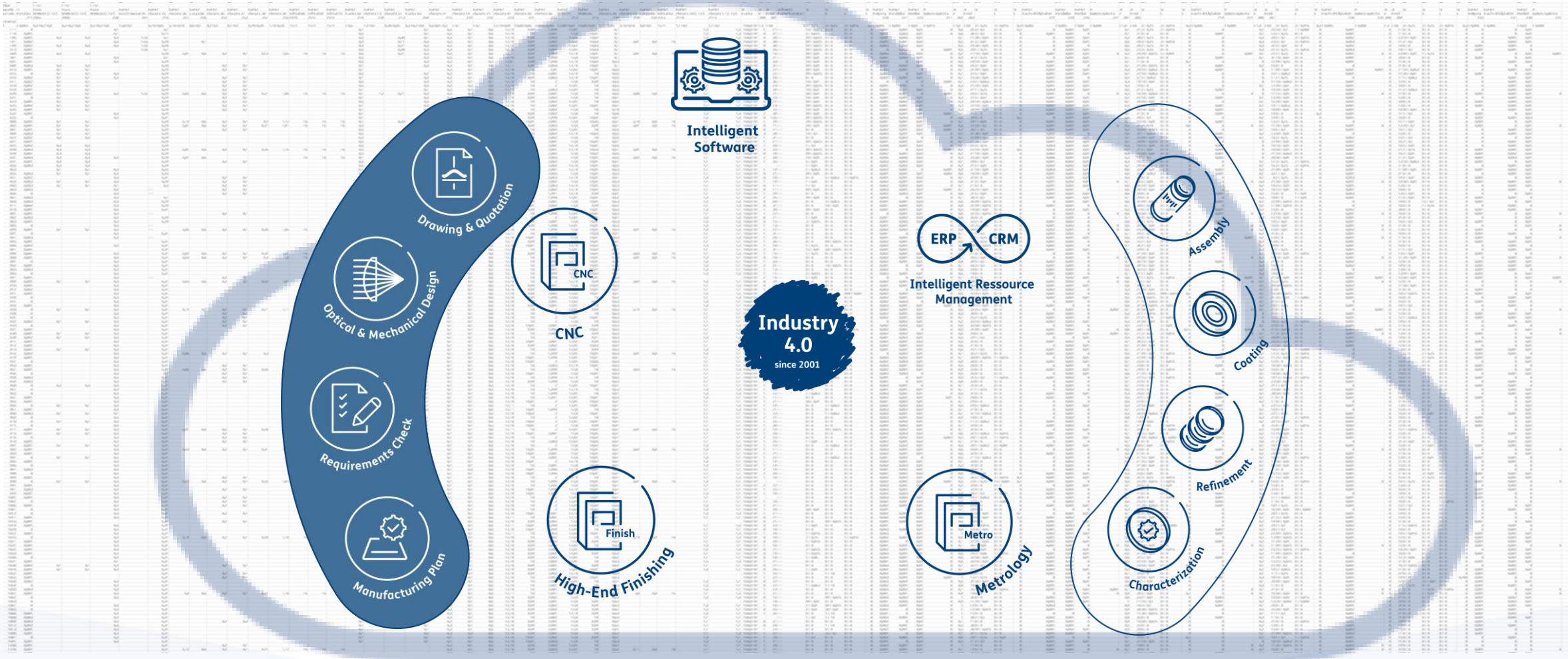
# How we decrease tolerance scatter

...AND GO TO VOLUME PRODUCTION

↓	↑
Human impact	automation
Machine to machine uncertainty	Reducing process steps
Different references, platforms, formats, evaluations, ..	One single source of truth



# Data is key for a seamless production



# What are we looking for?



- More confidence at the design phase
- Design and feasibility discussions
- Technical sparring partners
- Integrators - to find out limitations
- Great opportunities, partnerships and a worth living future



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