



## Communication between equipment

Three levels of communication in equipment can be recognized:

1. From PLC to input / output per machine
2. Between the PLC's from the different machines
3. Between the machine and the Internet





## **This Presentation is about communication between the PLC's of the different machines**

### **The three levels:**

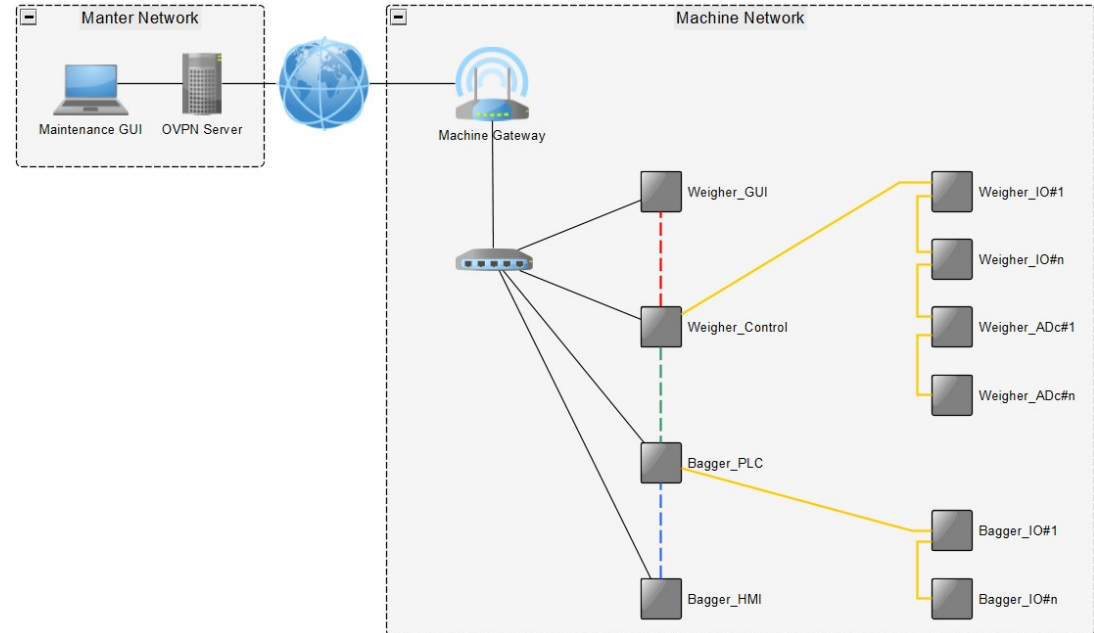
1. From the PLC in each machine to the input / output of that machine. To be decided per company. Manter is using Ethercat as a protocol to for instance the frequency drives.
2. Between the PLC's from the different (brand) machines. This the information that can be shared between weigers, baggers, checkweighers, palletizers, graders and sizers, etc. It can be statistic information or control information.
3. Between the machine and the Internet





# Why Machine integration?

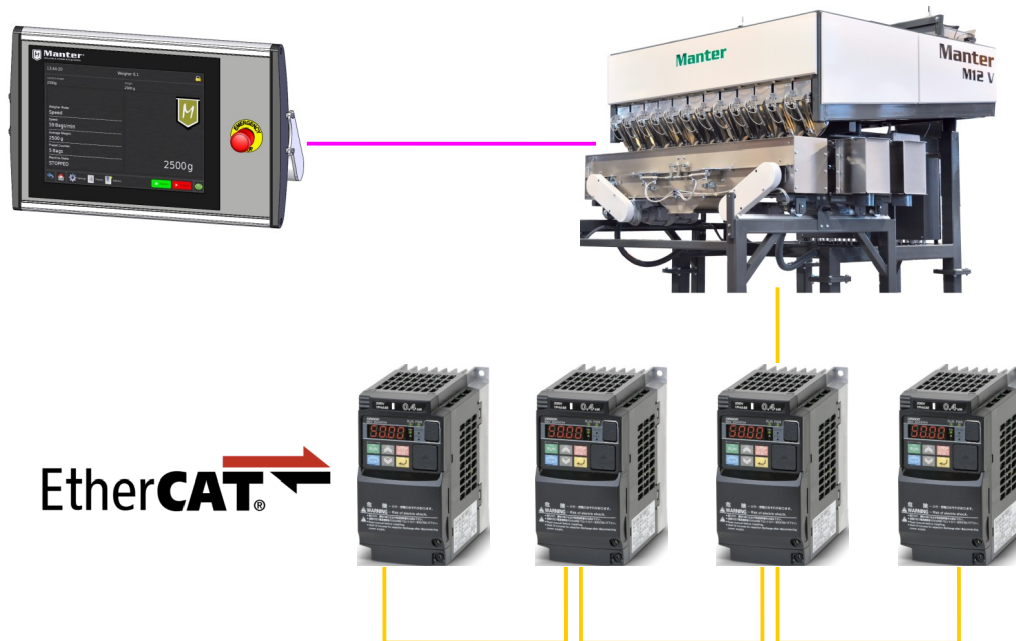
- ✓ To reduce total cost of ownership
- ✓ Internal between Manter machines and external between third party machines a communication with standardized industrial protocols.
- ✓ For use in f.i.:
  - Control over the complete line from one location
  - Predictive maintenance
  - Remote access to the equipment line
  - Connecting to an ERP system
  - Collecting statistic information





# Internal communication in a Manter weigher

- ✓ Dedicated communication weigher Touchscreen and the Control unit
- ✓ Prepared for future networks





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# Internal communication bagger

- ✓ Fins/UDP or Ethernet/IP between Touchscreen and PLC



- ✓ Prepared for future networks

Ether**CAT**®

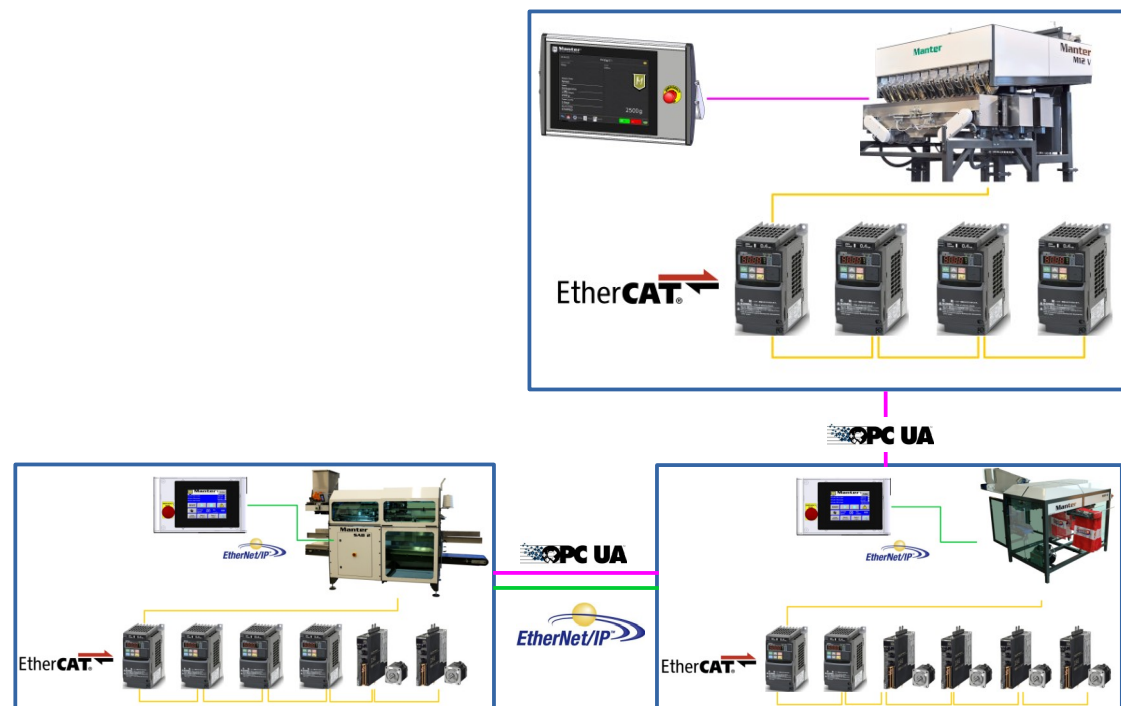






## Communication between Manter machines

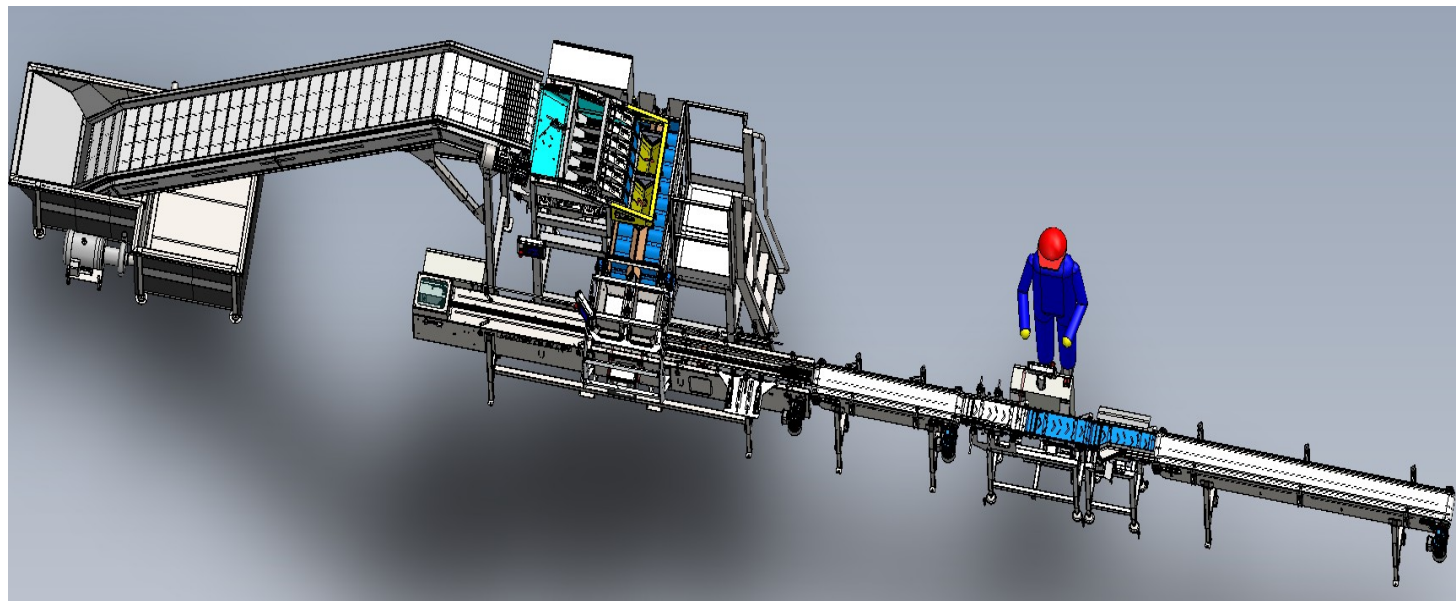
- ✓ Communication and integration between bagger plc's already realized
- ✓ Network prepared for future communication and integration between Manter weighers and Manter baggers





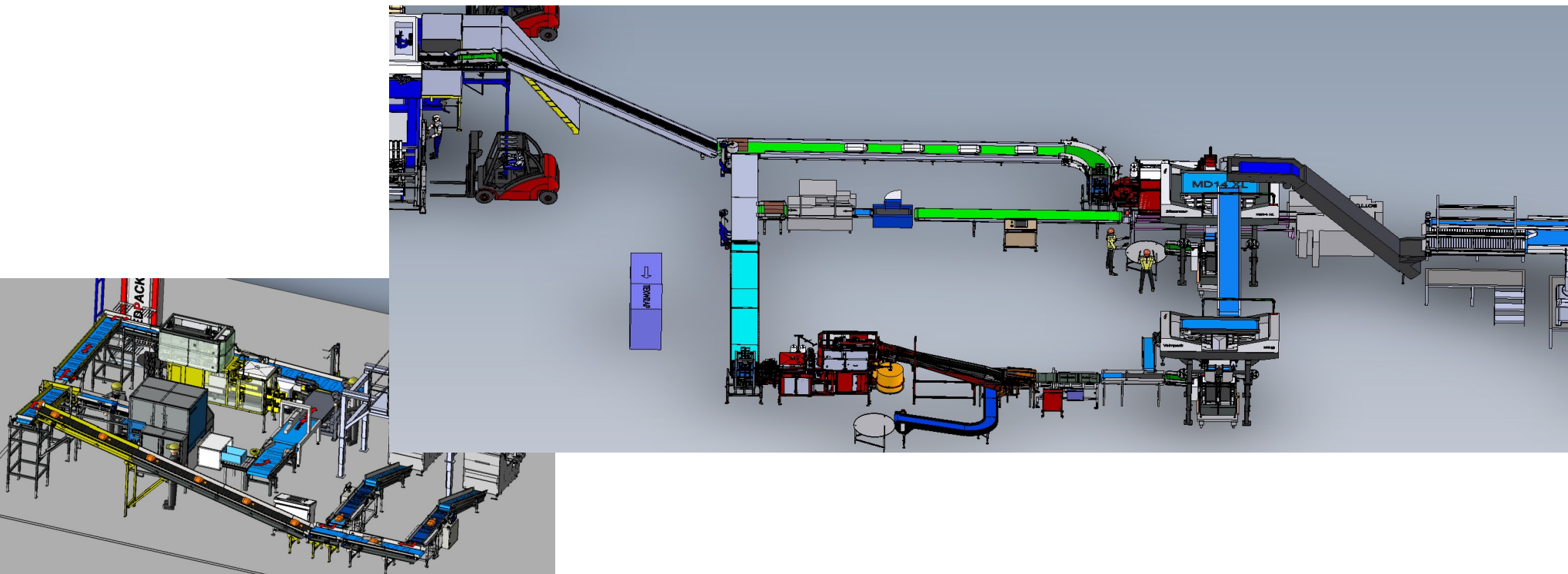
## Goal is to communicate between machines in small lines...

- ✓ Communication between weigher, clamshell bagger, checkweigher, etc
- ✓ Preset selection on 1 machine, sets the same preset on other machines in line
- ✓ Status and enable communication



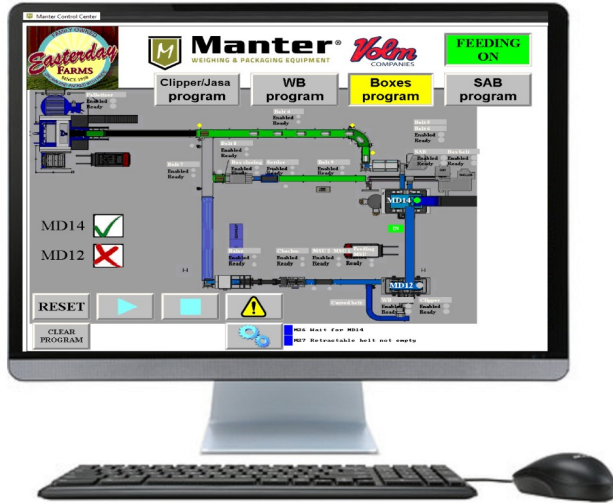


..to integration with third parties..

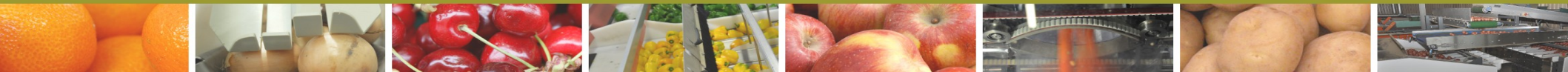
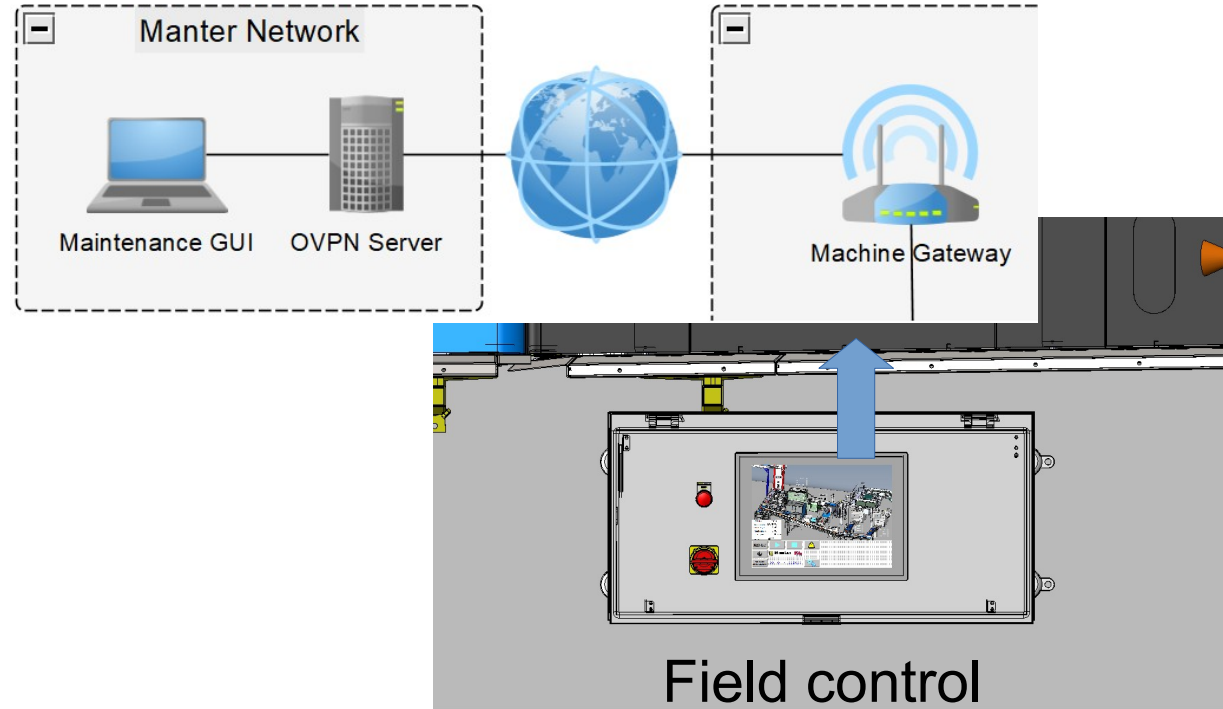




.. to remote maintenance and support



Manufacturer backoffice





## Available protocols

The Industry offers a variety of protocols. Not all are easy to implement. After a thorough study the best candidate has been found.

Currently Ethernet/IP, as hardware, is available at a lot of vendors. Problem is it requires still a lot of programming per machine manufacturer and they have to agree on many items if they want to work together.

The hardware and protocol OPC UA is strongly upcoming in many computers and PLC's.





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OPC UA offers features we as machine manufacturers are looking for.

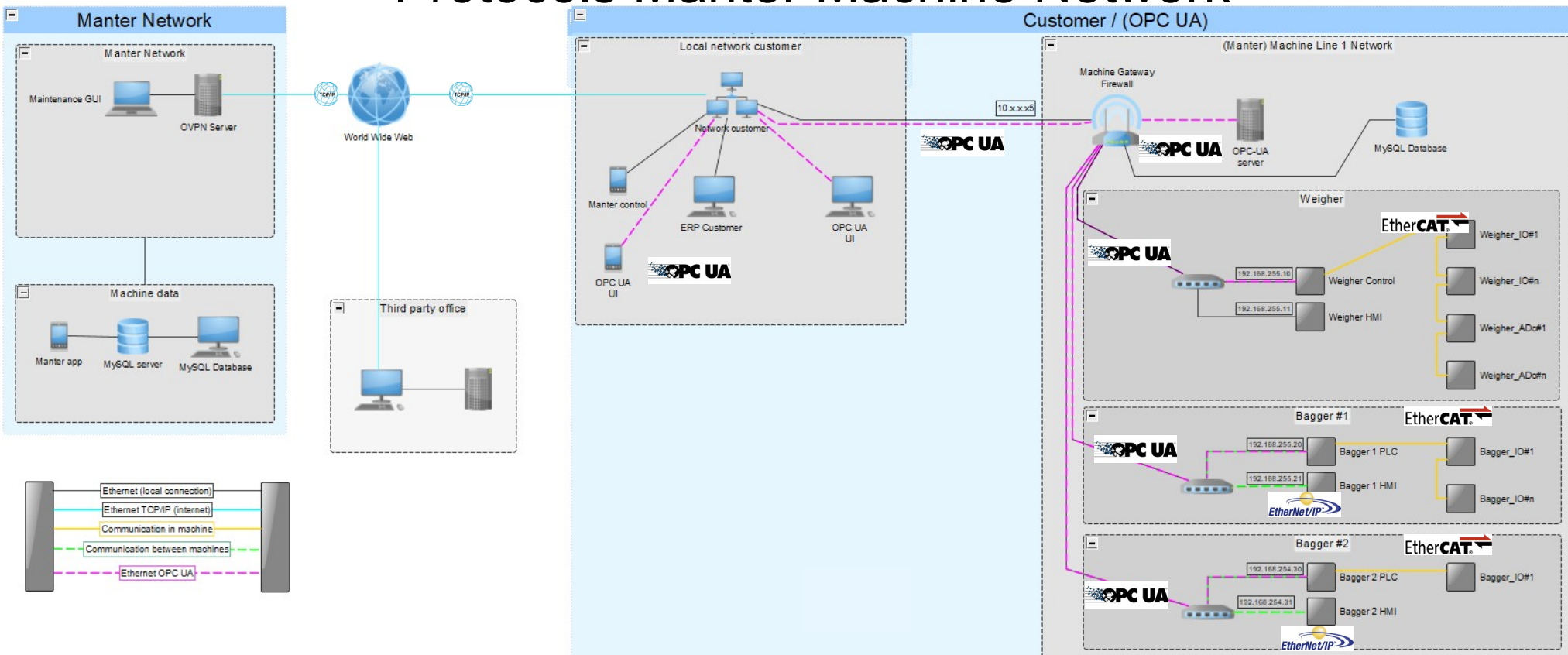
- Standard ethernet hardware is used with standard cabling
- OPC UA can be used over the same ethernet port as the standard network connection
- The protocol makes it possible to publicize data in a prescribed format.
- This data can be statistic info, status info or input / output info
- The data made public is available for all users in the network. This is a very strong point as any user can pick the info it needs or send info others need to know.
- The way this is done is ready for use and manufacturers do not need to do that again or more important need to find agreement.
- Per OPC UA network there needs to be a minimum of one client server.

Therefore Manter is focusing on the OPC UA protocol with suppliers and equipment manufacturers.





# Protocols Manter Machine Network







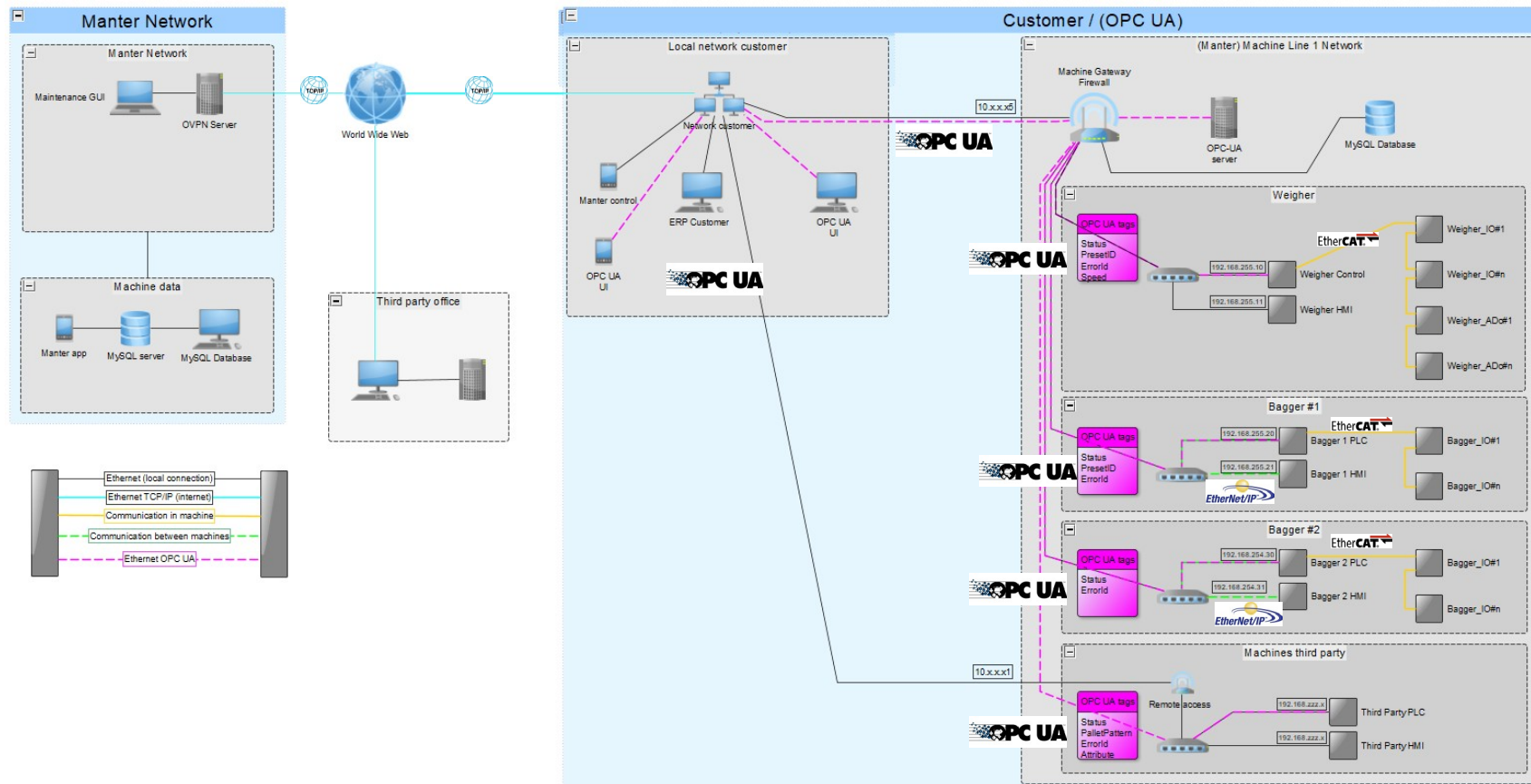
## Protocols in a Manter Machine Network

- ✓ From the computer or PLC to input / output: EtherCat
- ✓ Communication between machine computers and PLC: OPC UA
- ✓ Communication with customer local network: Ethernet TCP/IP (standard network connection)
- ✓ Communication with Manter backoffice: Ethernet TCP/IP through customer local network and a Internet connection.





# Protocol between Manter and other manufacturers





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## Protocol between Manter and other manufacturers

- ✓ The pink boxes, OPC UA Tags, in the sheet before show info that can be shared
- ✓ A local client server computer stores machine data and oversees the network
- ✓ This OPC UA server data is also available in the local network of the customer
- ✓ Information can be shared with f.i. an ERP system or an equipment manufacturers analytics software tool
- ✓ Manter f.i. wants to use the data for the “Manter maintenance app”





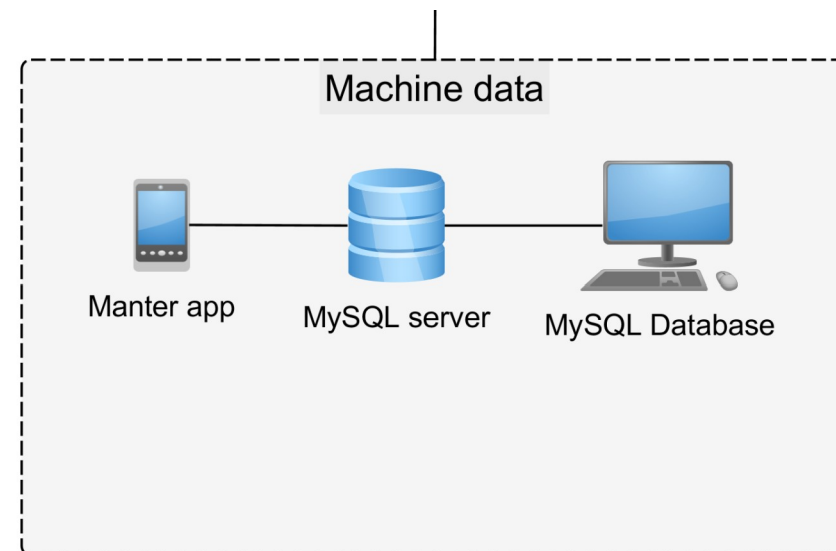
## Example of Data exchange

✓ Real time data, like:

- Weights
- Speeds
- Critical alarms
- Preset
- .....

✓ Historical data, like:

- Run per batch / day
- Nr of rejects / good bags
- Error log
- ....

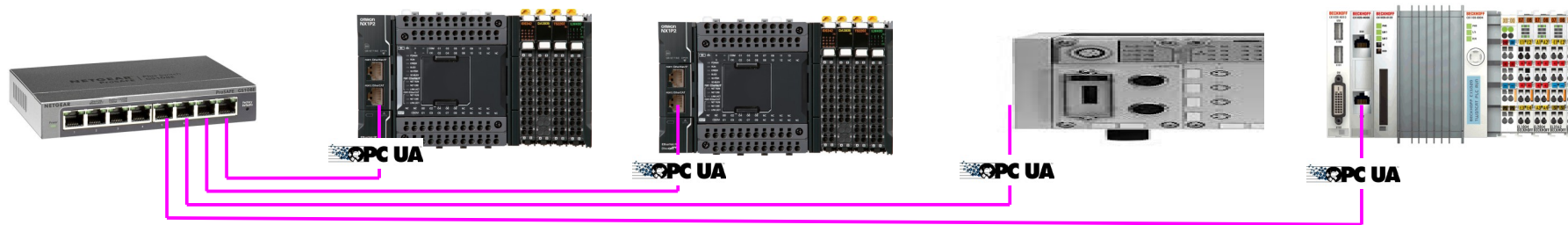






# Communication between Manter and others

- ✓ Conditions:
- ✓ The OPC UA protocol has to be available on third party machine networks and controllers.
- ✓ Between manufacturers a TAG list of what data is made public on a specific machine. Remember each manufacturer can decide by itself what is made public!





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OPC UA is supported by but not limited to, the following vendors:

<https://opcfoundation.org/>

### Initial supporting Automation Industry Players

**ABB**

**BECKHOFF**

**rexroth**  
A Bosch Company



**CISCO**

**hilscher**  
COMPETENCE IN  
COMMUNICATION

**HIRSCHMANN**  
A BELDEN BRAND

**HUAWEI**

**intel**

**kalycito**  
creating a difference

**KUKA**

**MITSUBISHI  
ELECTRIC**

**molex**

**OMRON**

**PHENIX  
CONTACT**

**PILZ**  
THE SPIRIT OF SAFETY

**Rockwell  
Automation**

**Schneider  
Electric**

**SIEMENS**  
Ingenuity for life

**TTEch**  
Ensuring Reliable Networks

**WAGO**

**YOKOGAWA**

