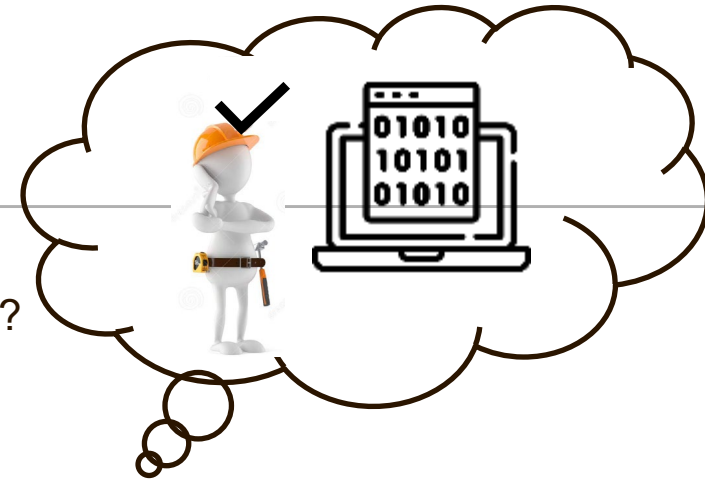


Machines in Construction MiC 4.0

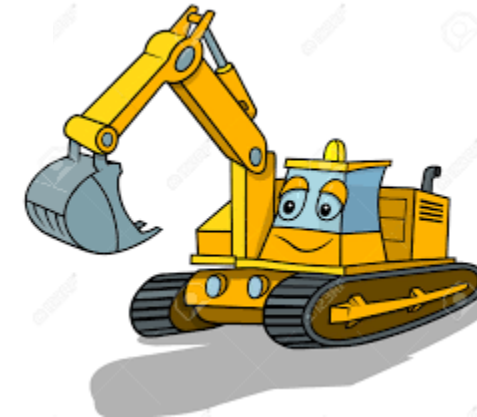
...one common digital language/one common understanding

MiC 4.0 – one digital language

... „machine to machine/server/cloud“ communication??

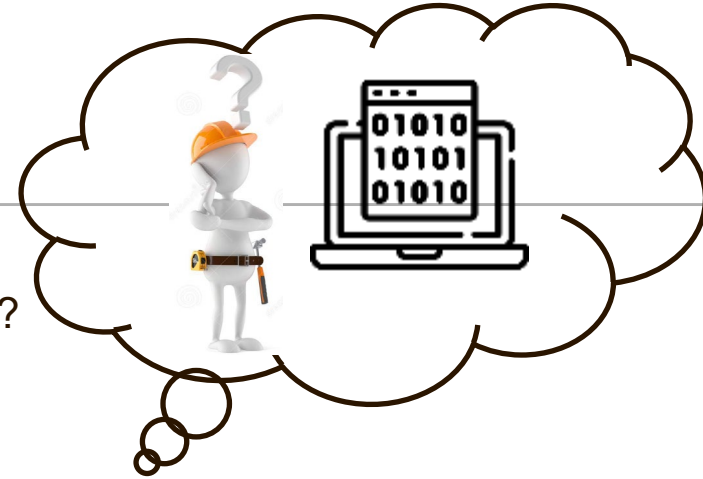


... from the same manufacturer = ✓



MiC 4.0 – one digital language

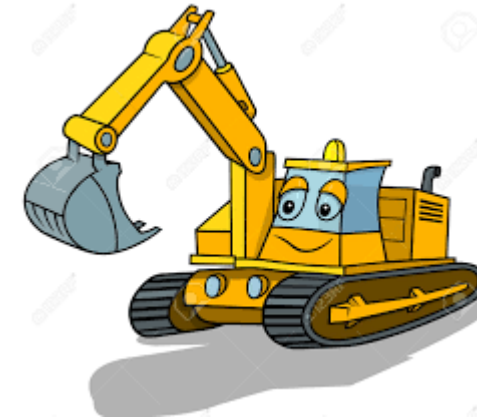
... „machine to machine/server/cloud“ communication??



Hi, can you please help me?



Ahh, you are wheelloader 123
... I am excavator 321



... but from **different** manufacturers = ???

MiC 4.0 – one digital language

... real „machine to machine“ communication – different manufacturers??
... real situations in the case of attachments ...

Ohhh. An attachment ...



Hello.
I am a compactor
with 48 Volts und 200 psi
pressure



WOW...
I must got something wrong ...



MiC 4.0 - Development - Foundation

What is digitalization on construction equipment/on the construction site?

- Machine to machine communication
- Building Information Modelling – BIM
- Fleet Management
- Better organization of material/equipment/construction site etc.
-

The solution can ONLY be a “one digital language”

- cross-machine approach
- manufacturer-independent

MiC 4.0 - Development - Foundation

- Foundation of the working group "Machines in Construction MiC 4.0" on 8 April 2019 at bauma19 in Munich
- Current number of members: 107 members (currently from seven European countries)
- 74 companies from the VDMA
- 28 companies from the construction industry and other sectors of the economy
- 5 universities

AK Machine data – first results – a common understanding

MiC 4.0 Results Paper
Machine condition data cluster 1
Earth-moving machinery



Based on / specification of ISO 15143-3

Image: Albert [www.vdma.de](#)

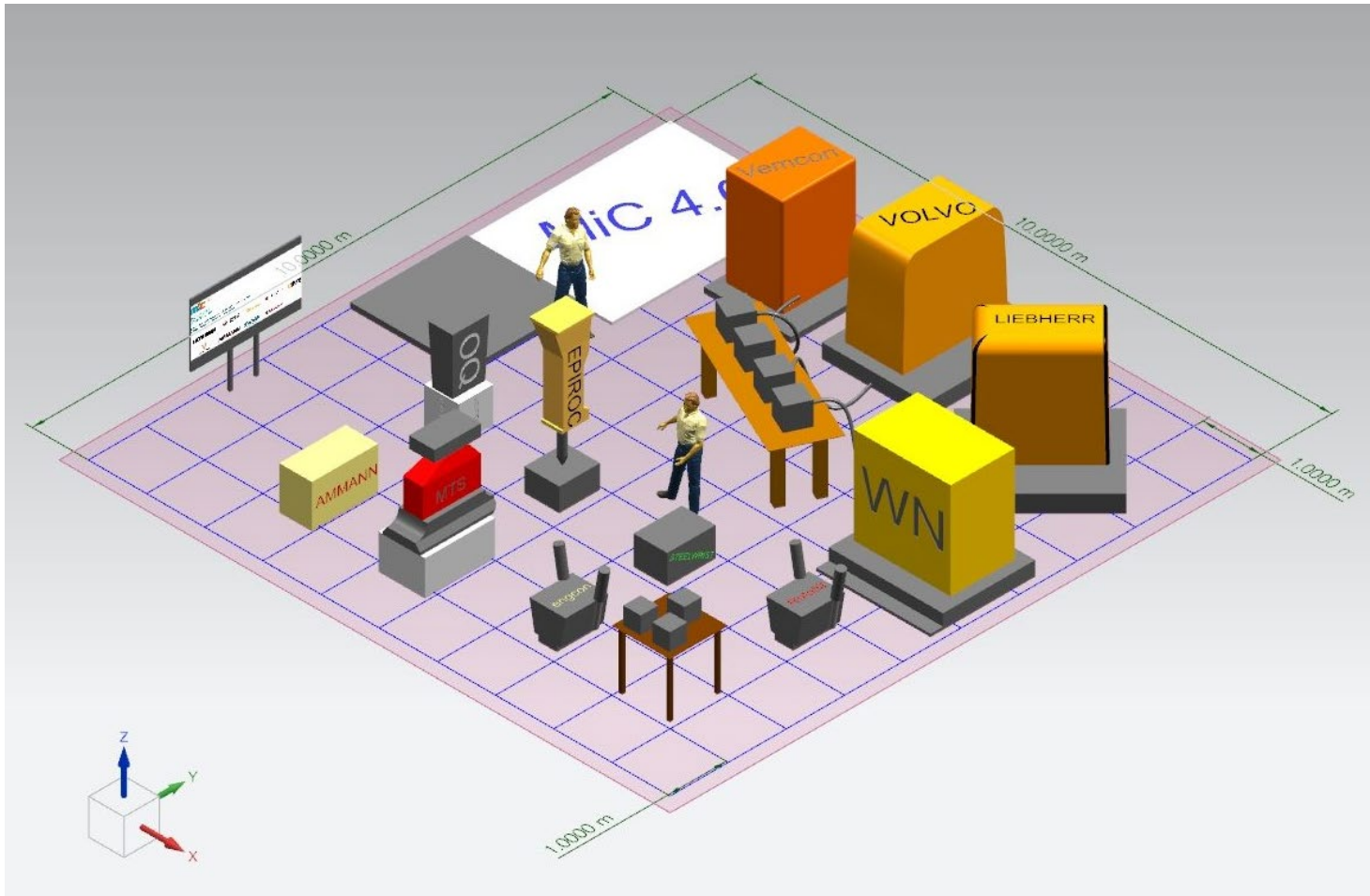
- All machine clusters
- MiC 4.0 data glossary
- MiC 4.0 icon design guideline
- «MiC 4.0 BUS» for attachments
- Physical presentation at bauma22

MiC 4.0 – bauma22 (24. – 28. October 2022 in Munich)

- mic40.org - new homepage, image film, "webshop" for the provision of the results
- Preparation for bauma22
- MiC 4.0 exhibition booth
 - Attachments demo area (approx. 100m²)
 - bauma-Innovationprice - participation in the field of digitalization
 - bauma Forum - Webinar, presentations and panel discussions
Thursday, October 27, 2022 - **"Digital construction site"** in Hall "Lab zero"

Making digitalization on construction sites possible

Visit us at bauma22 and see, what is possible if we all are working together



In cooperation with

MiC 4.0 – Machine data

Next steps:

- Programming of a common MiC 4.0 data protocol/test protocol
- Identification/definition of the work data/process data of the individual machine types.
- Machine users are currently in coordination (work data/process data, ISO 15143-4)
- In the area of attachments
 - Basic agreements achieved ✓
 - Software parameters agreed/defined ✓
 - Functional safety is ensured across the board ✓
 - Freeze of the first MiC 4.0 protocol ver. 0.1 in mid of June 22 ✓
 - CAN BUS programming is in process (MiC 4.0 protocol) ✓
 - Physical demonstration at bauma22 ✓

MiC 4.0 – Machine data – Examples Cluster 1 – Earth-moving machinery

Machine Type

- Crawler excavator
- Mobile excavator
- Wheel loader
- Dump truck
- Bulldozer
- Grader
- Single drum roller

Process

- Loosening material (store sideways)
- Backfilling material
- Material loading
- Profiling material (slope/embankment)
- Demolition/Scraping, Chisel Work

MiC 4.0 – Machine data – Examples Cluster 1 – Earth-moving machinery

Process-Data (examples)

- Transport vehicle identification
- Loading cycles
- Loading times
- Operating time
- Handling capacity
- Material weight per loading cycle
- Minimum and maximum force per operation
- Fuel consumption during operation/ activity
- Area
- Soil parameter
-
-
- Attachment identification (in cooperation with Cluster 7 - Attachments)
- Volume, content (size) of the attachment (in cooperation with Cluster 7)
- Average force applied to the attachment per operation (in cooperation with Cluster 7)

MiC 4.0 – general statement for correct understanding

- MiC 4.0 is driven by construction companies and machine users.
- We do **NOT** create standards or "binding specifications".
- All joint MiC 4.0 agreements are voluntary and owed to the requirements of the users/construction companies.
- MiC 4.0 is not mandatory, but rather voluntary self-commitments for the benefit of all participants along the value chain/construction site.
So everyone is invited to participate, to join this approach and to work together with all stakeholders on the challenges of a digital construction site.

Who can become a member of MiC 4.0?

Every manufacturer around construction equipment and every construction company which is dealing with questions and obligations around the digital jobsite.

The solution can **ONLY** be a “one digital language”

- cross-machine approach
- manufacturer-independent

MiC 4.0 - Contact



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Machines in Construction MiC 4.0

Thank you for your attention