20 years of SMS group and CADENAS

A review and outlook – CADENAS Industry Forum 2023

Leading Partner in the World of Metals

Our plants are at the heart of SMS group

› Ironmaking & reduction plants

› Metallurgical plants and environmental technologies

› Continuous casters

› Hot and cold rolling mills

› Strip processing lines

› Long product plants

› Forging plants

› Non-ferrous plants

› *Technical Service*

› *Electrics & Automation*

› *Digitalization*

SMS group

SMS group at a glance

Bar chart (In billion €)

Year	Order intake	Revenue
2018	3.1	2.8
2019	3.2	2.9
2020	1.9	2.7
2021	3.5	2.6
2022	4.6	3.1

Legend: ▮ Order intake   ▮ Revenue
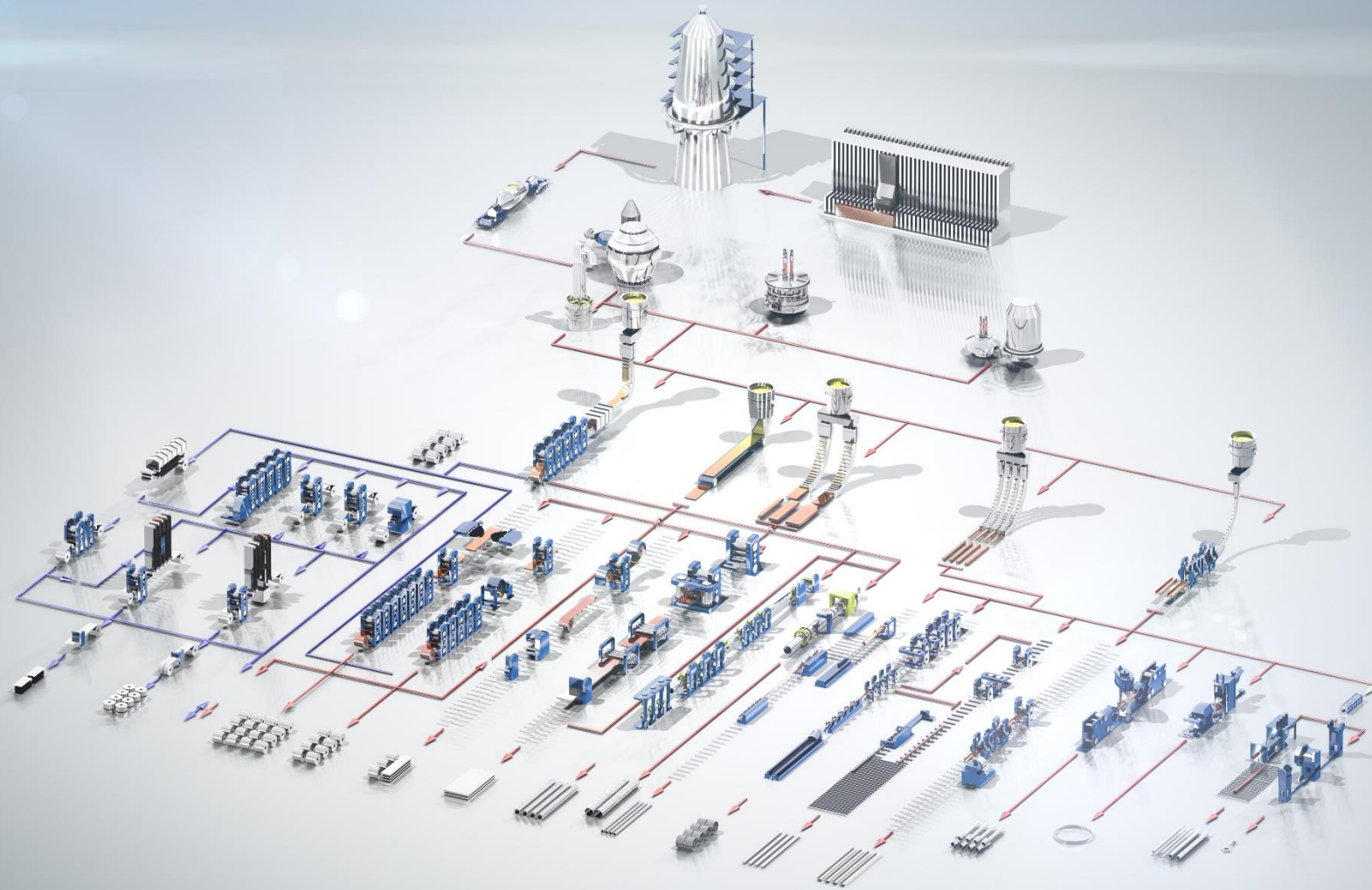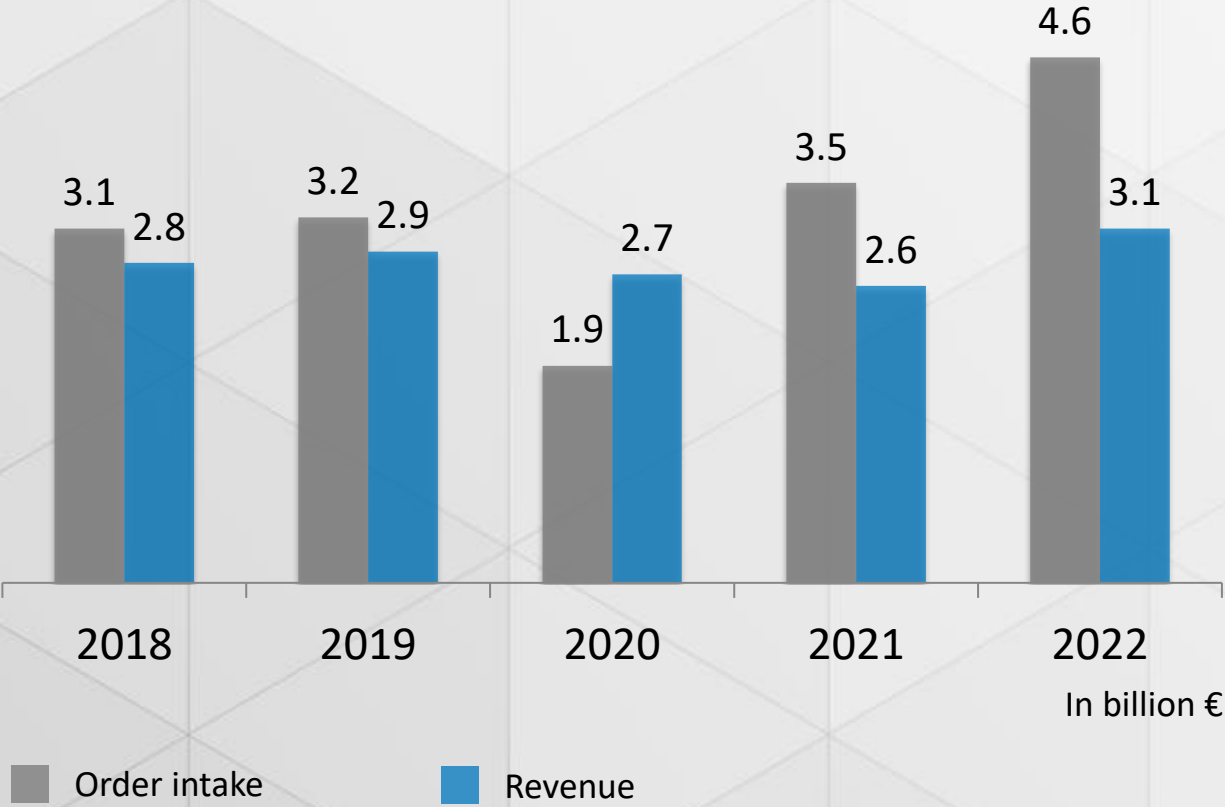
Experienced partner
150 — Family business with a history of more than 150 years as a technology leader

Worldwide
≈14,500 employees

Local
95 workshops and sites globally

Full-liner
For the entire metallurgical process chain

Comprehensive services
Lifecycle services for equipment, automation and digitalization

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150 years of shaping the future

1871

Many roots – one company
Carl Eberhard Weiss starts a forging business

1904
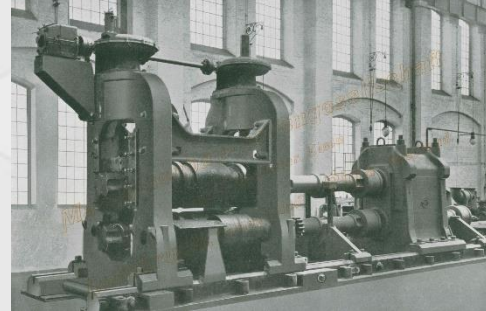
Global reach and local expertise
We supply our first rolling mill to China

1952

A partner for megaprojects
Building the first integrated steel plant in India

1989

Pioneering solutions
We invent CSP® technology – a revolution in sustainability

2016

Life cycle partner
The Learning Steel Plant – our first fully digital steel production facility

2023

#turningmetalsgreen
Shaping the future of metals and drive the green revolution

SMS group

H2 Green Steel
The world's first 100% hydrogen-based steel plant

› **CO_2 emission** reduction up to **95%**

› Based near **Boden, Northern Sweden**

› Start-up of first plant: **2025**

› Capacity of phase 1: **2.5 million t/year**, phase 2: **5 million t/year**

› SMS group supply from **melt shop to finishing lines**

thyssenkrupp Steel
Natural gas-based direct reduction coupled with an open bath furnace

› Annual saving of **over 3.5 million metric tons of CO_2**

› Based in Duisburg

› Start-up of first plant: **2026**

› Capacity of **2.5 million metric tons** of directly reduced iron

› **Engineering, delivery and construction** of a hydrogen-powered direct reduction plant, two innovative melters

© thyssenkrupp Steel Europe AG
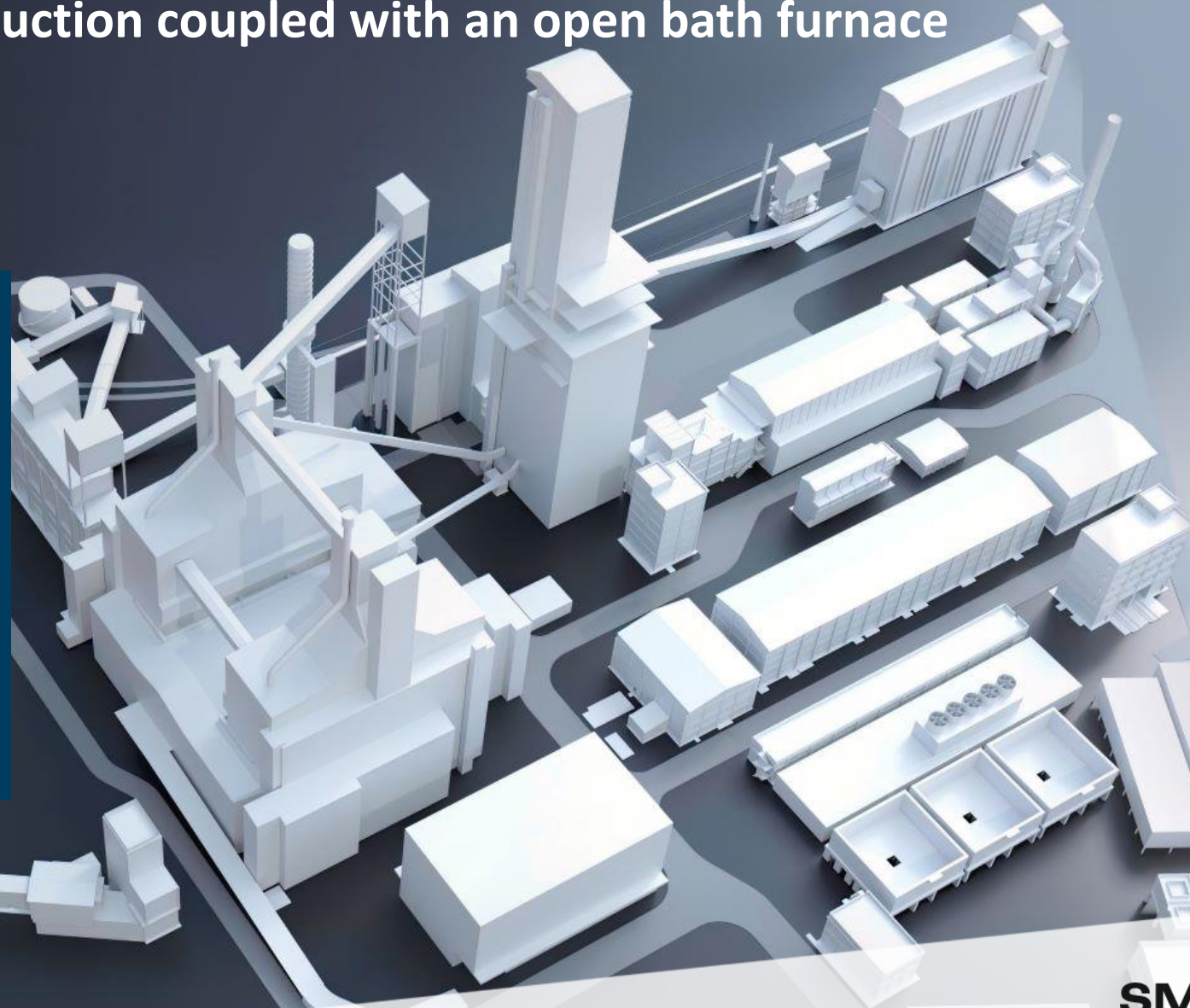
Spotlight: Primobius
Special process of recycling Lithium-Ion batteries

› CO_2 minimal process

› High purity of recovered materials (lithium, cobalt, nickel)

› Scalable

› Industrial applicable

› High scrap rate in battery production

Primobius
Battery recycling without limits

》 Industrial recycling facility Hilchenbach JV with NEOMETALS, cooperation with Mercedes-Benz

SMS group

The most modern heavy workshop for quality components

› **850 employees** and over 55,000 m^2

› **In-house manufacturing** of key components

› **Pre-assembly and testing** of quality-relevant units and hydraulic systems

› **Close cooperation** between engineering, manufacturing and global sourcing

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Switch on and start production quickly and safely

› Realistic **3D real-time simulation**

› **Tested software** before delivery

› **High product quality** from the very beginning

› **Trained personnel** at an early stage

› Faster **commissioning and ramp-up**

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Additive manufacturing

Weight reduction + multi functions → CO_2 reduction

› Aviation and aerospace

› Automotive

› Machine engineering and tooling

› Medical applications

Expertise in the whole value chain of additive manufacturing

› Powder atomization plants

› Turnkey solutions for additive manufacturing series production

› Additive manufacturing applications

SMS group

Technology transfer to boost logistics efficiency

Disruptive technology for container handling

› Container storage 11 tiers-high

› 200% more capacity than a conventional terminal, one third of the space

› Faster turnaround times and reduced congestion in ports

› Lower OPEX, direct access to each container, no reshuffling

› Modular, scalable and expandable

› Fully automated and digitalized

› Truly green technology, fully electric powered by solar energy
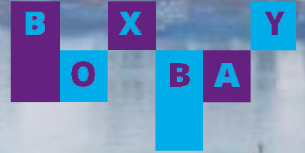
» FAST – SMART – GREEN

SMS group

20 years CADENAS@SMS group
The Beginning ➜ SMS Eumuco

1997 – First inconclusive discussions with SMS Schloemann-Siemag (today's SMS group) and CADENAS

2002 – Starting position @ SMS Eumuco

The time before CADENAS
Up to the year 2002:
- ca. 80 ME10 workplaces under HP-UX 10.20
- ca. 25 MEDUSA workplaces on Windows
- ca. 10 Pro/E workplaces on Windows
- ERP system: PSIpenta/PflASt (self-created)
- Each CAD system has its own library of standard parts ➜ three different standard parts systems
- Many different catalogs of different quality
- Different search options and operating concepts
- Many parts created by users themselves
- No connection to the ERP system ➜
  - Significant search times
  - Article duplicates
- Updates to new standards have to be made very late or not at all, as there is a very high amount of care required.

20 years CADENAS@SMS group
The Beginning

2002 – The solution → CADENAS PARTsolutions

- Uniform standard parts system for all three systems

- Bidirectional connection to the ERP system

- Integration of supplier catalogs into the standard parts system

- Integration in Pro/Intralink with automatic updating when the article master data is changed in CADENAS

And that is true to the present day, only the systems are different. +X

The wishes at that time (2006):
- Catalog updates messages with content of the changes
- Scriptable option of catalog updates including download
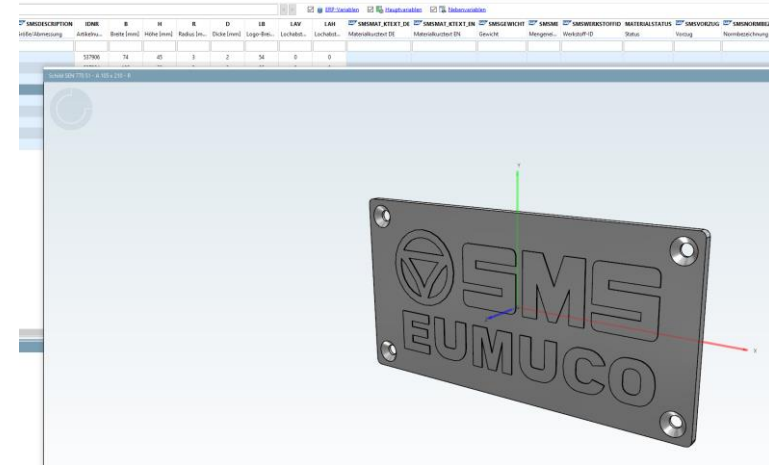
20 years CADENAS@SMS group
The Beginning ➜ SMS DEMAG

2004-2006 –
Introduction of SAP

- The problems are the same, the solution too.

- But: Additionally introduced standard and catalog parts management.

PARTsolutions@SMSDemag

Motivation: Project new parts management system

- Several CAD systems

- Various part libraries with different contents

- No coupling of part libraries and ERP system

Pro/E   ACAD

≠
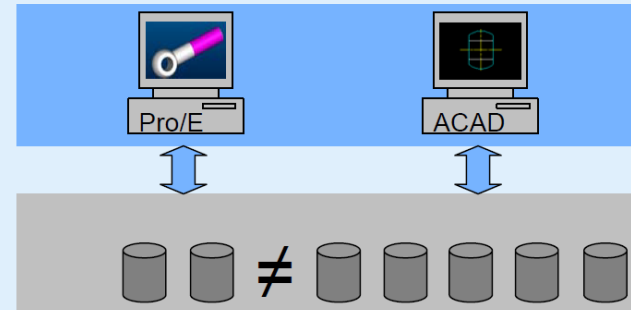
≠ • Data Stocks
  • Contents of the master data

SAP

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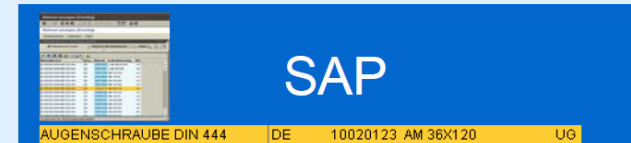
20 years CADENAS@SMS group
Implementation by SMS DEMAG in 2006

- Start of integration of German locations (Dü and Hi)

- Connection to Creo, AutoCAD (and Inventor later on)

- SAP connection

- Creation of a central parts management office for creating and maintaining standard and catalog parts ➔ 5 employees

- Provision of missing geometries in the CADENAS format ➔ own modeling
  ➢ The previous requirement is that all possibly geometry-relevant standard and catalog parts must be made available in PARTsolutions

20 years CADENAS@SMS group
Implementation by SMS DEMAG in 2006

- Standard parts were converted and cleaned from old system → standards Office had already created standard parts centrally in the old system ➔ ca. 25,000 active standard parts (in old system 60,000)
  - ➢ Today: Approx. 134,000 active standard parts

- Catalog parts (approx. 973,000 "bought-out items") were not converted → Greenfield central system
  - ➢ Today approx. 152,000 active catalog parts worldwide

- Cover letter to manufacturer for generating catalog content (Purchineering initiative)

- Approx. 1100 Users

- Site-based installation ➔ mirroring of data required

- Idea back then: We only need about 80 manufacturers.

20 years CADENAS@SMS group
Timeline

2002
Start SMS
Eumuco

2006
Merger SMS
Eumuco +
SMS MEER

2006
Start SMS
DEMAG DE

2008
Start Ticket
system
AVTM/PMWS

2011
SMS USA

2013
Fontaine
Engineering

2014
SMS MEER

2015
SMS India

2016
SAP
integration
SMS MEER

2018
SMS Italia and
SMS China

2022
CADENAS
Croatia

2023
And now?
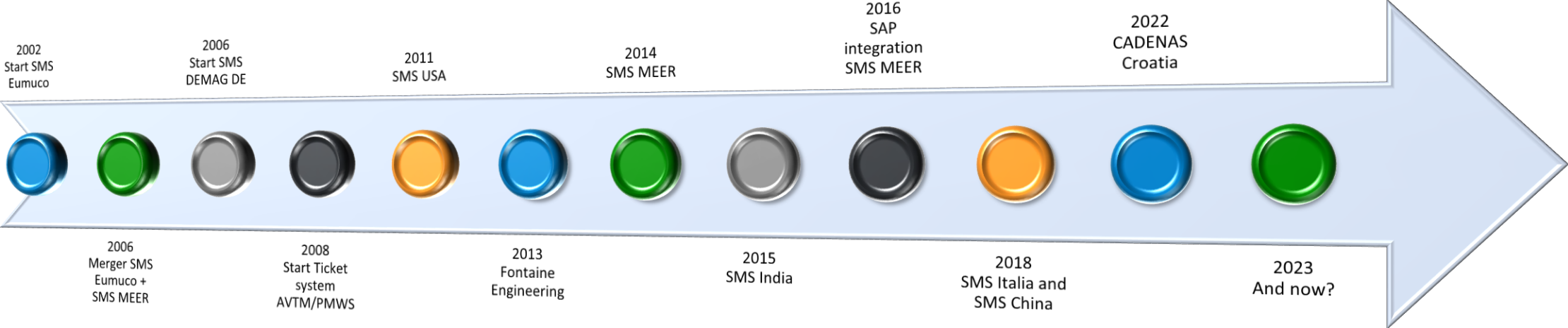
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20 years CADENAS@SMS group
In the meantime?

- Company has renamed itself twice
  - ➢ SMS DEMAG ➔ SMS SIEMAG ➔ SMS group

- Various mergers of the old companies
  - ➢ SMS Eumuco + SMS MEER ➔ SMS MEER
  - ➢ SMS MEER + SMS SIEMAG ➔ SMS group

- CADENAS is still there and still says so.

- 2008: Dedicated request system for standard and catalog parts (AVTM / PMWS)

- 2012: In-house Department parts Management (previously part of the standards Office)

- Various migration projects (SMS USA, Fontaine Engineering, SMS MEER, SMS India, SMS Italia, SMS China)

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20 years CADENAS@SMS group
In the meantime?

- Parts Management (PM) has grown further and become international
  - ➢ Own departments of the PM in India and Italy under the leadership of SMS group DE
  - ➢ Anticipation of the new way of working of the SMS group

- Conversion from data distribution via Robocopy to PARTapplicationServer
  - ➢ Major Simplification
  - ➢ One master server, the rest proxies
  - ➢ Performance? ➜ runs when the line fits.

- Scaling of PARTsolutions worldwide ➜ no problem (also through PARTapplicationServer)

20 years CADENAS@SMS group
Status Today (2023)

- Over 3,000 potential CAD users, of which ca. 1,500 actual users in CADENAS PARTsolutions

- Approx. 100 PARTsolutions user per day

- Approx. 152,000 catalog parts in SAP

- Approx. 134,000 standard parts in SAP

- Approx. 3,800 manufacturers, of which approx. 1,800 are relevant for geometry (2008 were 240)

- 202 official catalogs used (from 948; unfortunately we do not need BIM, 2008 were 43)

- Approx. 1700 self-produced catalogs

20 years CADENAS@SMS group
Status Today (2023)

- Approx. 1,200 persons can request standard and catalog parts ➔ all persons in the new system.

- Team Parts Management incl. CADENAS Croatia: 21 persons
  - ➢ 8 CADENAS Croatia, of which 1 modelers
  - ➢ 2.5 SMS Germany
  - ➢ 1.5 SMS Italia
  - ➢ 9 SMS India, of which 5 modelers

- Provision of data via PARTapplicationServer
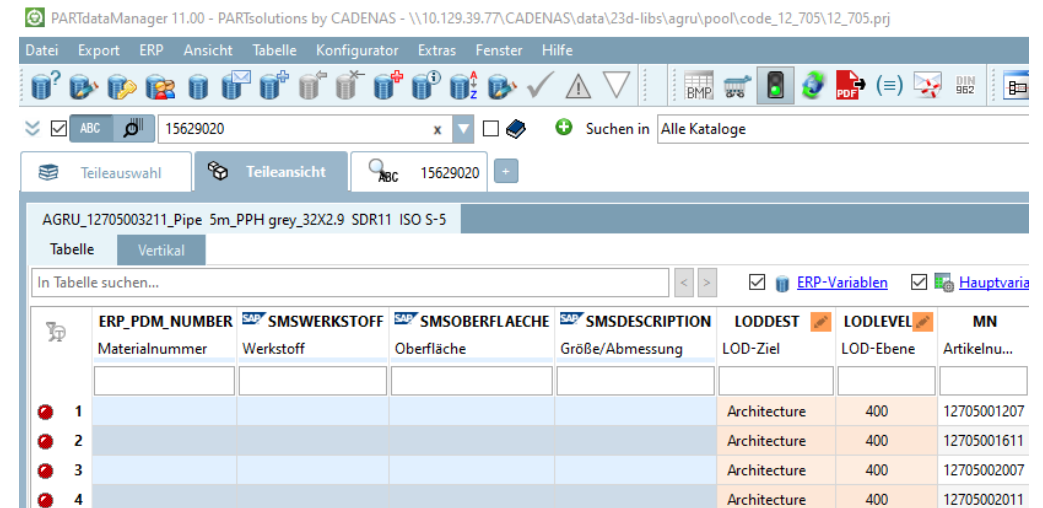
20 years CADENAS@SMS group
Lessons Learned - Negative

- Purchineering initiative failed

- Seamless integration did not work for us

- Q&S catalogs only work very unreliable with CREO

- No-one uses PARTconnection (screwed/bolted connection tool) except us

- Switch V8 ➔ v9 or: How to do it better.
  - ➢ Software ran very unreliable
  - ➢ All catalogs prepared in-house had to be adapted and re-zipped due to a new Suchindex ➔ expenditure of 9 months
  - ➢ PARTident omitted ➔ PARTwarehouse is a monster

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20 years CADENAS@SMS group
Lessons Learned - Negative

- Data model of the tables has potential for optimization; instead of individual tables → database (possibly as cloud solution?)

- Again and again new functions are forgotten by major customers in the mechanical engineering and plant construction sector
  - ➢ Currently: Different LoD for BIM and Mechanical Engineering → BIM preset!
  - ➢ Prevents automatic generation in CREO

- AutoCAD 2D derivation is always a little difficult.

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Lessons Learned - Positive

- Software and parts management are accepted and is a matter of course

- Highly scalable software from local to global

- The right softare at the right time

- Central parts management with CADENAS PARTsolutions: It is worth it
  ➔ worth proof Bachelor's thesis Tobias Popies

- Unconsciously and not intended: Training in the digital twin

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Lessons Learned - Positive

- Greatest Benefit:
  - ➢ Expandability
  - ➢ Integration slides/stickers (but only shelf)
  - ➢ Central surface
  - ➢ Linking with SAP

- Automatic catalog installation is possible

- eCatalog-Solutions for self-created catalogs have proven to be successful

- Search and filter options as well as geometry exchange are very simple

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Lessons Learned – Totally underestimated (of many)

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What happens next?

- Since 03/2023 Master Data Management Department

- Change-over to S/4 HANA

- Further connection of SMS companies/Paul Wurth ➔ data migration projects

- Update V12 (probably 2024)
  - ➢ Change-over to web interface (ENTERPRISE 3Dfindit) if it works
  - ➢ PARTwarehouse in operable (prel. 2023)

- Further investigations use Q&S catalogs

- Change-over to new ticket system from MEDAXperts/CADENAS (09/2023)
  - ➢ Simplified Operation
  - ➢ PARTsolutions connection to ticket system
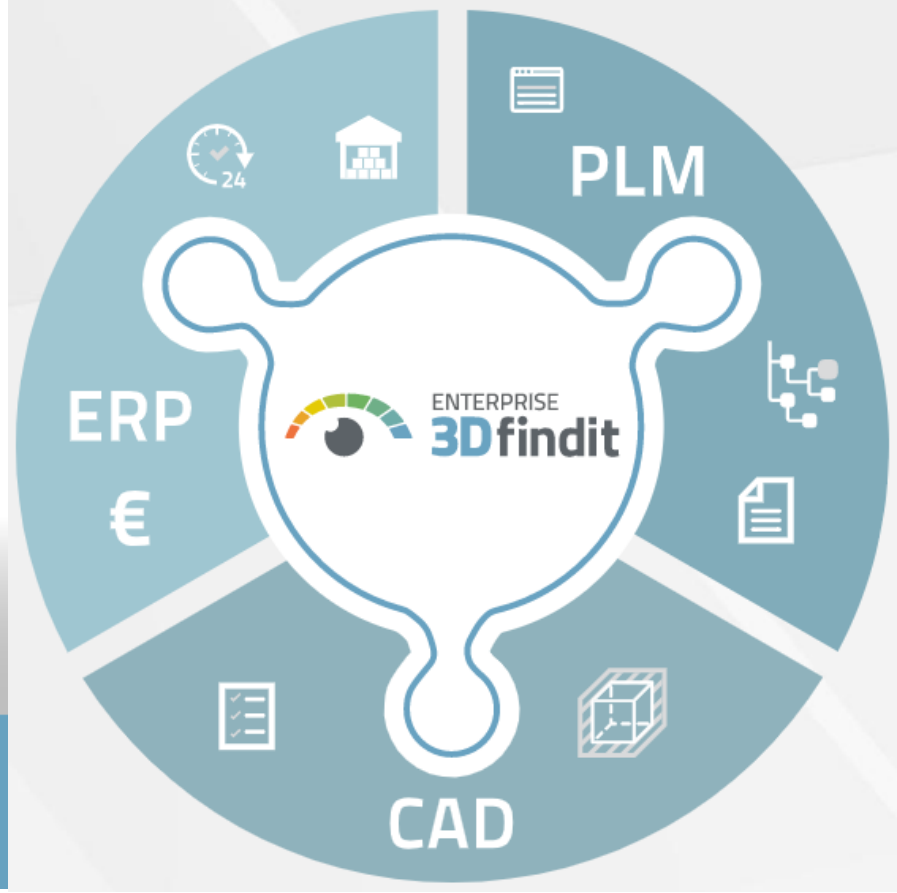 - ➢ Connection designation catalog Standard parts (in v2 also catalog parts)

20 years CADENAS@SMS group
SMS group # MDM Ticket System – Key Features

20 years CADENAS@SMS group
SMS group # MDM Ticket System – Key Features

- Data transfer from the PARTsolutions catalogs to the ticket system

- Ticket system with SMS fields for central new creation of standard and catalog parts in SAP

- Integration SMS designation catalog with AutoComplete

- Duplicate check for standard and catalog parts

- Weight calculation for standard parts

- Status network for modeling missing standard and purchased part geometries

- Automatic creation of SAP basic data via the PARTsolutions SAP R3 or SAP 4/HANA MM interface

- Monthly dashboard for evaluating the number, status, master data quality of the processed tickets

- Ticket system Ready for ENTERPRISE 3Dfindit
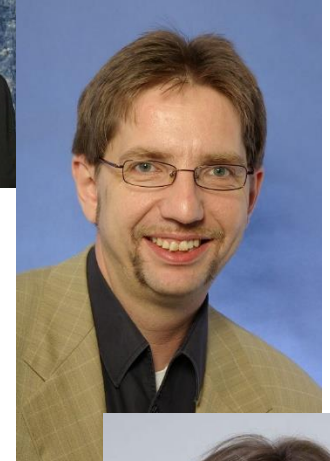
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Live Demo

- Previous Ticket System

- New Ticket System

- CADENAS PARTsolutions

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Conclusion

- Master data management and obsolescence management has been and continues to be important and is becoming increasingly important
  - ➢ Digital Twin
  - ➢ Legal requirements for master data
    - o Material Compliance
    - o Hazardous Goods (Lithium Batteries)
    - o Product Carbon Footprint
  - ➢ Processes
  - ➢ AI

- CADENAS PARTsolutions helps in this process.

- Decision was right.

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