



# Geräteintegration mit FDT and OPC UA - Ein Baustein für Industrie 4.0

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**Forum Industrie 4.0**

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- **FDT Overview**
- **FDT/OPC UA WG Status**
- **FDT/OPC UA Interface**
- **Next steps**



# **FDT TECHNOLOGY**

## **SCALABLE, FLEXIBLE DEVICE INTEGRATION**





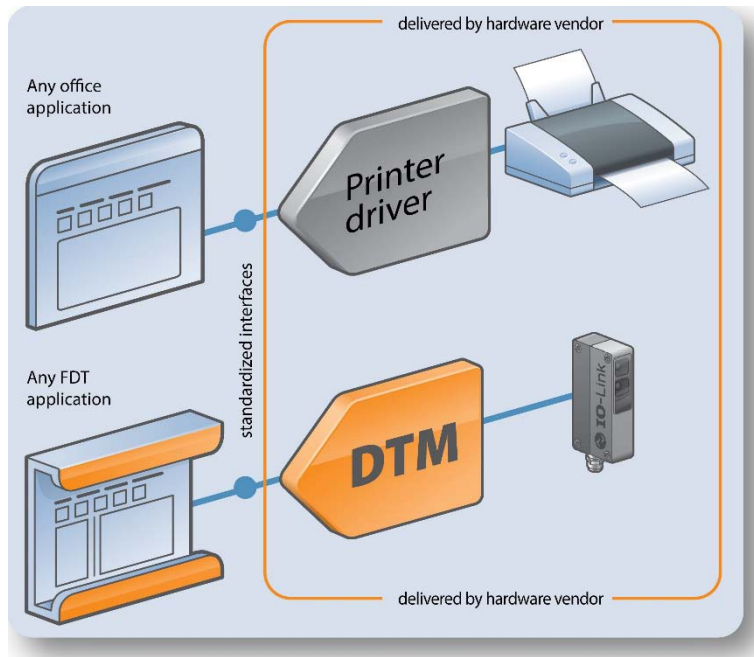
# What is FDT?

- **FDT technology is a widely accepted international standard**
  - IEC 62453
  - ANSI / ISA 103
  - GB/T 29618
- **Allows management of different devices in a heterogenous environment (one tool)**
- **is protocol-independent**
- **can be used in all automation applications (e.g. Energy, Hybrid, Process, and Factory Automation)**
- **promoted and supported by the FDT Group ([www.fdtgroup.org](http://www.fdtgroup.org))**





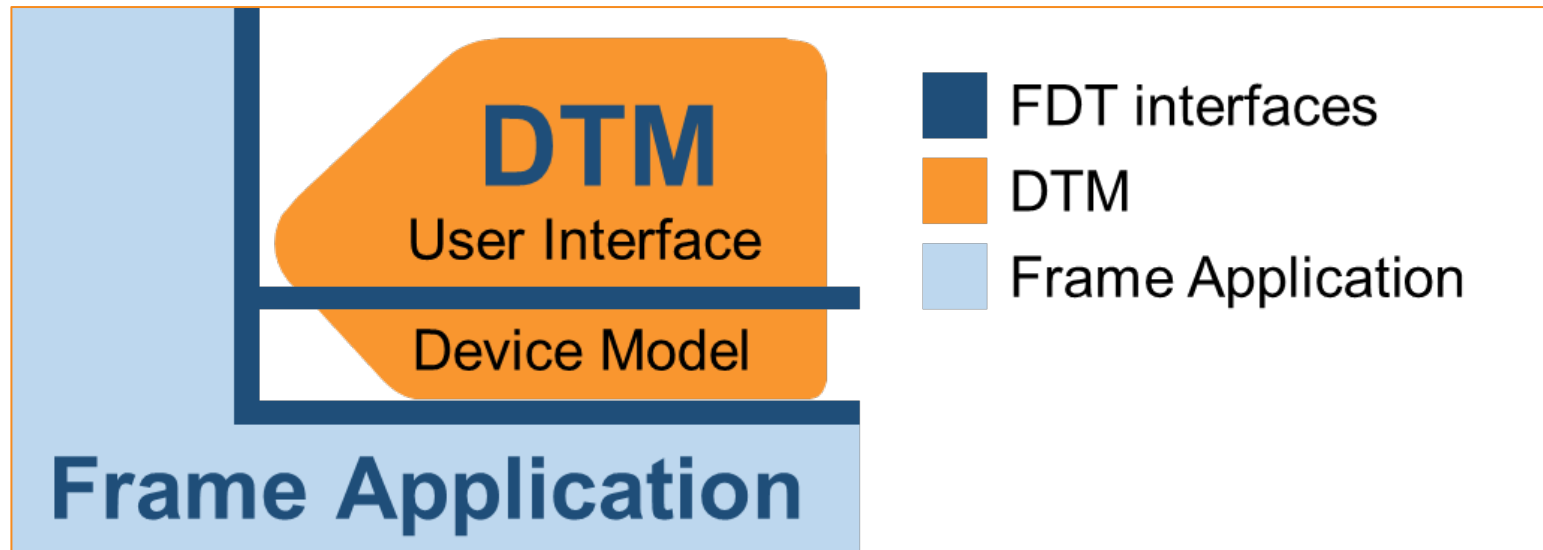
# FDT basics – DTM



- **Similar concept like printer drivers**
- **Device is represented by a software component named Device Type Manager (DTM)**
- **DTM is delivered by the device manufacturer**
- **DTM is used for device configuration, diagnostics and other functionality**
- **DTM includes specialized user interface for the device**



# FDT basics – frame application

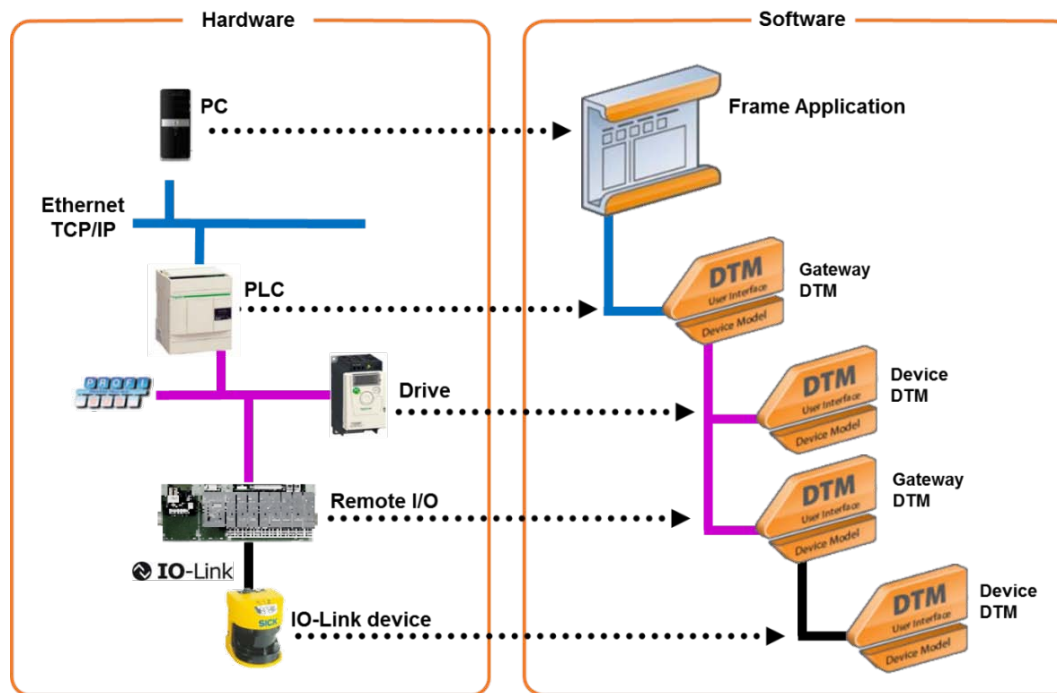


- **DTMs are used inside software tools called frame applications**
- **Frame application can be any application supporting the FDT interfaces, e.g. engineering tools, device setup tool etc.**
- **Frame application and DTM interact via software interfaces defined by FDT**



# ➤➤ FDT basics - topology

- Each physical device is represented by one DTM.
- DTMs have the same relationship as the hardware and they create a topology
  - Only DTMs providing the same connectors can be plugged together

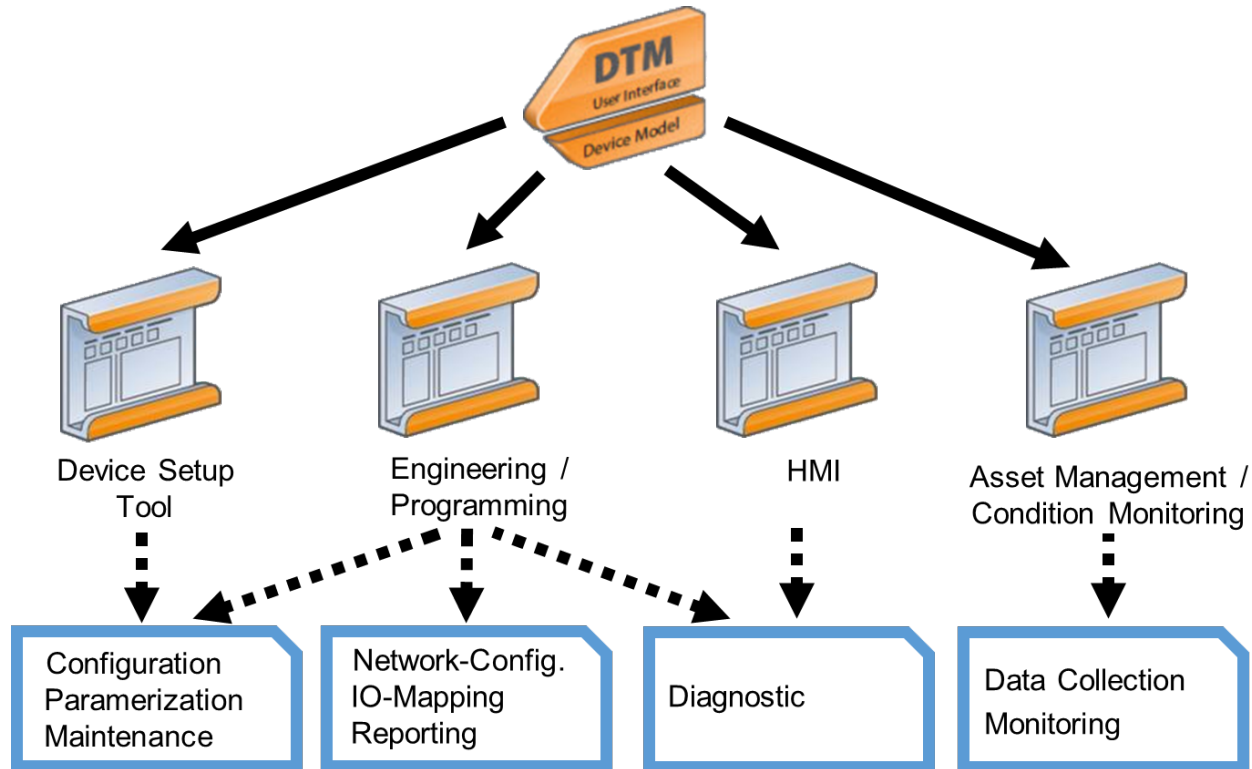


- Devices such as actors and sensors are represented by device DTMs
- Devices which build a bridge between different network types are represented by a gateway DTMs



# FDT basics - conclusion

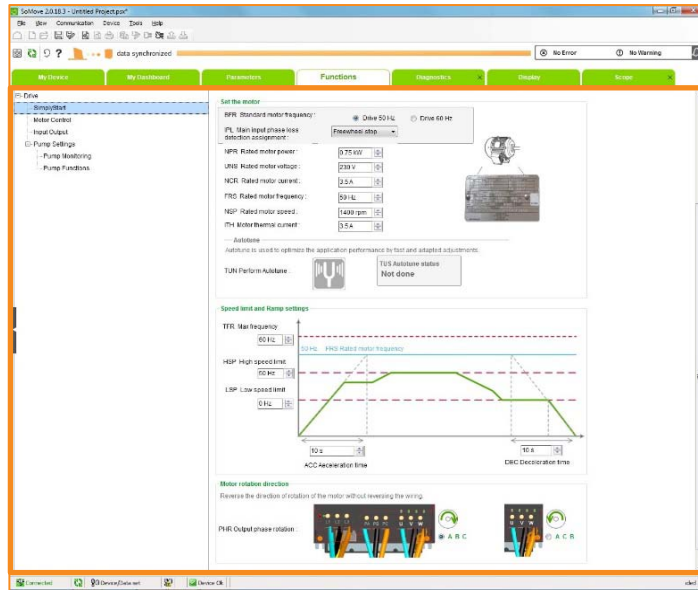
## DTM integrates into various frame application



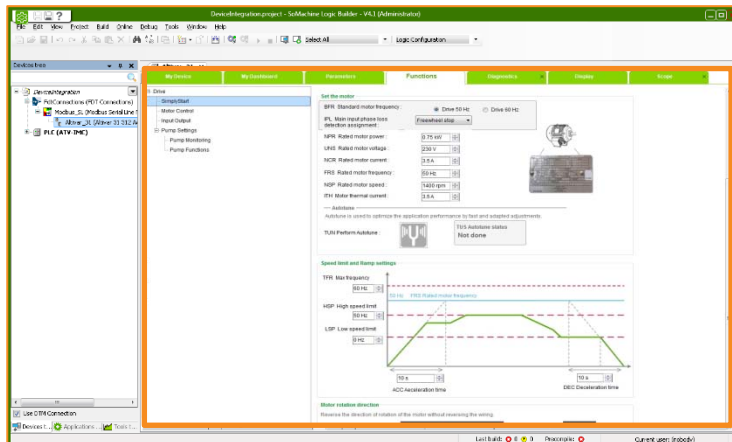




# Example – Device DTM for a Drive



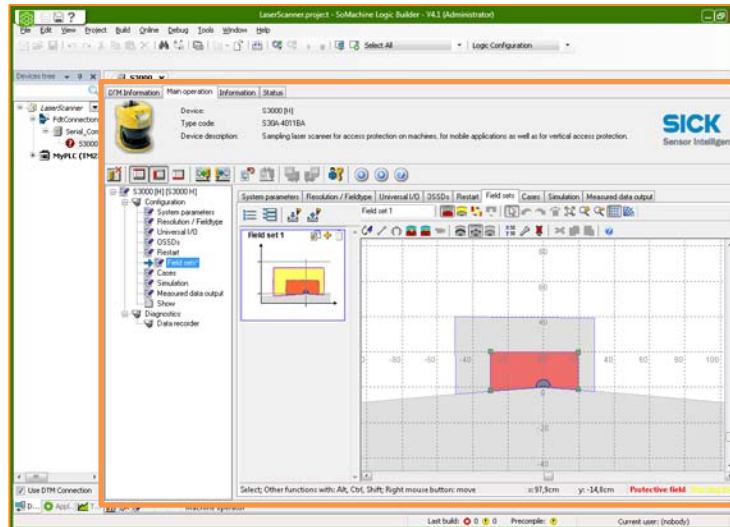
- Integration in a stand-alone tool
  - for simple and quick management of one drive



- Integration in an engineering tool
  - Same Device DTM for the drive
  - User interface for the drive is the same like in the device setup tool
  - User can also configure the drive, perform diagnostic

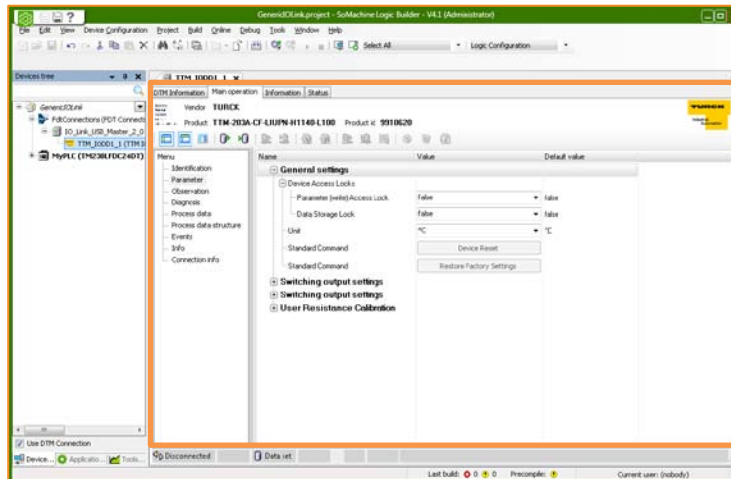


# Example – integration of third party device



- **DTMs of other vendors can be integrated in the engineering tool – just like the own DTMs**

- **Specific Device DTM provides**
  - sophisticated user interface
  - best usability



- **If Specific Device DTM is not available, then DD-Interpreter DTM can be used**
- **Interpreter DTM provides**
  - support of many devices via device descriptions (DD)
  - support of devices without DTM



# Conclusion

- **With FDT it is easy to extend device support in software tools through integrating DTMs**
- **System vendors can integrate own devices and devices from third parties in the engineering tools with the same mechanism**
- **DTMs integrate devices also in simpler device setup tools or in engineering tools from different vendors**
- **Standard Interpreter DTMs can be used, if a standard device description is available (e.g. Profinet GSDML, Ethernet IP EDS, IO-Link-DD)**
- **Standard Interpreter DTMs and FDT Frame / DTM toolkits are available on market and reduce development effort**
- **Devices supported by device description and DTMs coexists in one network configuration view**





# **FDT AND OPC UA**



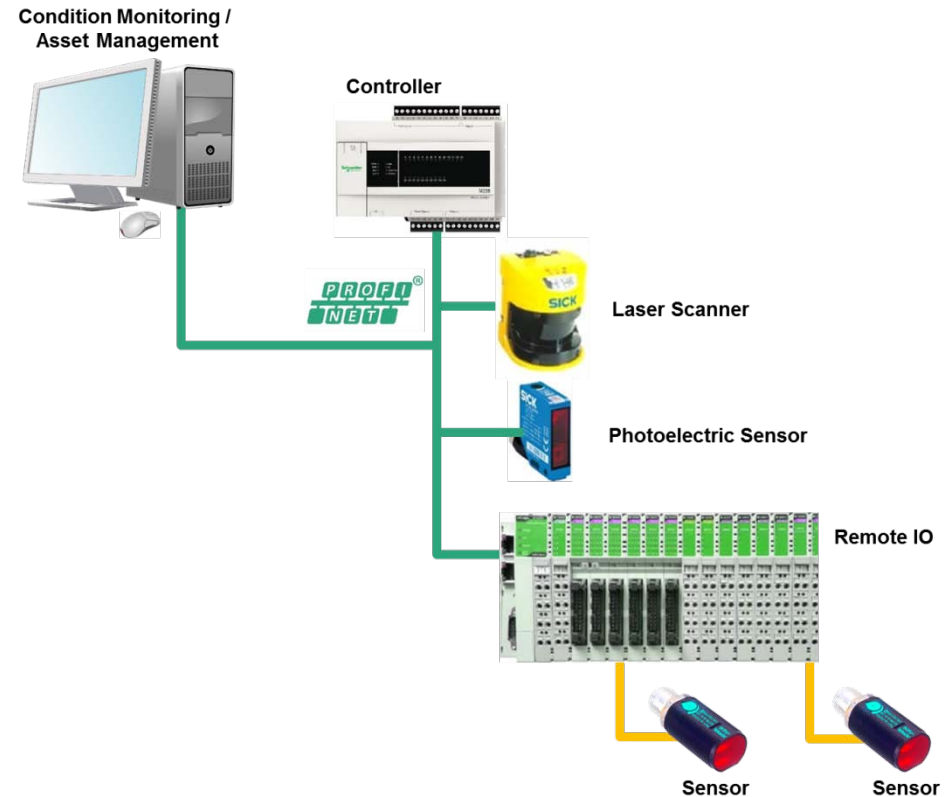
# Working Group Status

- **Common working group between OPC Foundation and FDT Group**
- **Draft document available**
- **Prototyping/spec verification (started)**
- **Finalize FDT/OPC UA specification (October 2015)**
- **Define next steps**



# Use case examples

- **Asset management**
- **Diagnostic**
- **Predictive maintenance**
- **Mobile access**

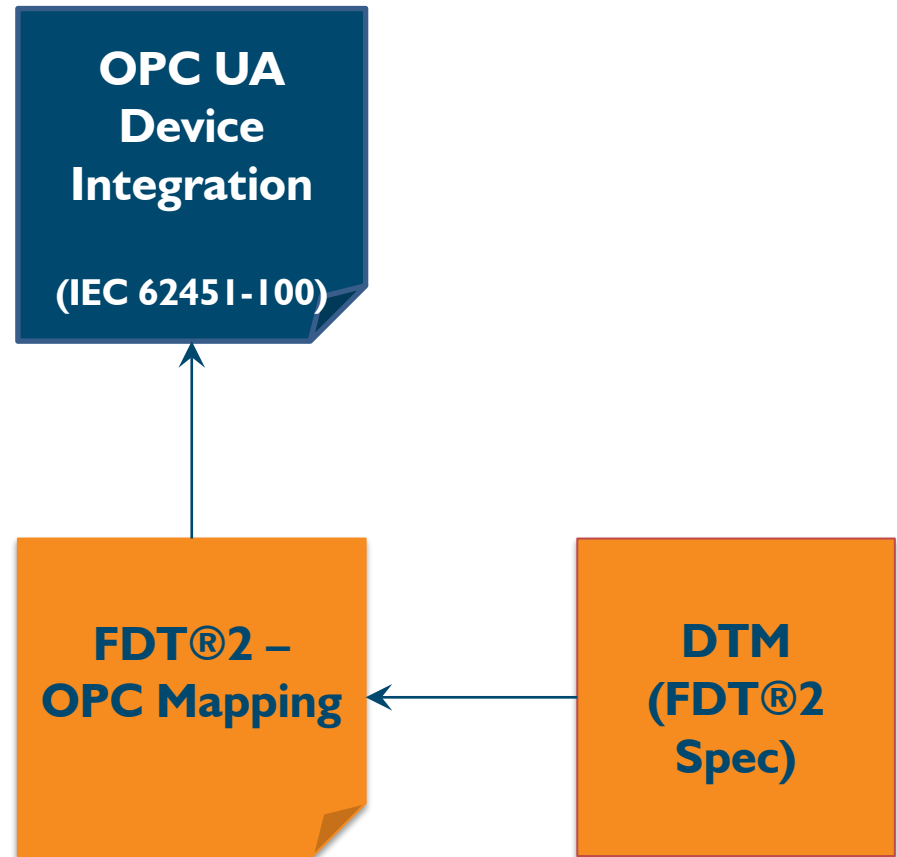






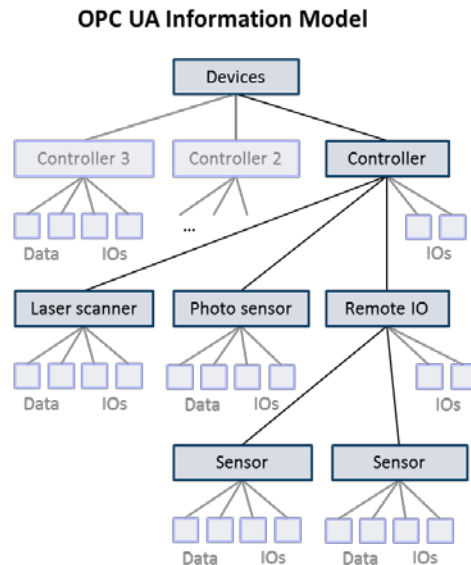
# FDT®2 - OPC UA standard definition

- **Standard definition for implementing OPC UA servers based on FDT®2, with**
  - **Standard FDT®2 - OPC UA information model**
    - Extension of standard OPC UA Device Integration definition
  - **Mapping of information and functions provided by DTM's into the FDT®2 - OPC UA information model**



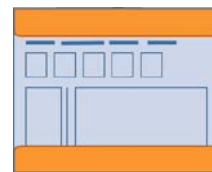
# Creation of FDT®2 - OPC UA info model (1 / 2)

- Network / devices need to be configured, before they can be used. This can e.g. be done in a normal engineering tool using the DTMs.
- Configured network topology / device type information can be used to generate basic part of FDT®2 OPC UA information model

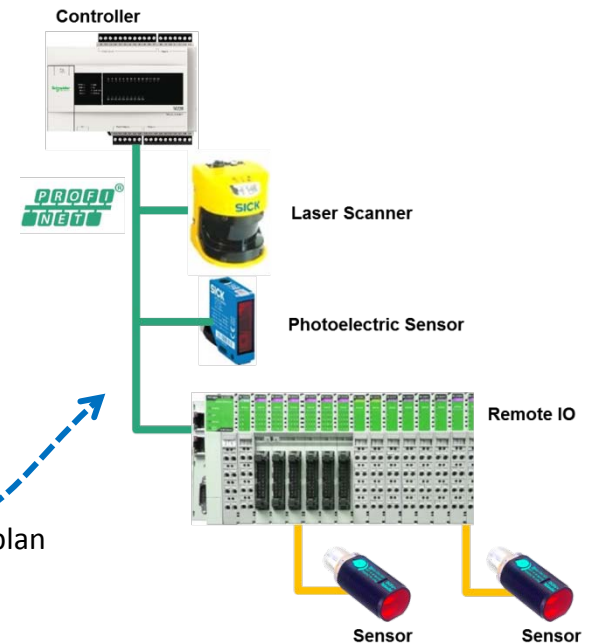


create

Engineering tool



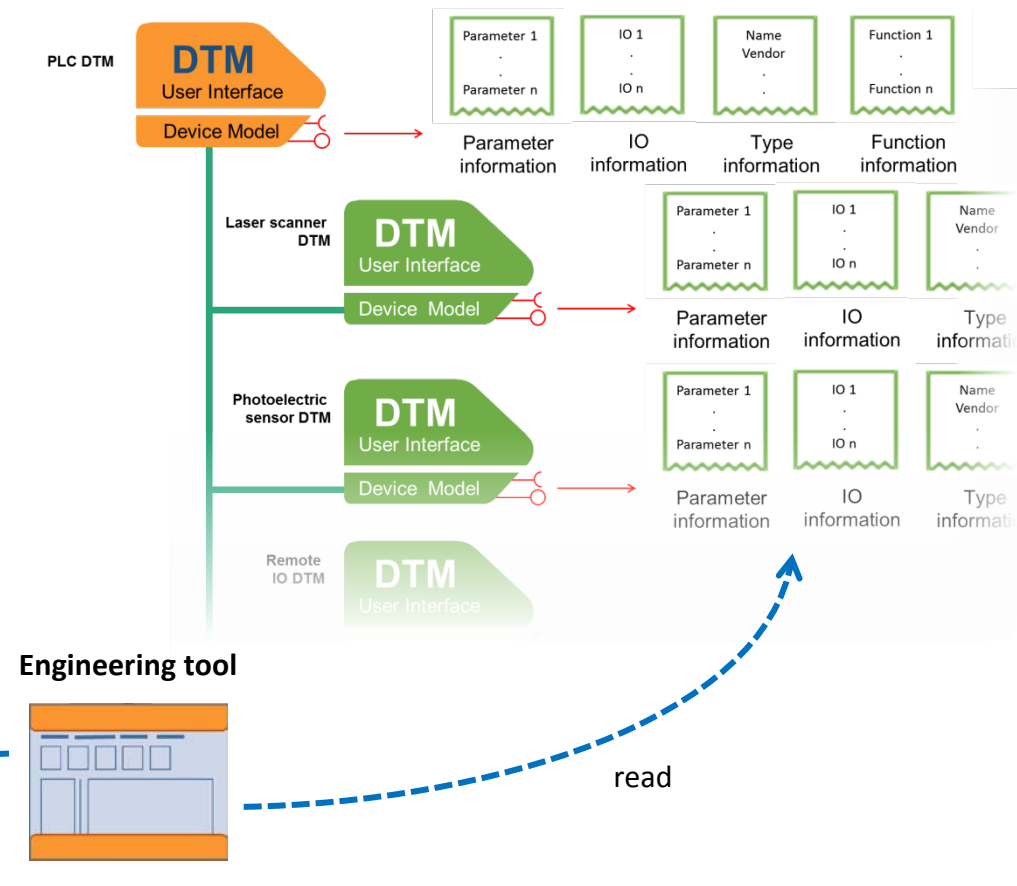
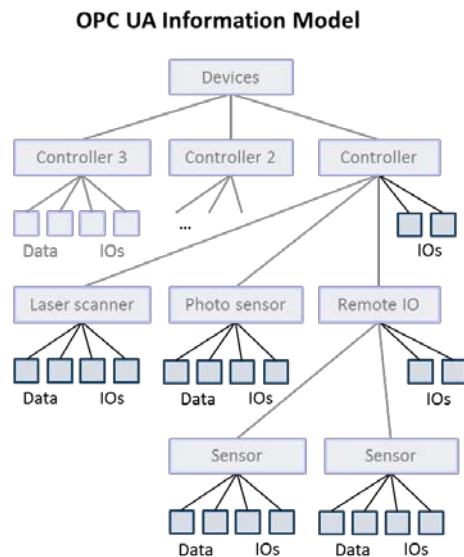
plan



# Creation of FDT®2 - OPC UA info model (2 / 2)

## Information provided by the DTM can be used to complete the information model

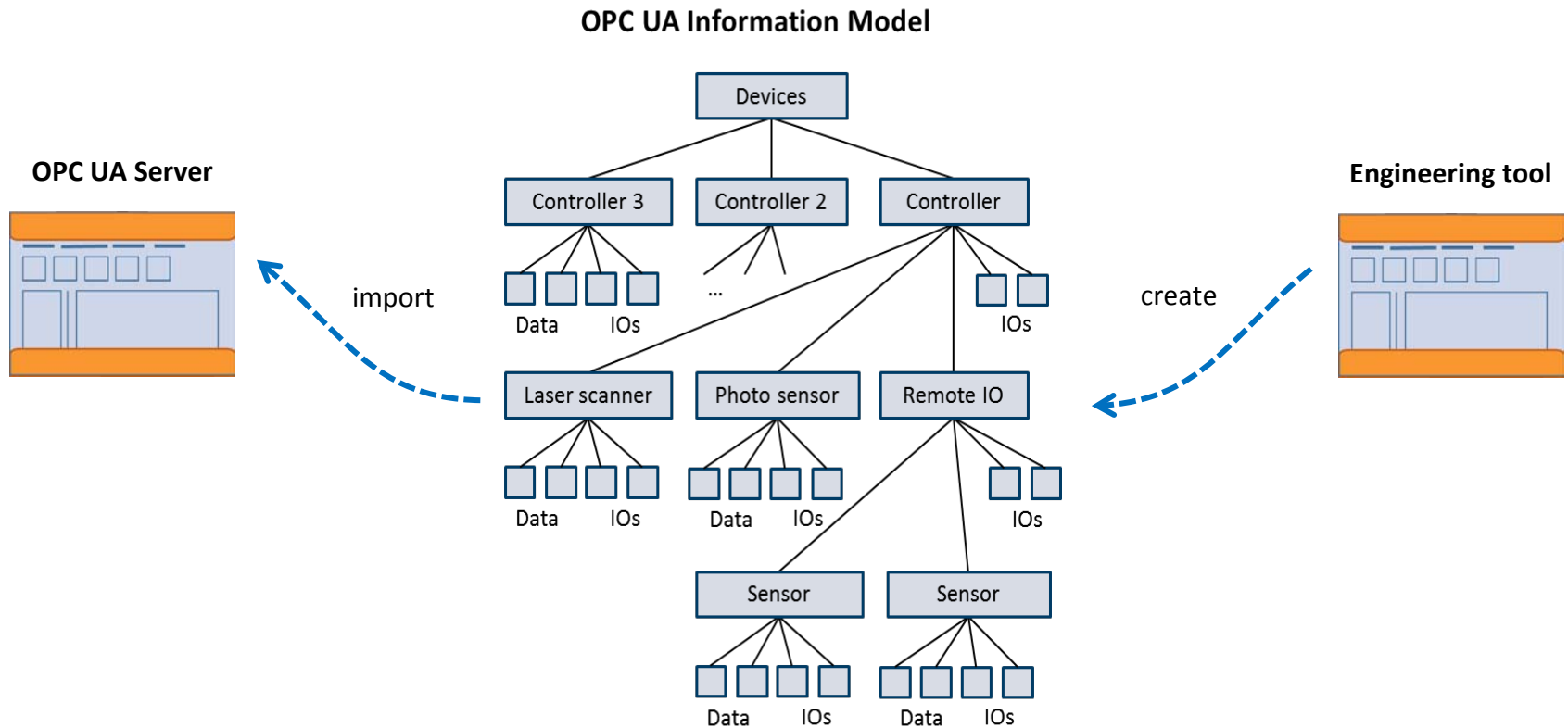
- Device type information
- Parameter information
- IO information
- Supported DTM functions





# OPC UA server configuration

- **OPC UA information model created by the engineering tool can be used to configure the OPC UA server**



# OPC UA server as FDT frame application

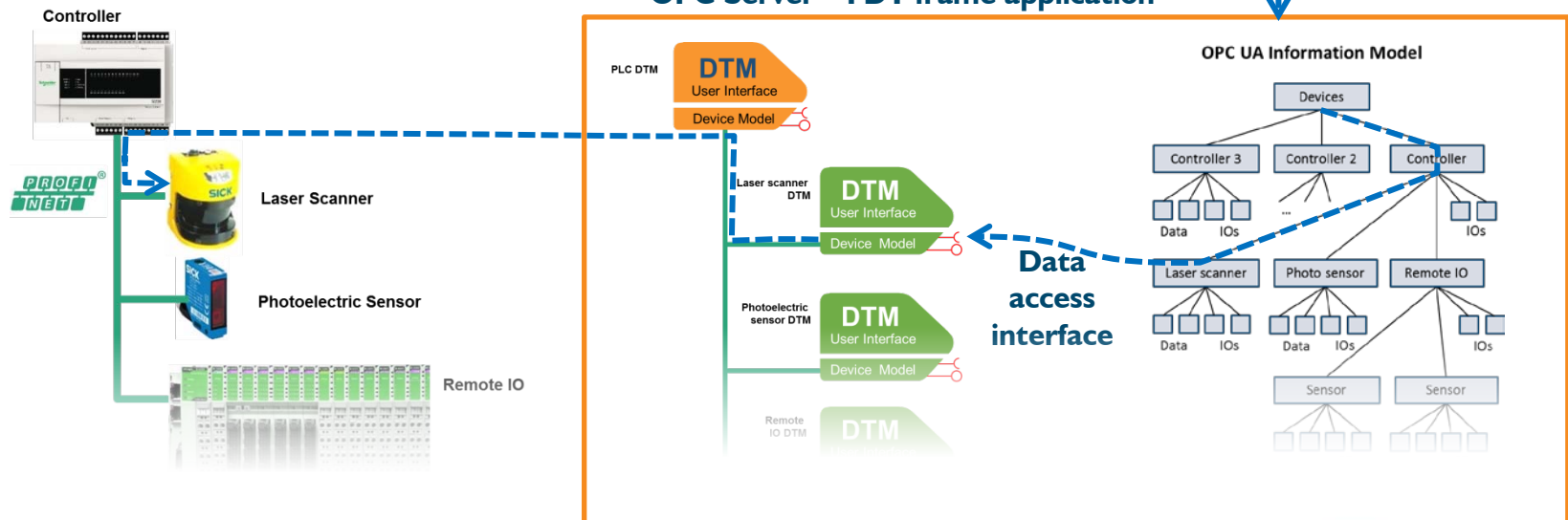
## OPC UA server can use device DTMs to access data

- Enables access to all parameters, IOs
- Enables data read and write
- OPC server doesn't need protocol specific handling

### OPC UA Clients



browse  
read/write  
data  
execute  
function



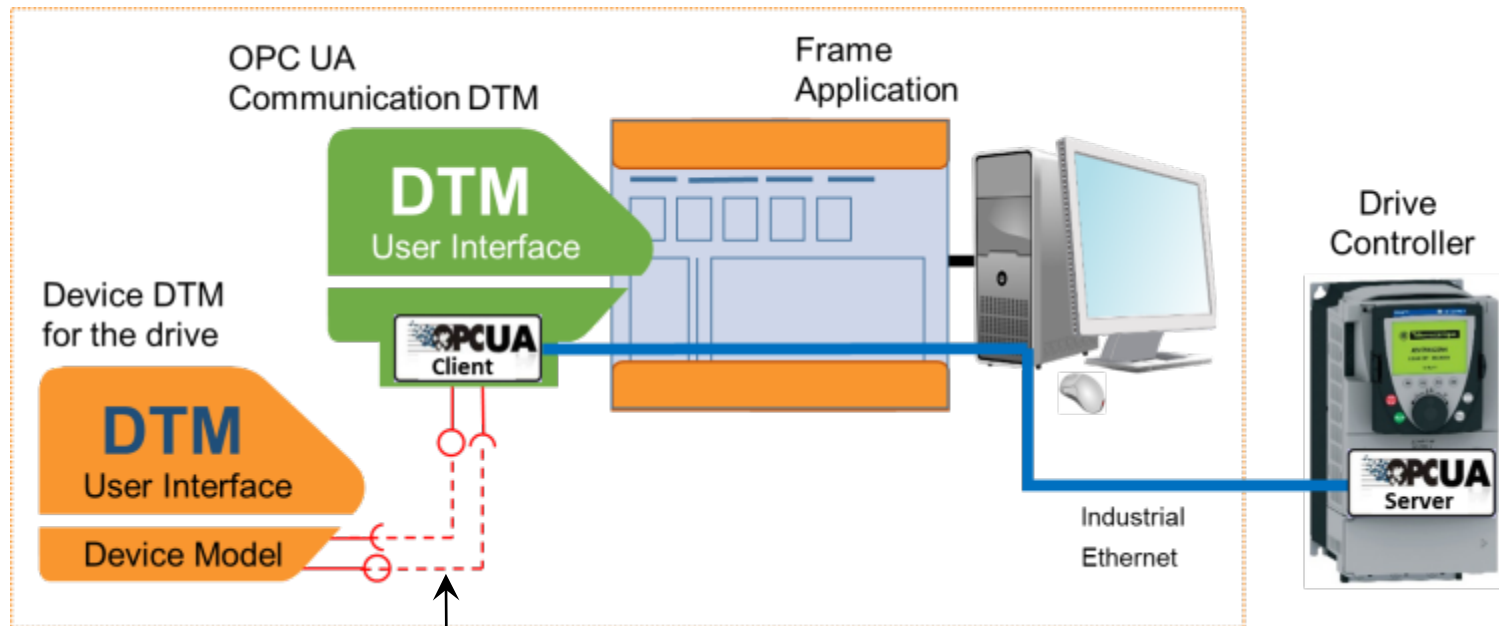


# **NEXT STEPS**



# OPC UA enabled devices

- Industry 4.0 enabled devices provide embedded OPC UA server



FDT®2 –  
OPC UA  
protocol  
annex

- Defines communication messages for accessing OPC UA services

- Browse
- Read / write
- Subscribe / unsubscribe
- Invoke function



# Components for the future

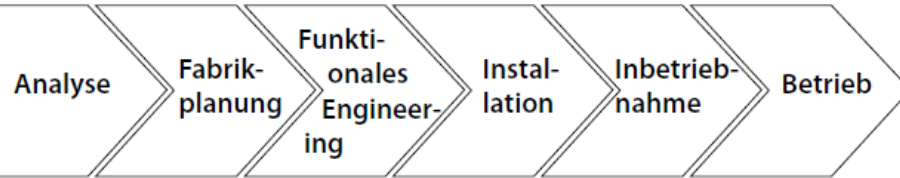


Bild: Otto-von-Guericke-Universität Magdeburg

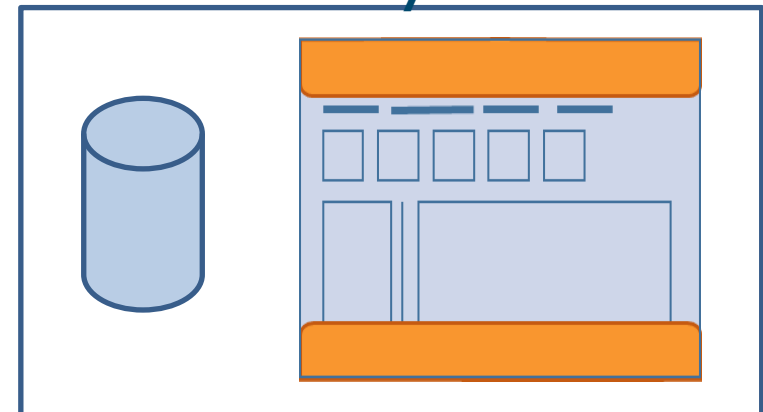
## AutomationML



Bild: OVG-Universität Magdeburg



## FDT System





# Automated Engineering Work Flow

AML

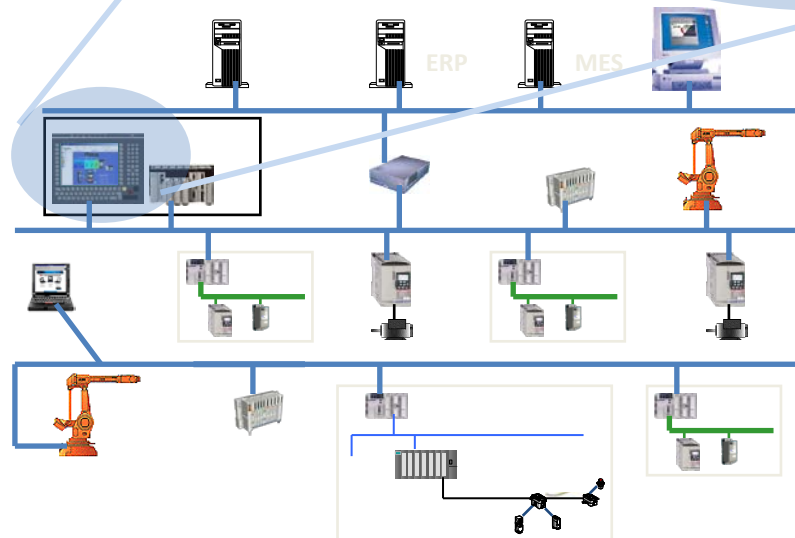


Topology & Network

DTM Deployment and Installation

FDT System

Project Data Base





# Conclusion

- **Concept combines where FDT and OPC fits best**
  - **OPC provides uniform interface for many different client applications**
  - **FDT provides network / device configuration and access to devices**
- **FDT concepts enable unification of system engineering, configuration & diagnosis in Industrie 4.0**
- **FDT supports Industry 4.0 devices, but is also able to build a bridge to Industry 3.0 networks and devices**
- **Required FDT extensions are**
  - **FDT OPC UA protocol annex specification**
  - **FDT / AutomationML data mapping annex specification**







# Members of the FDT Group





## Stay connected

**www.fdtgroup.org**  
**info@fdtgroup.org**



## Our newsletter:



**<http://www.automationworld.com/device-integration-strategies>**

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