

Welcome to AEF

Communications Networking on Agricultural Machinery

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VDI Vorträge zu “Koopertativer Zusammenarbeit in der Landtechnik”

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Content

- Introduction and history on ISOBUS
- AEF and its products
- Future of Communications Networking
- Conclusion

Market situation – Lots of different tractors and implements



Why standards



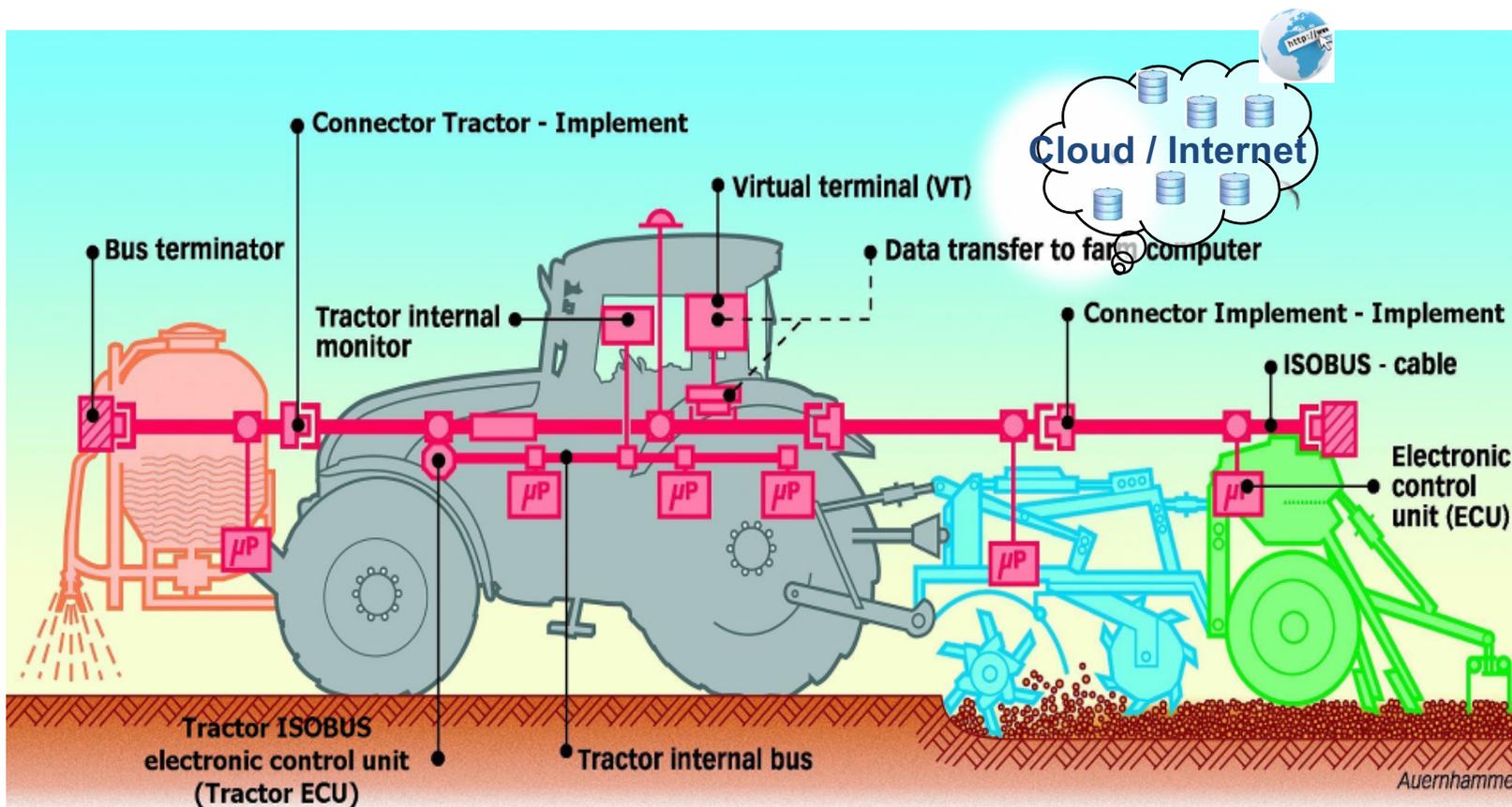
History – Electronic Standards

→ The 90th

- Rapid increase of Electronics in Tractors and Implements (multi-brands)
- Protocol needed for data communication between tractors implements based on CAN
- The most important standard developed was ISO-11783

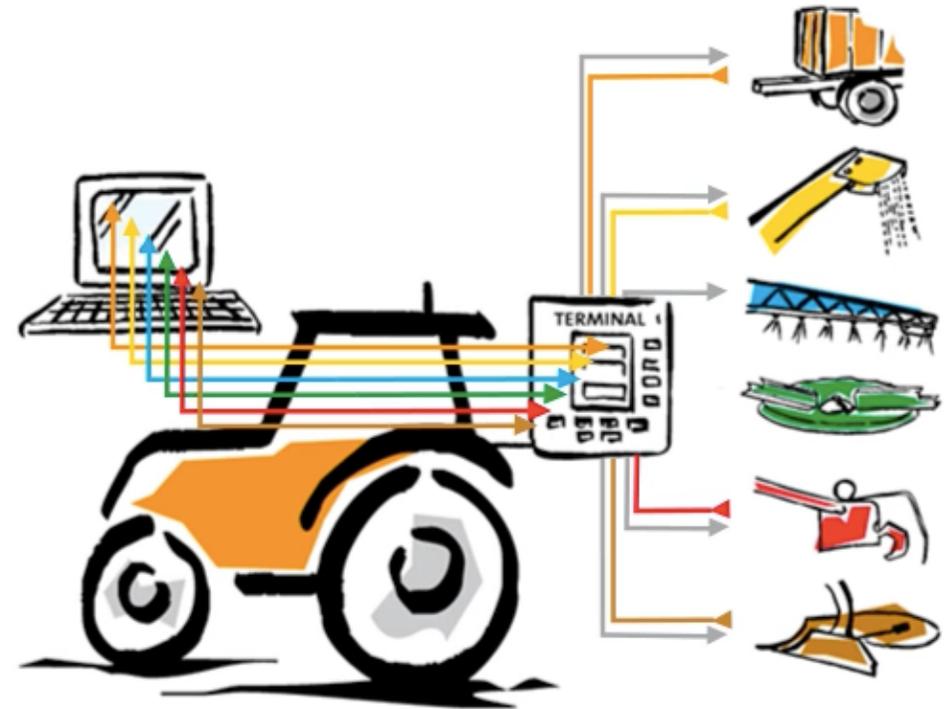


History – Electronic Standards



What is ISOBUS?

- Brand name of a data bus for agricultural use
- Based on Standard ISO 11783
- ISOBUS as mutual communication between implements and tractors as well PCs on the farm
- For tractors and implements the ISOBUS standard has been introduced 2001



ISOBUS market introduction

→ Early 2000s

- ISOBUS started slowly in 2001
- Since 2005 rapid growth in ISOBUS applications
- Many companies involved worldwide
- Different interpretations of the standard
→ **the standard is extensive!**
- Incompatibility issues

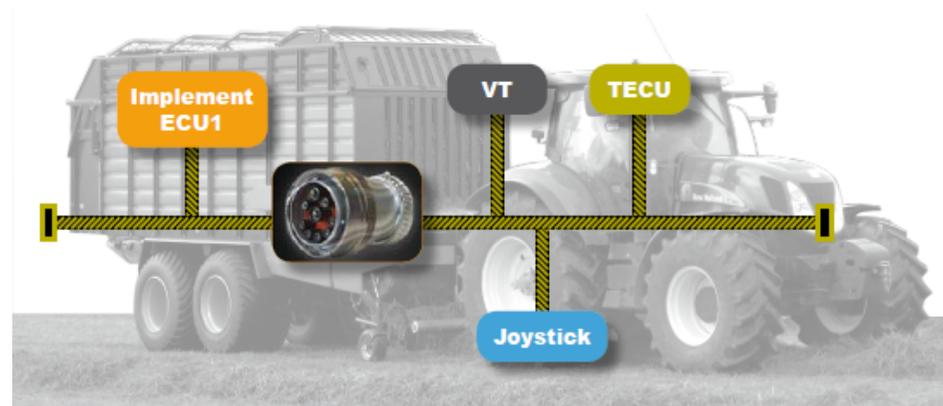
→ Need for Conformance Testing!



History – Industry awareness

→ Mid 2000

- Typical ISOBUS systems sold in high quantities
- Only one testing institute: DLG, still incompatibility issues in the field
- Non-aligned, unstructured approach to market
- ISOBUS ‘prepared’ or ‘light’, what does it mean...?
- In practice: Customers losing confidence in manufacturers!



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Founding of AEF

→ Agricultural Industry Electronics Foundation

- Founded on October 28, 2008 by 7 manufacturers and 2 Associations

→ Today 8 major agricultural equipment manufacturers and 3 Associations

- Worldwide support of ISOBUS implementation
- Structured in 11 project teams with different scopes
- Supported by 5 international test lab to certify products



AEF combines ISOBUS and Ag industry needs

STANDARDIZATION

ISOBUS

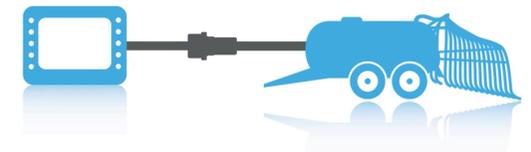
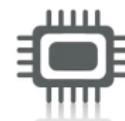
INTEGRATION



USER ORIENTED



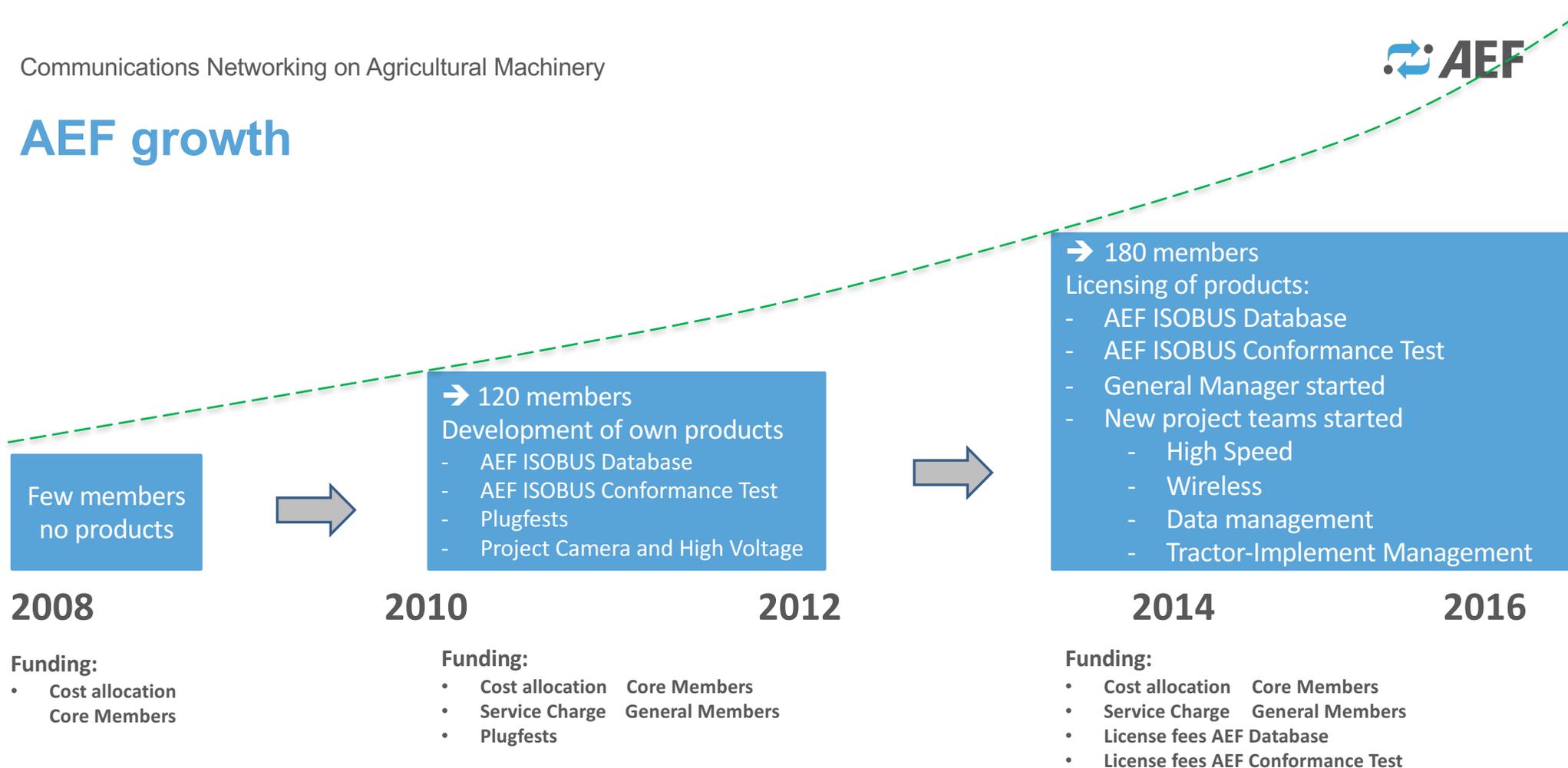
COMPATIBILITY



→ Main goals

- Create solutions based on ISOBUS
- Define standards for Ag industry
- Focus on Tractor – Implement connection
- Coordinate activities and developments
- Communicate via interfaces

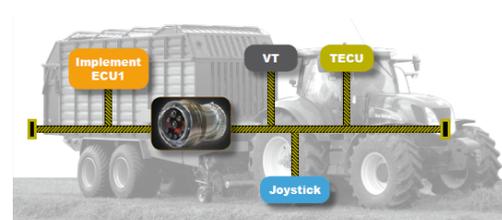
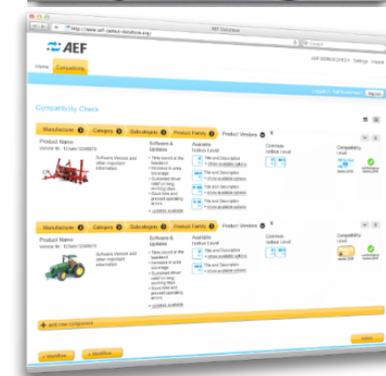
AEF growth



→ AEF has gone through a tremendous development over the past 6 years !

AEF products

- Component certification with **AEF Conformance Test**
- **AEF ISOBUS Database**
- Organization and hosting of **Plugfests**
 - Up to 250 participants testing equipment
- AEF publishes **Guidelines**
 - Implementation or Functional Safety guidelines
- AEF works with 5 recognized Test Labs
 - Certified Equipment will be stored in the AEF Database



ISOBUS functionalities

- AEF Functionality; a separate “module“ on the ISOBUS
- One or more can be bundled together into a retail product, intended to interconnect with other products that contain AEF Functionalities (client/server)
- AEF Conformance Test and Database make full use of this functionality concept



- An open concept, new functionalities will be defined in the future ...

AEF Database

The screenshot displays the AEF Database interface for a compatibility check. The page title is "Analyzing diagnostic data" and the user is logged in as "Peter van der Vlugt". The main content area is titled "Compatibility Check" and "Combined Functionalities".

Product	Update	Available Functionalities	Combined Functionalities	Certification
CLAAS > Tractor > ARION 600 T4i > ARION 600 T4i > Product Version ✓ X TECU (A107 002170477.0 / V02.01.11)		UT 1.0 TECU 1.0	UT 1.0 AUX-N 1.0 TC Bas 1.0 TC SC 1.0	AEF Certified ISO 11783
Kvemeland Group > VICON > Spreader > Fertilizer Spread... > Spreader Fertiliz... > RO-EDW > Product Version ✓ X Software: EDW2_ISO V1.15		UT 2.0 AUX-O 1.0 AUX-N 1.0 TC Bas 1.0 TC SC 1.0	UT 1.0 AUX-N 1.0 TC Bas 1.0 TC SC 1.0	AEF Certified ISO 11783
Kvemeland Group > VICON > Electronic Compon... > Terminal > IsoMatch Tellus > IsoMatch Tellus > Product Version ✓ X Software: IsoMatch Tellus V1.13		TC Bas 1.0 TC SC 1.0 UT 2.0 AUX-N 1.0 UT 2.0 AUX-N 1.0	UT 1.0 AUX-N 1.0 TC Bas 1.0 TC SC 1.0	AEF Certified ISO 11783

Buttons: + Add new component, Create PDF, Reset

Footer: Manufacturer, Version 2.1.4, 08-Jul-2016

www.aef-isobus-database.org

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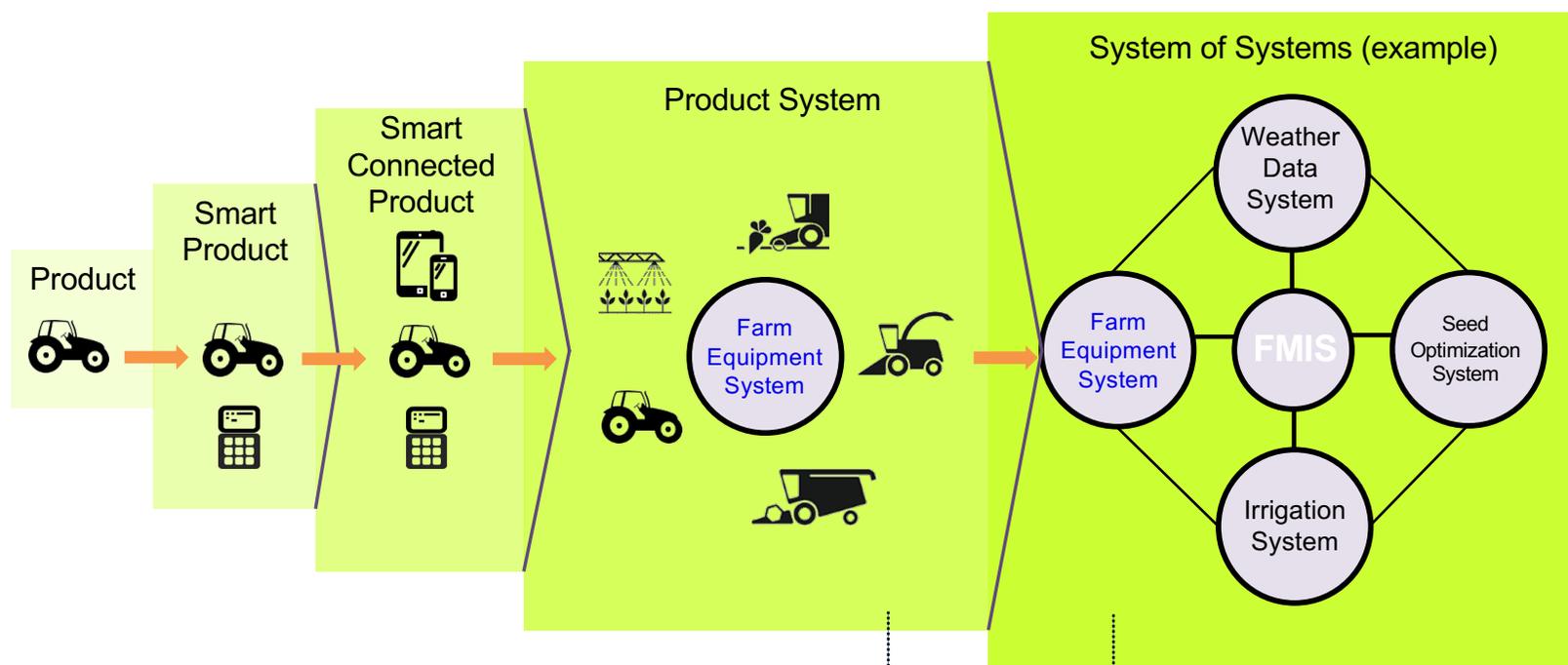
→ Conclusion

Future Networks and Connectivity (AEF Scope)

- TIM – Tractor Implement Management
- **Data Management / FMIS interfaces**
- **Always Connected: ISOBUS and Telematics**
- High Speed ISOBUS
- Wireless Infield Communications
- High Voltage / High Power network

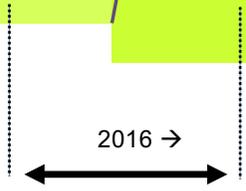


Connectivity – Data Management

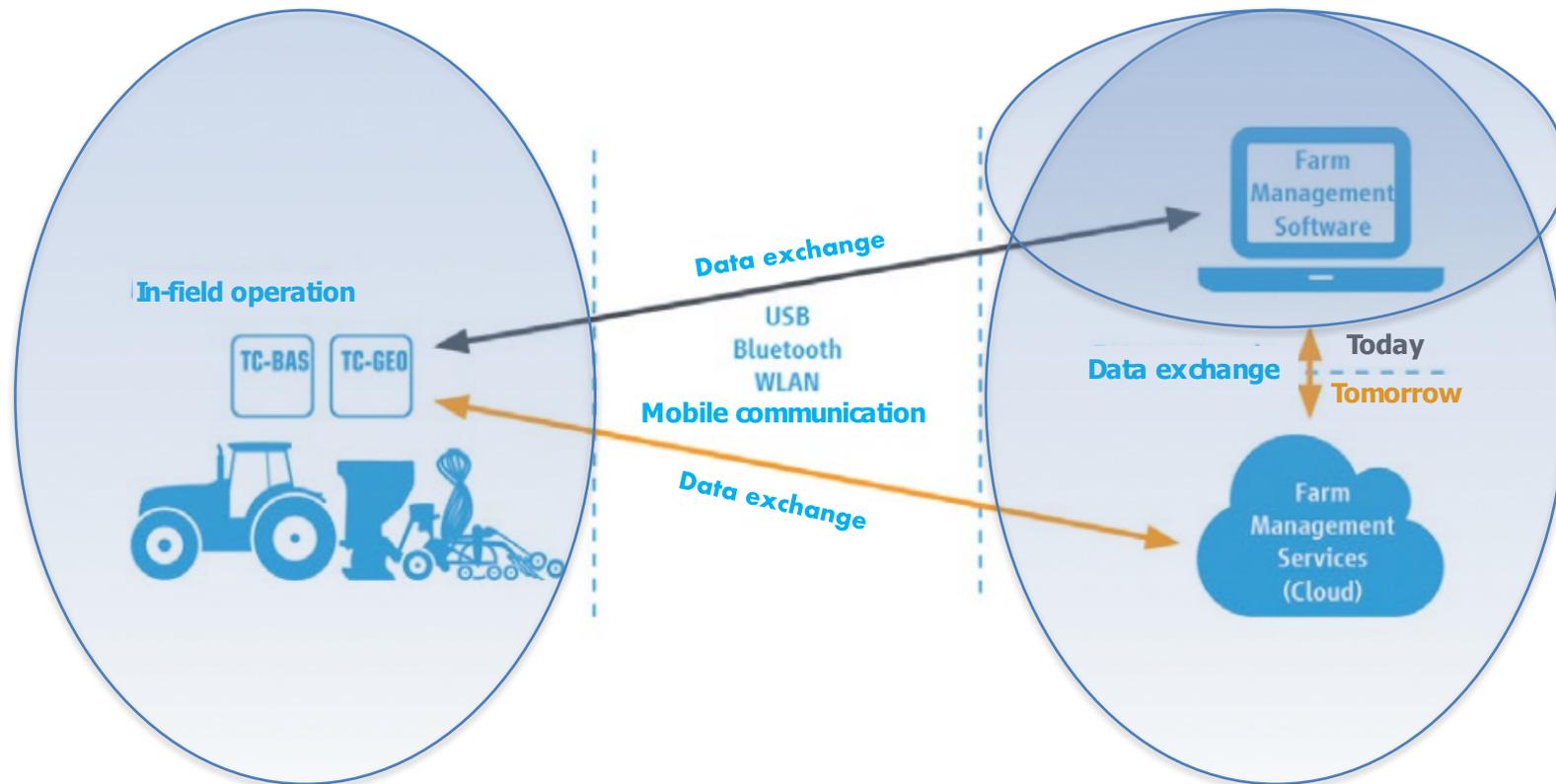


Source: Harvard Business School, 11/2014

* FMIS = Farm Management Information System



General conditions of data exchange

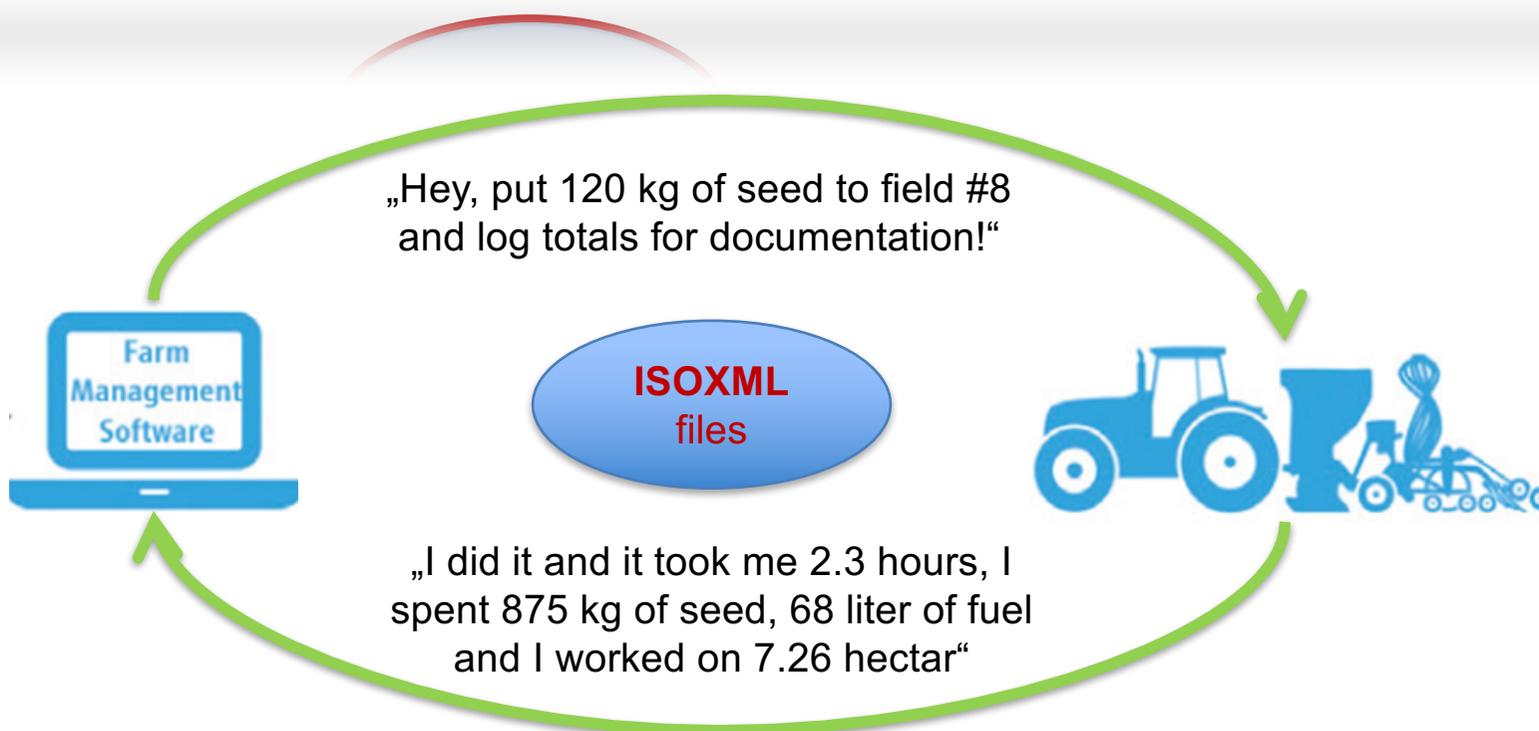


MICS: Mobile Implement Control System

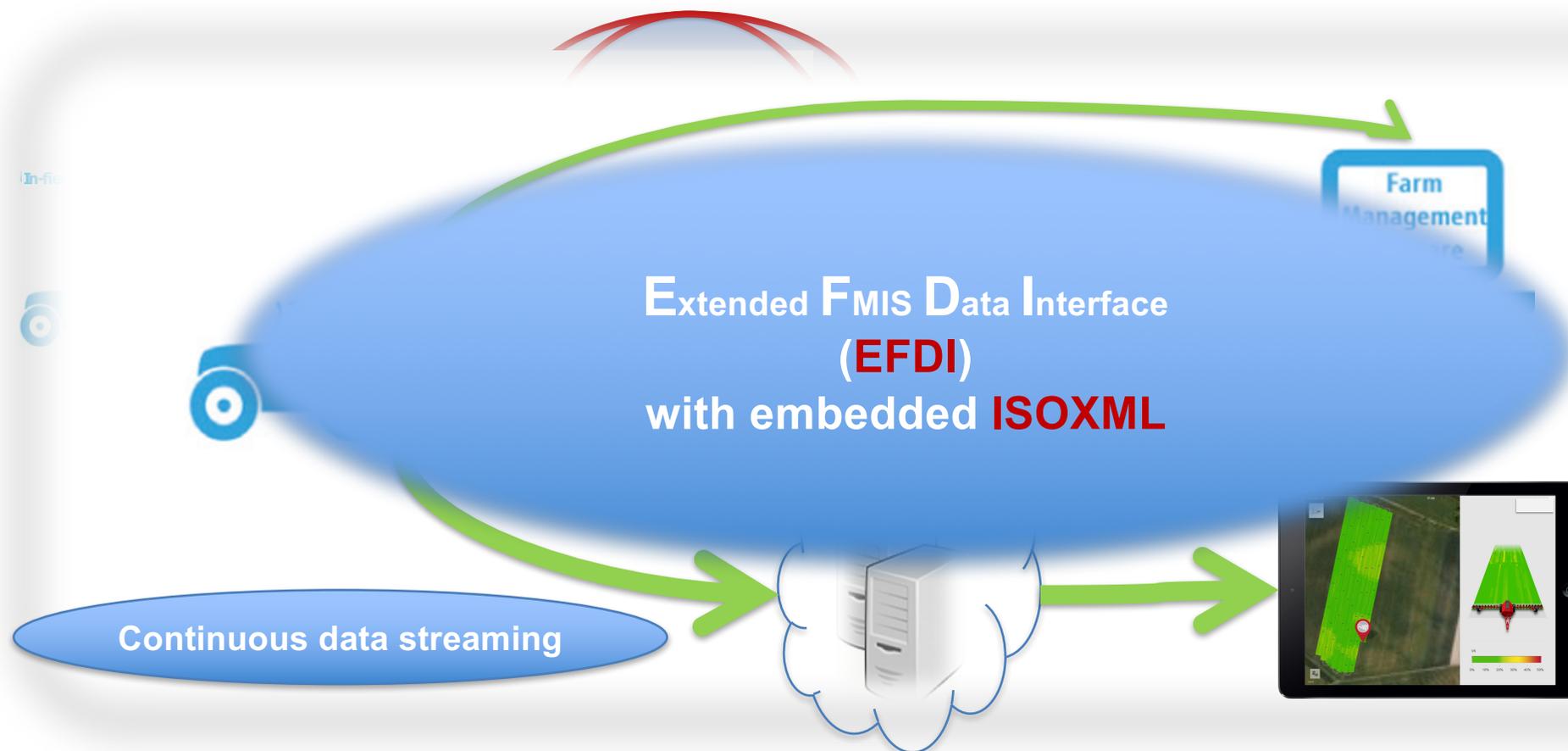
FMIS: Farm Management Information System

General conditions of data exchange

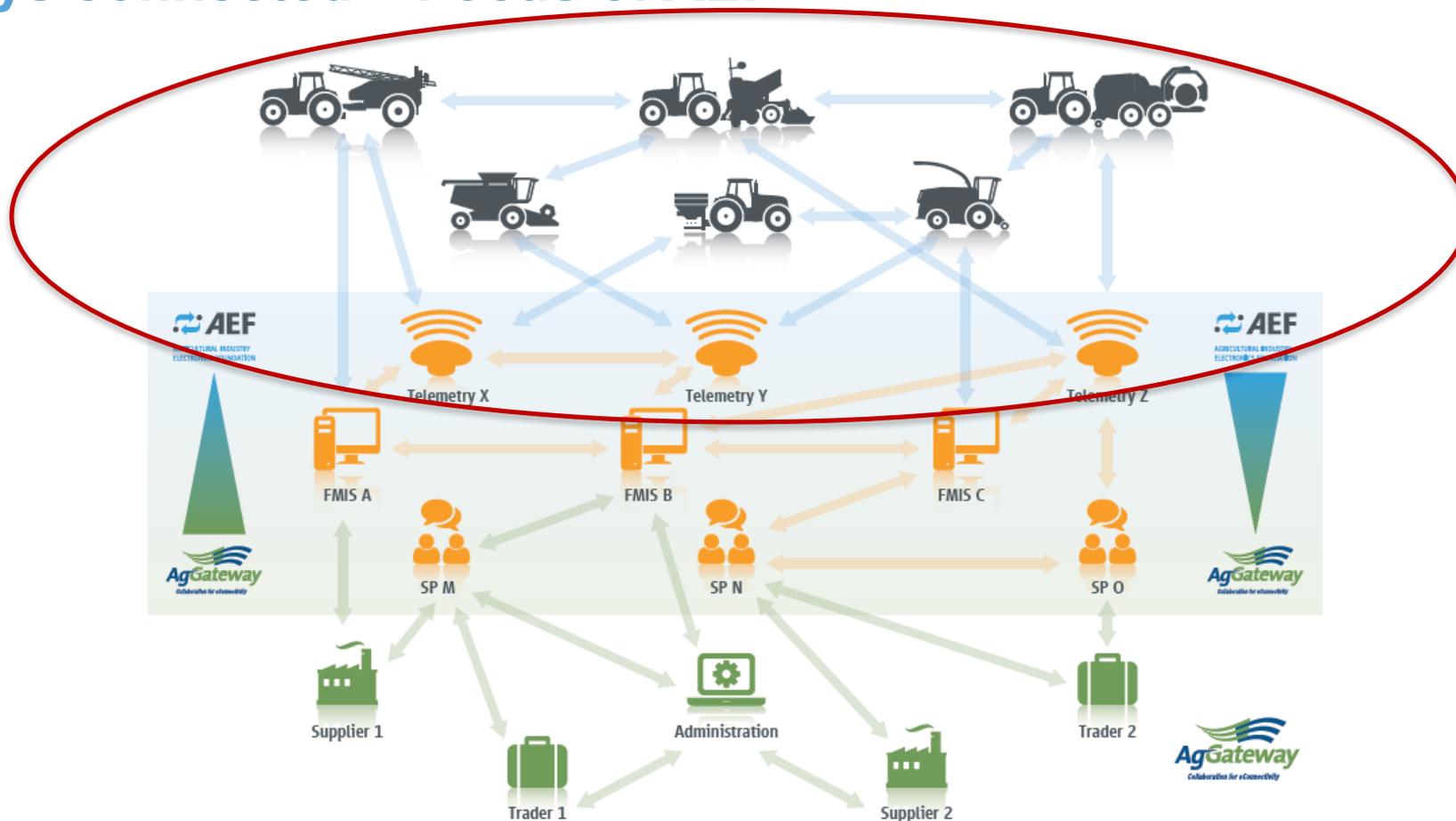
In-field



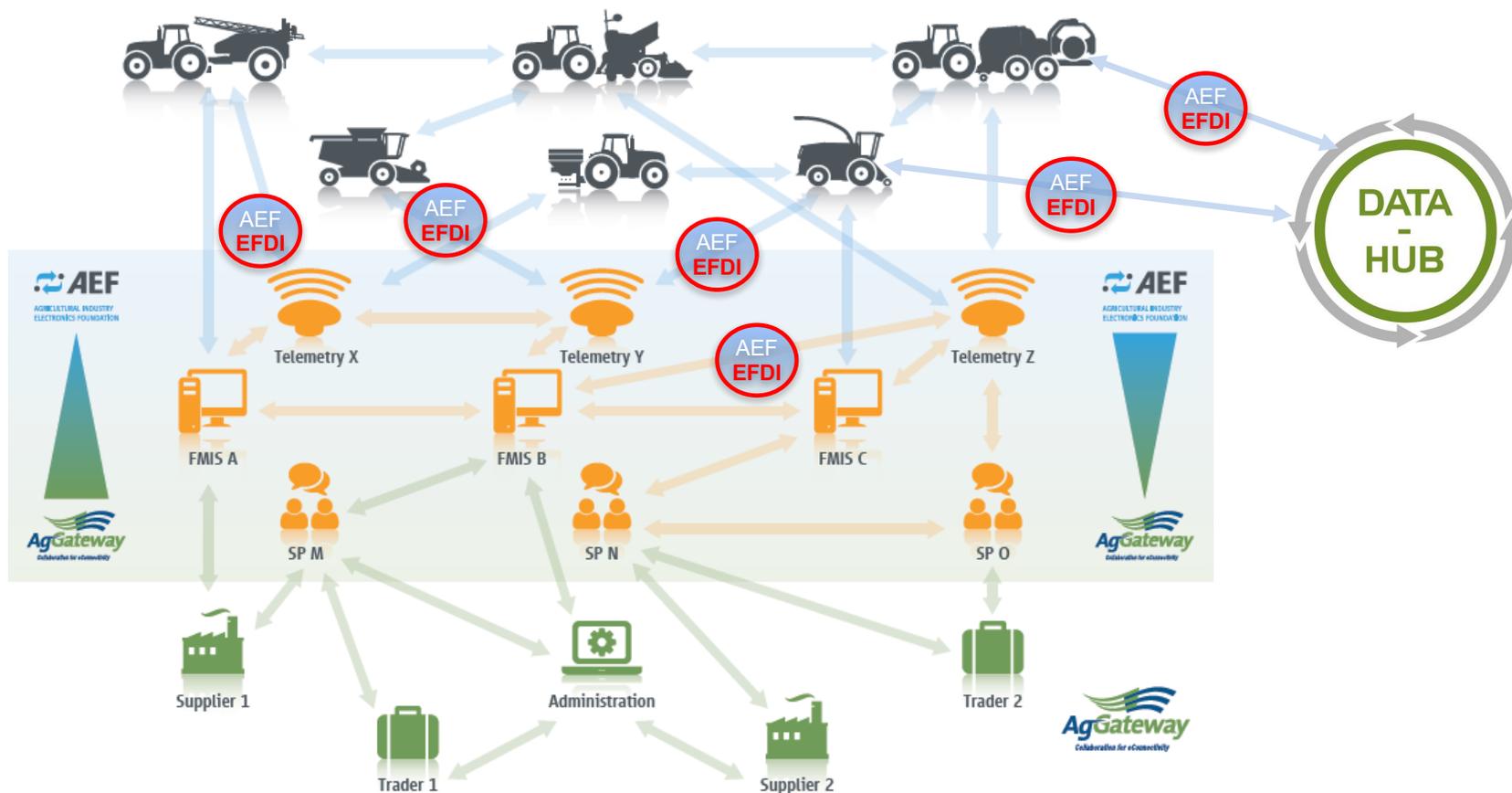
General conditions of data exchange



Always connected – Focus of AEF



Always connected – EFDI interface definition



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Conclusion

- Ag Electronics Industry successfully joined forces in 2008 through AEF
 - Complex standards require coordination and cooperation
 - Electronics Standards succeed because global acting players accept, align and enforce them
- AgTech development is ramping up rapidly
 - Standards & Organizations are key
 - Connectivity and Data become key
 - Need to streamline it to the markets
 - Complexity increases
 - Changing business models
- Common interface has to be defined
 - Extended FMIS Data Interface



•But keep in mind:

→ **Farmers just want it simply to work!**

How to contact AEF?

- AEF web site: www.aef-online.org
- General information and news about AEF
 - Become a new member
 - Sign up for newsletters

→ Smartphone dB App available



→ General support: office@aef-online.org



Thank you for your attention.

Questions?
Questions?

