

An Update On Device Integration

- Current Status and News -

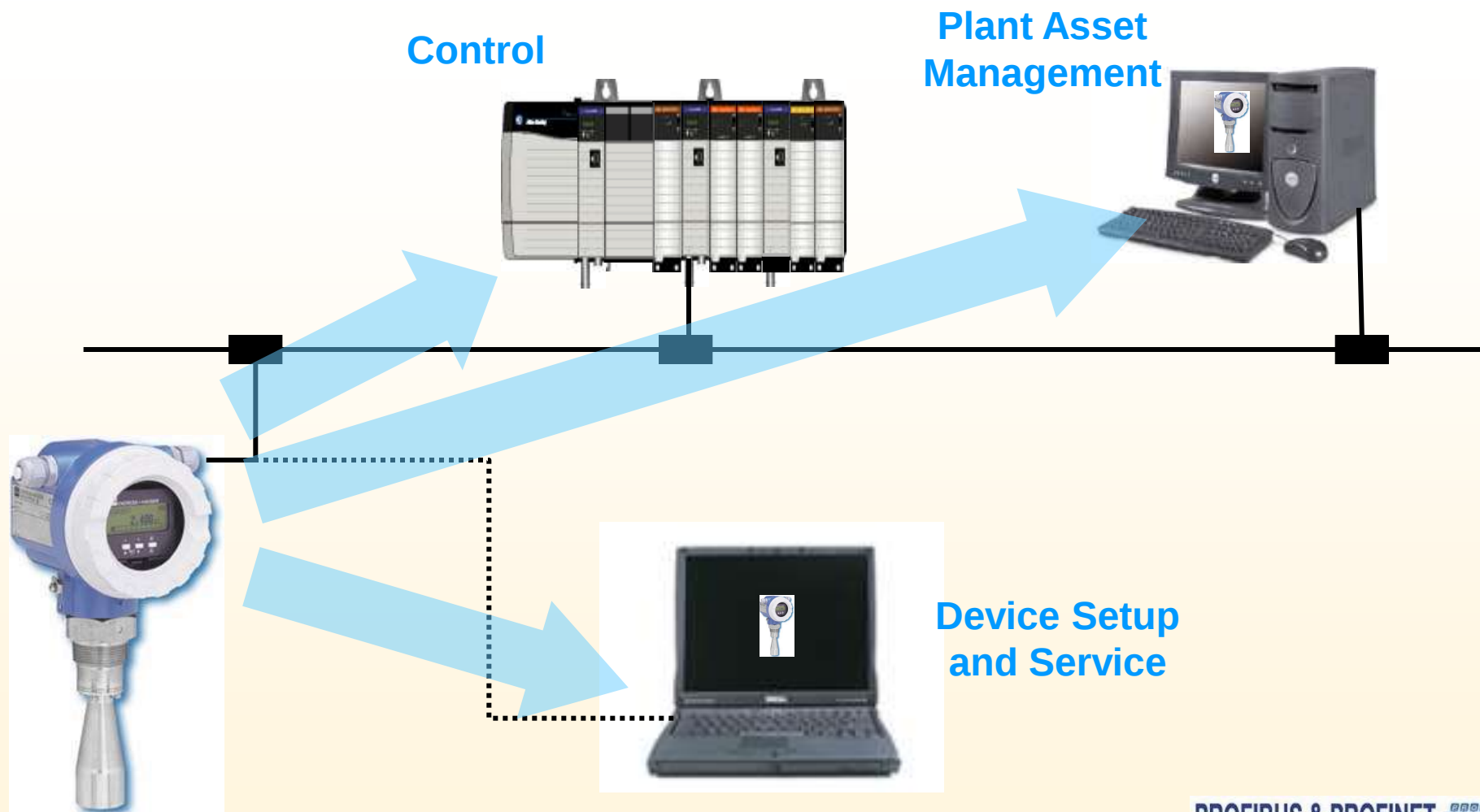
Dr. Rolf Birkhofer, CodeWrights GmbH

June 29th, 2009



What is meant by 'Device Integration' ?

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▶ What a system needs to know

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Operation:

- Menu
- Display- and Edit-Formats

Firmware:

- Parameters
- Attributes (e.g. read_only)
- Functions (e.g. Reset)



Communication:

- Addressing
- Description of Transactions

Meta Data:

- Device Name
- Firmware Version
- Profile Revision
- Manufacturer

▶ The „Descriptive“ Way

Meta Data:

Device Name
Firmware Version
Profile Revision
Manufacturer

Firmware:

Parameters
Attributes (e.g. read_only)
Functions (e.g. Reset)

Operating:

Menu
Display- and Edit-Formats

Communication:

Addressing
Description of Transactions

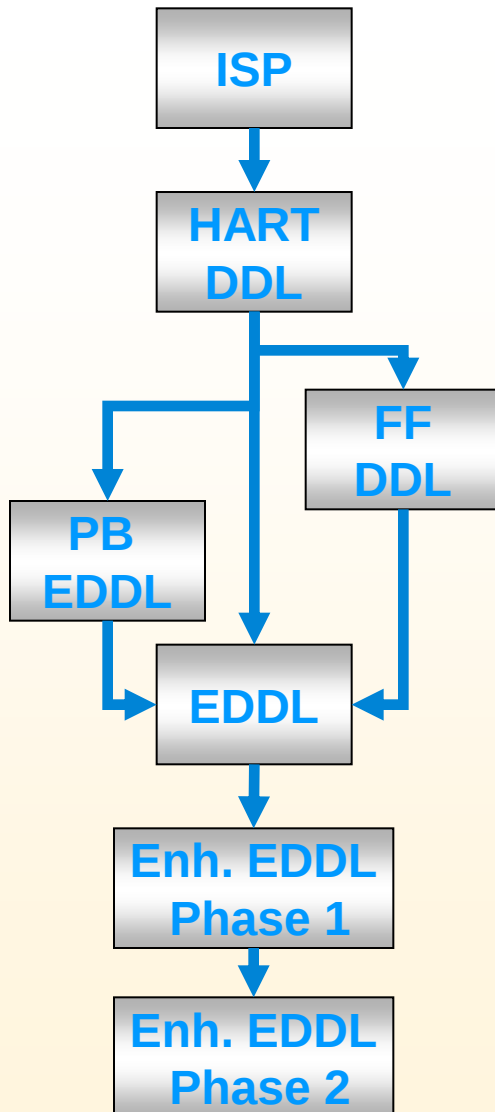
```
MANUFACTURER 255,DEVICE_TYPE 2,
DEVICE_REVISION 1;
Variable MaxMeasurement
{
    TYPE FLOAT;
    HANDLING READ;
    MIN_VAL = 0.5;
}
Variable Damping
{
    TYPE ENUM;
    ITEM(1) = „AUTO“;
    ITEM(2) = „MAN“;
}
Method setDamping
{IF MaxMeasurement=0.8
THEN Damping=„MAN“;}

Menu Measure_Set
{MEMBER MaxMeasurement;
MEMBER Damping;}

COMMAND Read_Damping
{
    BLOCK DeviceBlock;
    INDEX 10;
    OPERATION READ;
    TRANSACTION{
        REQUEST{}
        REPLY{DeviceBlock__DEVICE_MAN_ID}
    }
}
```

History of EDDL

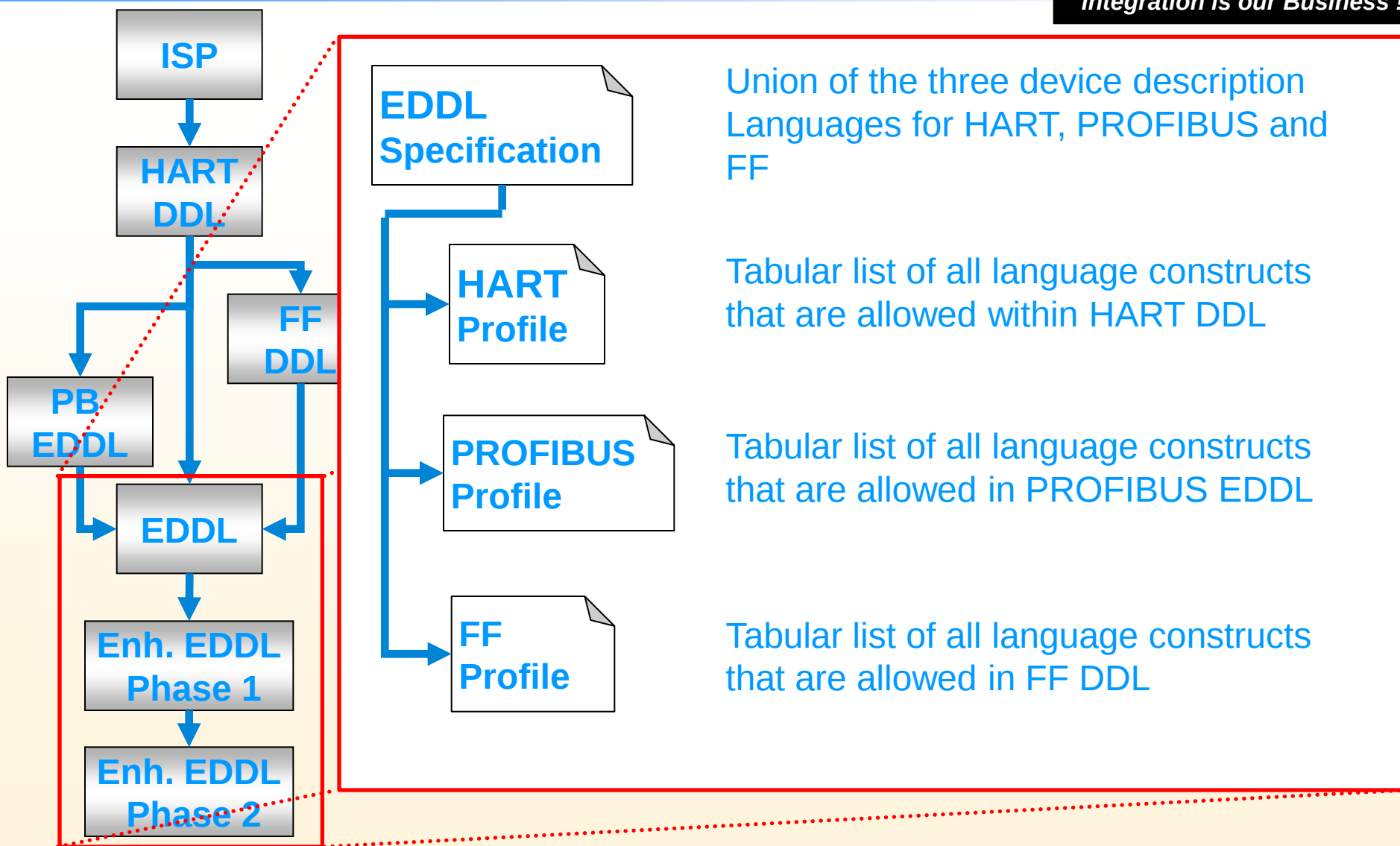
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- 1991** First publications under the heading “Interoperable System Project” (ISP)
Elektronik 1991, Nr. 18
- 1992** HCF declares HART DDL as a new HART standard
- 1996** FF declares an extended form of the HART DDL as a new FF standard
- 2000** PNO declares an extended form of the HART DDL as a new PNO standard
- 2004** EDDL (IEC 61804-2) merges all DDL dialects into one language specification
- 2004** EDDL Enhancements Phase 1 extends the language with elements for new extended user interface controls
- 2007** EDDL Enhancements Phase 2 will offer OPC UA integration, Offline Configuration including Up-/Download, modular devices and more.

“But, there are EDDL Profiles”

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▶ “But there are Host System Specialities”

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Field Communicator 275/375

- strong restricted use of HART EDDL:
 - maximum 255 parameters in up-/download list
 - conditions in menu objects are not calculated at all or not dynamic
- no or insufficient offline operation

AMS

- similar restrictions like HART Communicator 275/375
- standard menu structure only allows to sub menu levels
 - ⇒ redesign of menu structure necessary
- dialogs need to have additional descriptions and resource
 - ⇒ input fields must be positioned and configured for each parameter



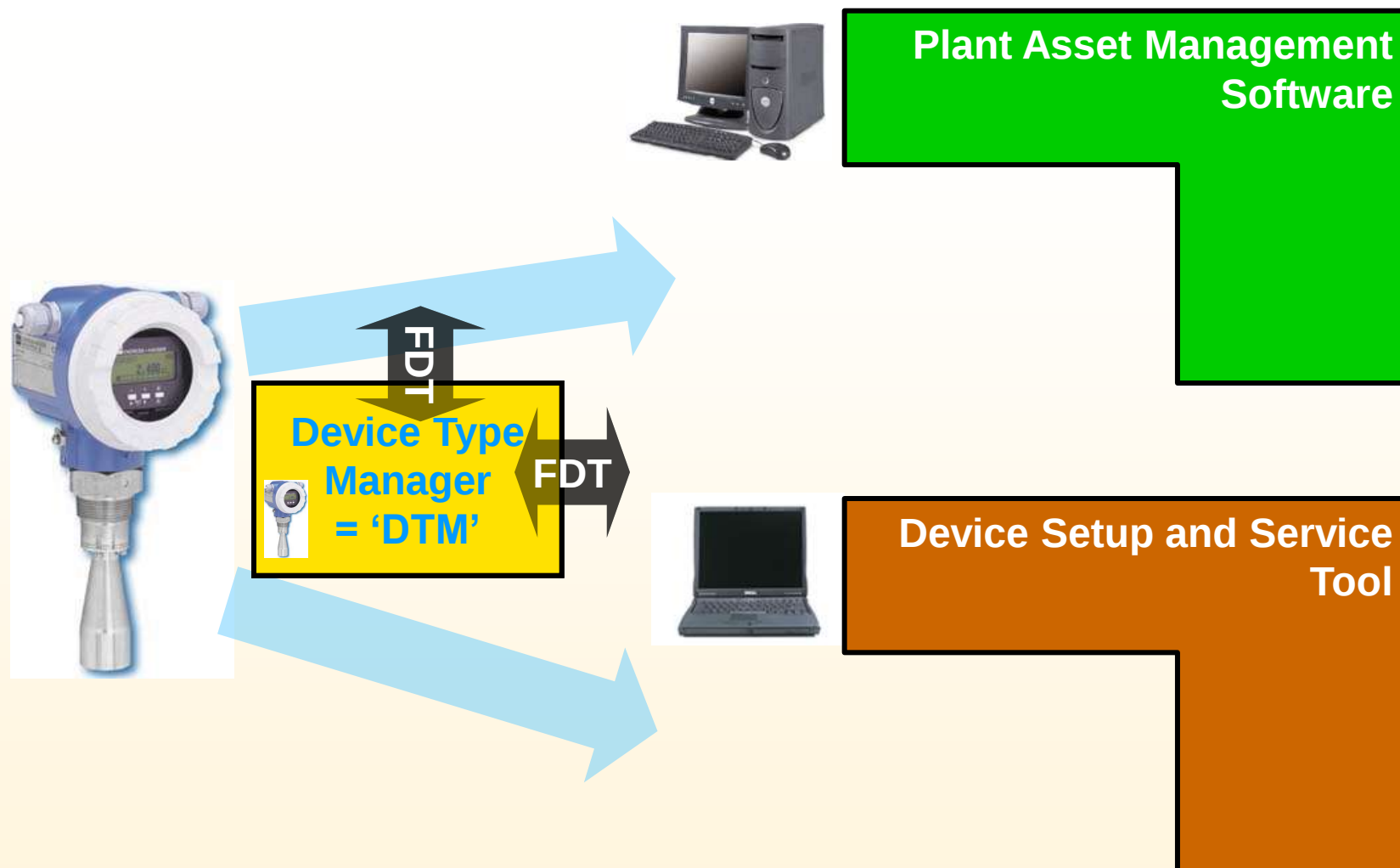
PDM

- uses extended DD language
- uses the HC 275/375 online menus for offline operation
 - ⇒ redesign of the menu structure necessary
- special online dialogs (e.g. trend display)



► The „programmed“ way

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▶ User Benefits

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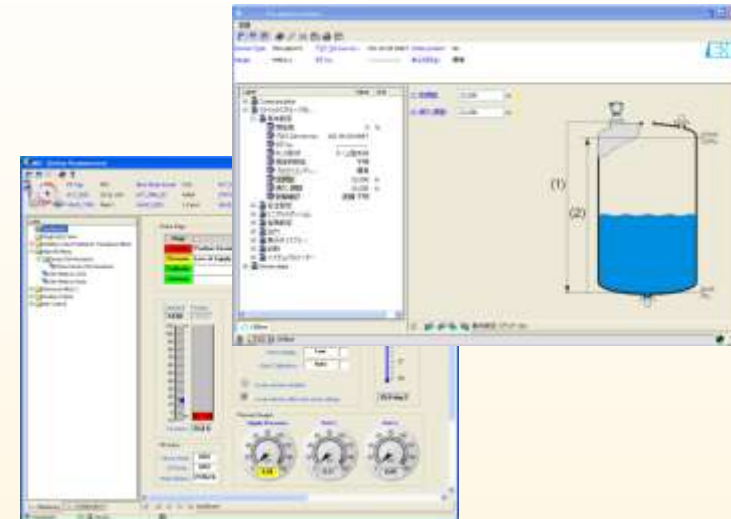
Frame Apps are independent from the bus system:



HART, FF
Ethernet
AS-Interface
IO-Link

...

DTMs provide highly sophisticated user interfaces and specific functionality



Data Persistency & Nested Topologies

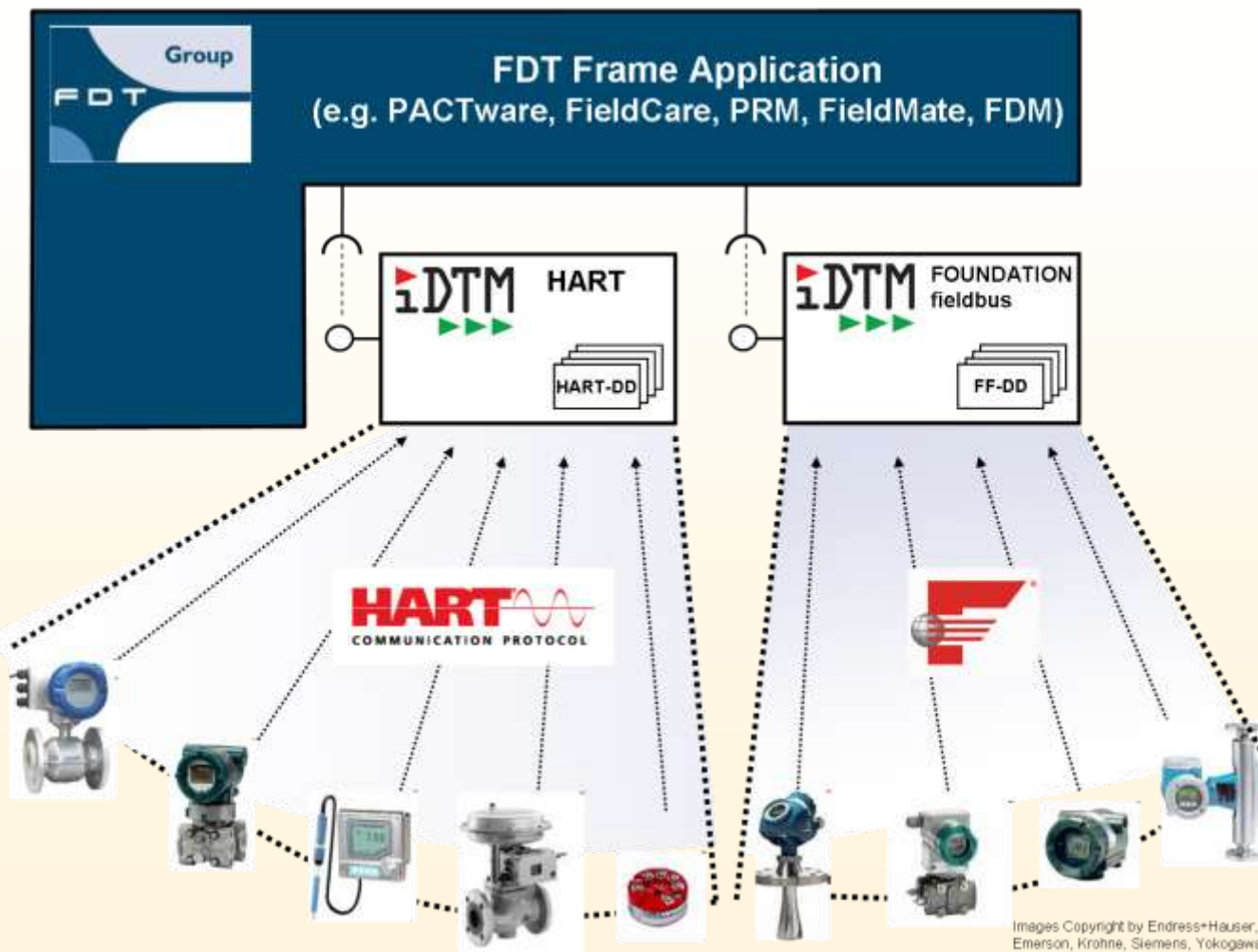
Device tag	Address
HOST PC	
RSLink Flex Rail	
1794-IE8H/B	0
DTM	0
DTM	0
DTM	0
1794-OE8H/B	1
PROFIdtm	0
1794-APBDPV1/A	22
1794-IF8IH/A	2
LevelFlex / FMP 5x /	0
ND9000H	0
1794-OF8IH/A	5

“But: Where to get all these DTMs?”
“But: All DTMs look differently”

Both ways combined through “iDTMs”

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iDTM = **i**nterpreting **D**TM

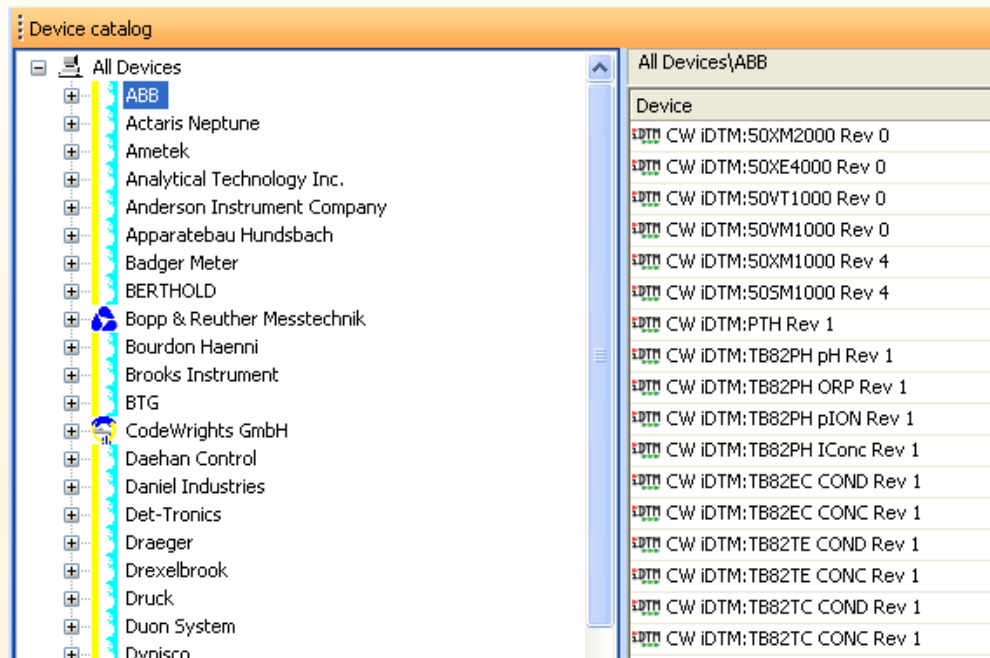


Images Copyright by Endress+Hauser, Emerson, Krohne, Siemens, Yokogawa

User benefits

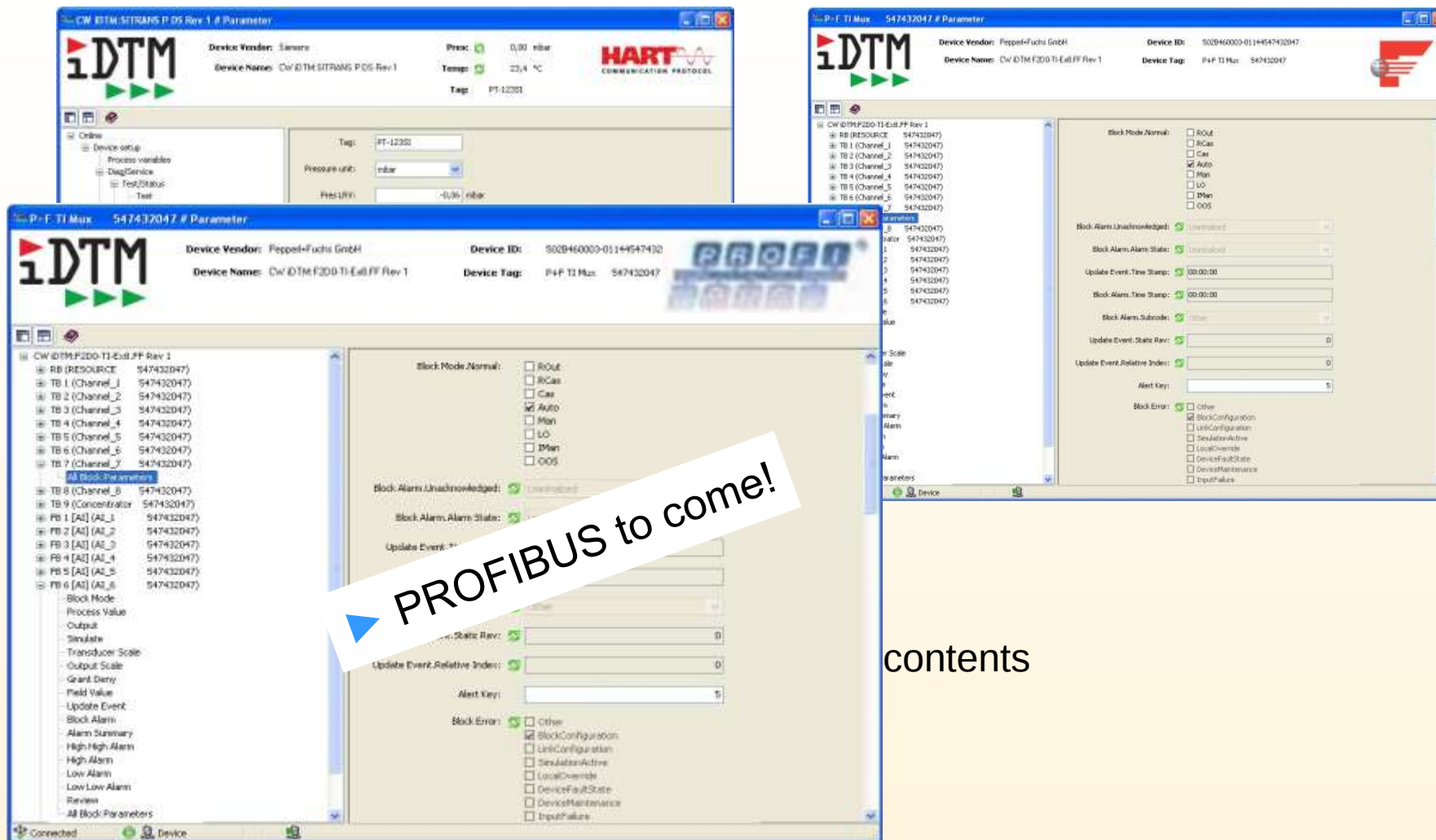
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- ▶ iDTM allows integration for devices where no specific DTM exists/can be found
- ▶ Complete device operation through manufacturer-created EDDs
- ▶ Plus the usage of official interpreter gives the user a complete and safe function
- ▶ The iDTM is handled like any other device DTM
- ▶ Each device appears in the catalogue under the device vendor:



A unified look&feel is a key user benefit

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The image displays three screenshots of the iDTM software interface, illustrating a unified look and feel across different device types and views.

- Top Left Screenshot:** Shows the 'CW-ITM-SITRANS P DS Rev 1 # Parameter' window. It displays device information (Vendor: Siemens, Device Name: CW-ITM-SITRANS P DS Rev 1) and process variables (Pressure: 0.00 mbar, Temp: 23.4 °C, Tag: PT-12301).
- Top Right Screenshot:** Shows the 'P-F-TI Max 547432047 # Parameter' window. It displays device information (Vendor: Pepper-Fuchs GmbH, Device Name: CW-ITM-F200-TI-Edl FF Rev 1) and a list of channels (TB 1 to TB 7).
- Bottom Screenshot:** Shows a detailed view of the 'CW-ITM-F200-TI-Edl FF Rev 1' device parameters. It includes a tree view on the left with categories like 'Block Mode', 'Process Value', 'Output', 'Simulate', 'Transducer Scale', 'Grant Deny', 'Field Value', 'Update Event', 'Block Alarm', 'Alarm Summary', 'High High Alarm', 'High Alarm', 'Low Alarm', 'Low Low Alarm', and 'Review'. The main area displays various configuration options and status indicators.

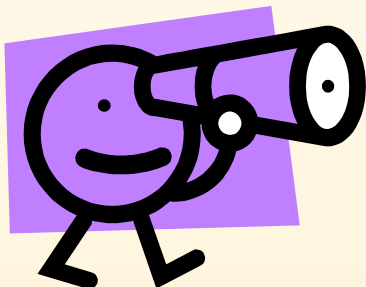
A diagonal banner across the bottom left of the bottom screenshot reads: **PROFIBUS to come!**

contents

Short Resume

Integration is our Business !

- ▶ There is an increasing demand for Device Integration
- ▶ There are different ways to do it
- ▶ Both ways have their Pros and Cons
- ▶ The iDTM products unite the Pros of both worlds
 - End users can finally focus on their application
 - The device vendors can focus on outstanding device functionality



There are new technologies on the horizon

- ▶ FDT works on a 2.0 specification
- ▶ DCS vendors work on FDI

▶ Motivation

▶ End user Driven:

„... Our company (chemical company) has built 3 new production plants in which we have used fieldbus technology (FF and PA).

We have encountered many problems during the engineering , construction and start-up phases...

-commissioning of the FF- and PA-devices was taking a lot of time (10 minutes or even much longer using our 3 host systems) and was not done before the start of the loop-checks .

After the start-up of the 3 plants we still are wrestling with :

- the management of the fieldbus device software versions (DD's , EDD's , DTM's , GSD's , ...)

▶ Developer Driven:

From ActiveX to .NET

User Interfaces through Windows Presentation Forms

Latest Development Tools (Visual Studio) allow higher productivity

▶ Targets of FDT 2.0

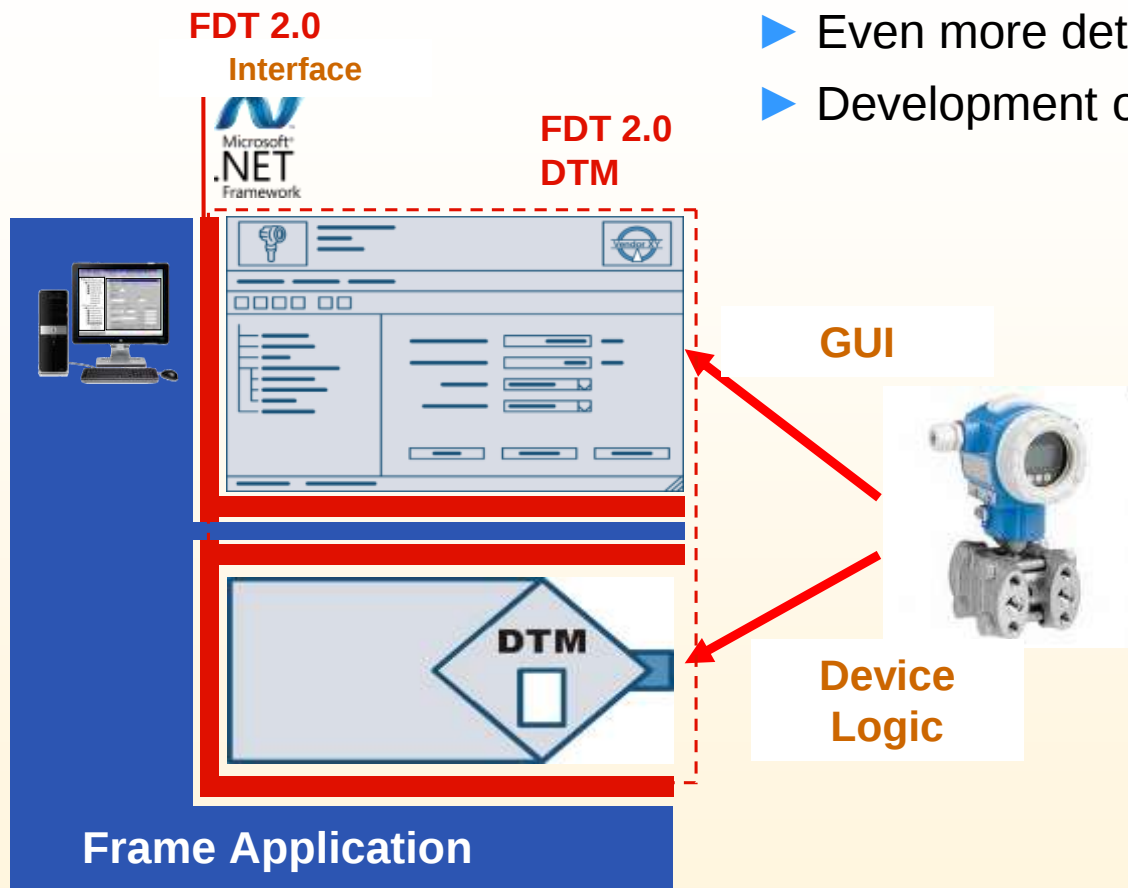
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- ▶ General Innovation / technology update
- ▶ Improved Performance and Installation
- ▶ Requirements from the factory automation (PLC Tool Interface)
- ▶ Improve Interoperability
- ▶ Analysis of problems with FDT 1.2
- ▶ Improved compatibility and Life Cycle Support

▶ FDT 2.0 – Interoperability through...

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- ▶ Simplification of the system architecture
- ▶ Even more detailed interface specification
- ▶ Development of Standard components



▶ FDT 2.0 – Backward Compatibility

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FDT 1.2.x
DTM

FDT1.2.x
Interface

COM
activex



private
Interface



Microsoft
.NET
Framework

FDT 2.0
Interface

FDT 2.0
DTM



FDT 2.0 Frame Application

▶ Targets of FDI

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- ▶ FDI = Field Device Integration
- ▶ One single standard for device integration
- ▶ Investment protection through focus on compatibility
- ▶ Robustness
- ▶ Only one integration entity needed for all systems
- ▶ Lifecycle support

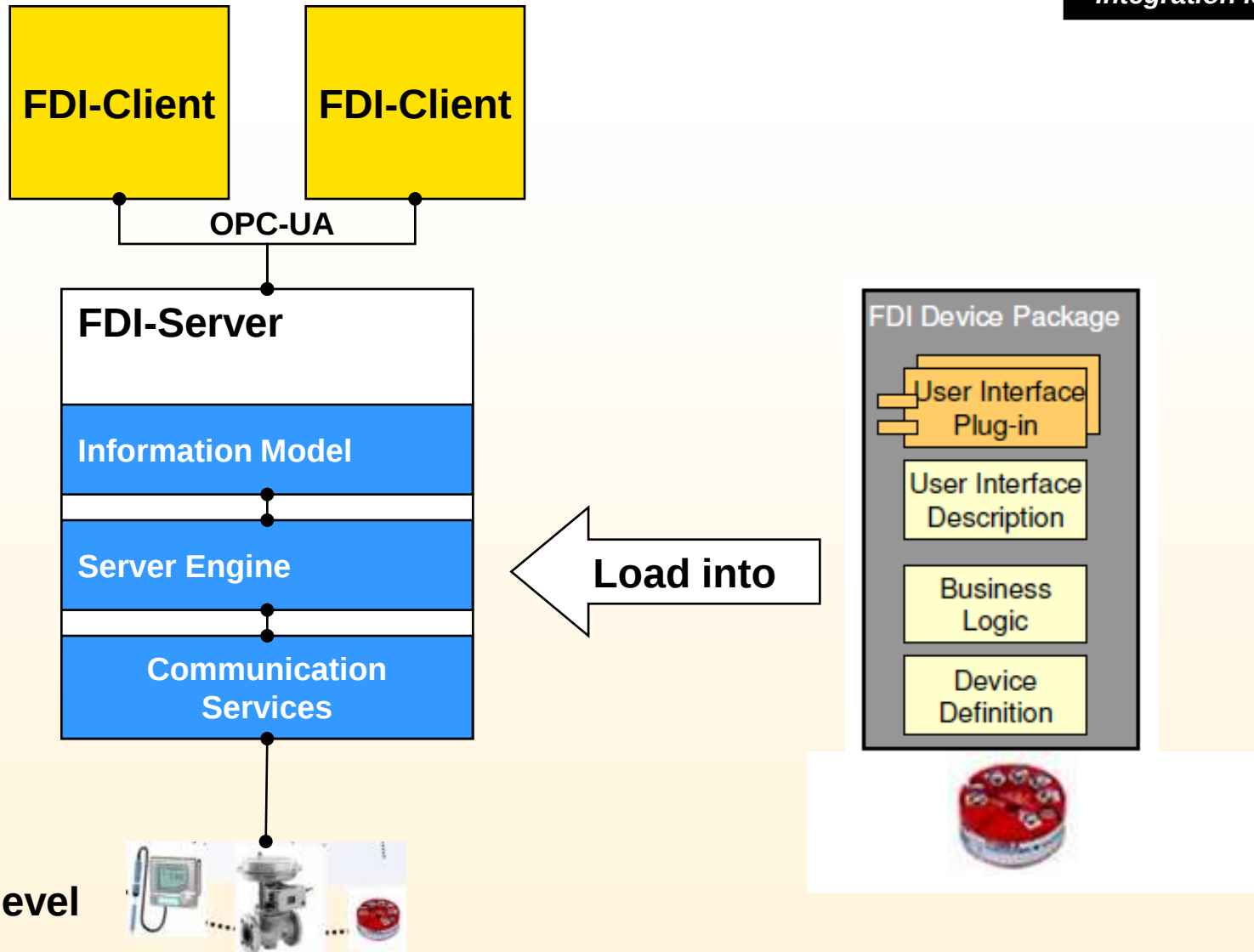
Information taken from:

VDI-Automation Conference 2010 in Baden-Baden: *Field Device Integration (FDI) - Betrachtung im Systemkontext*

Authors: Großmann, Daniel; John, Dirk ABB AG Forschungszentrum, Ladenburg; Lange, Ronald, Siemens AG, Nürnberg.

► Base architecture of an FDI-Tool

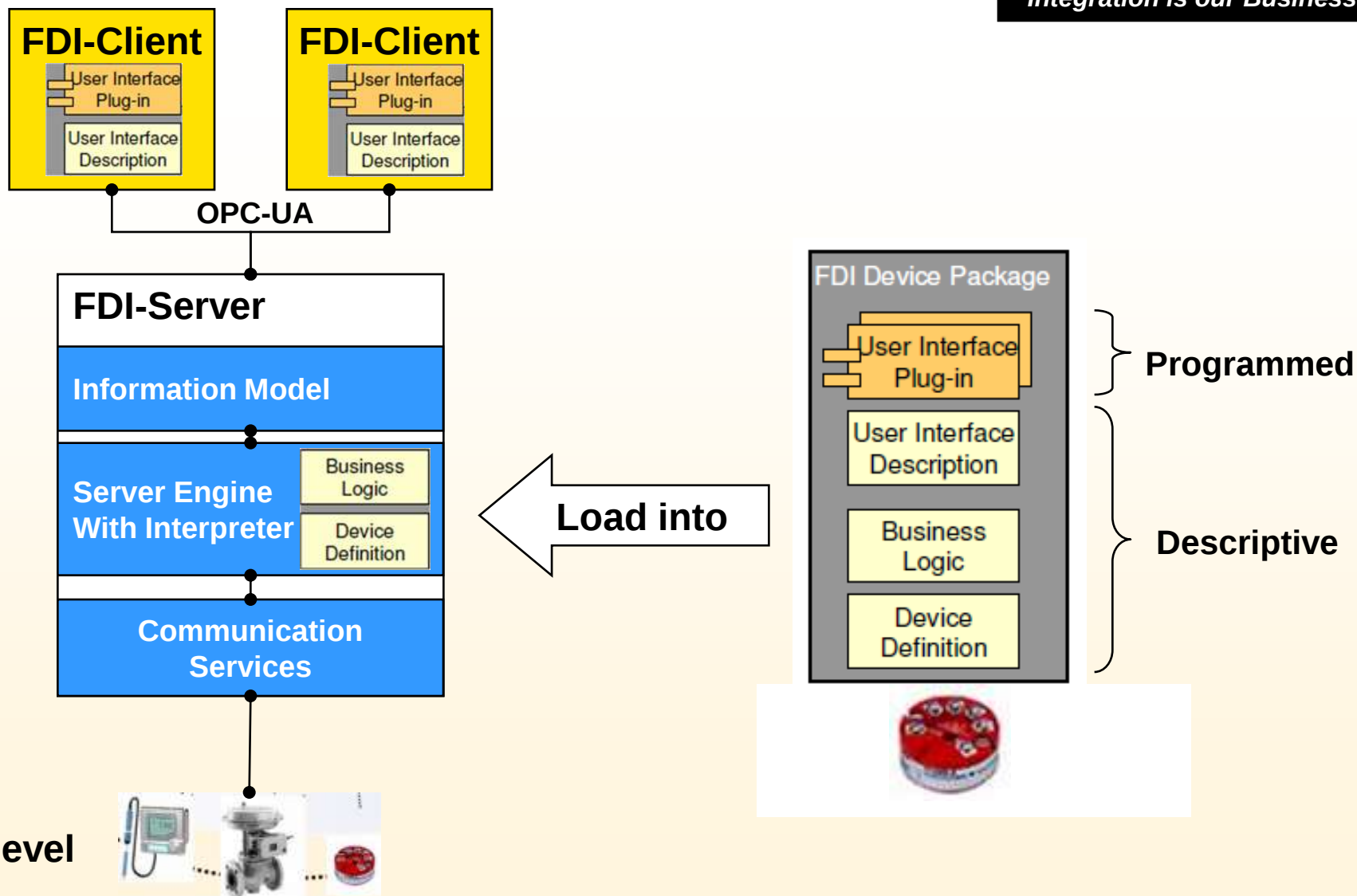
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Field level

▶ At Runtime

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► Implications for the end user

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Will have to deal with:

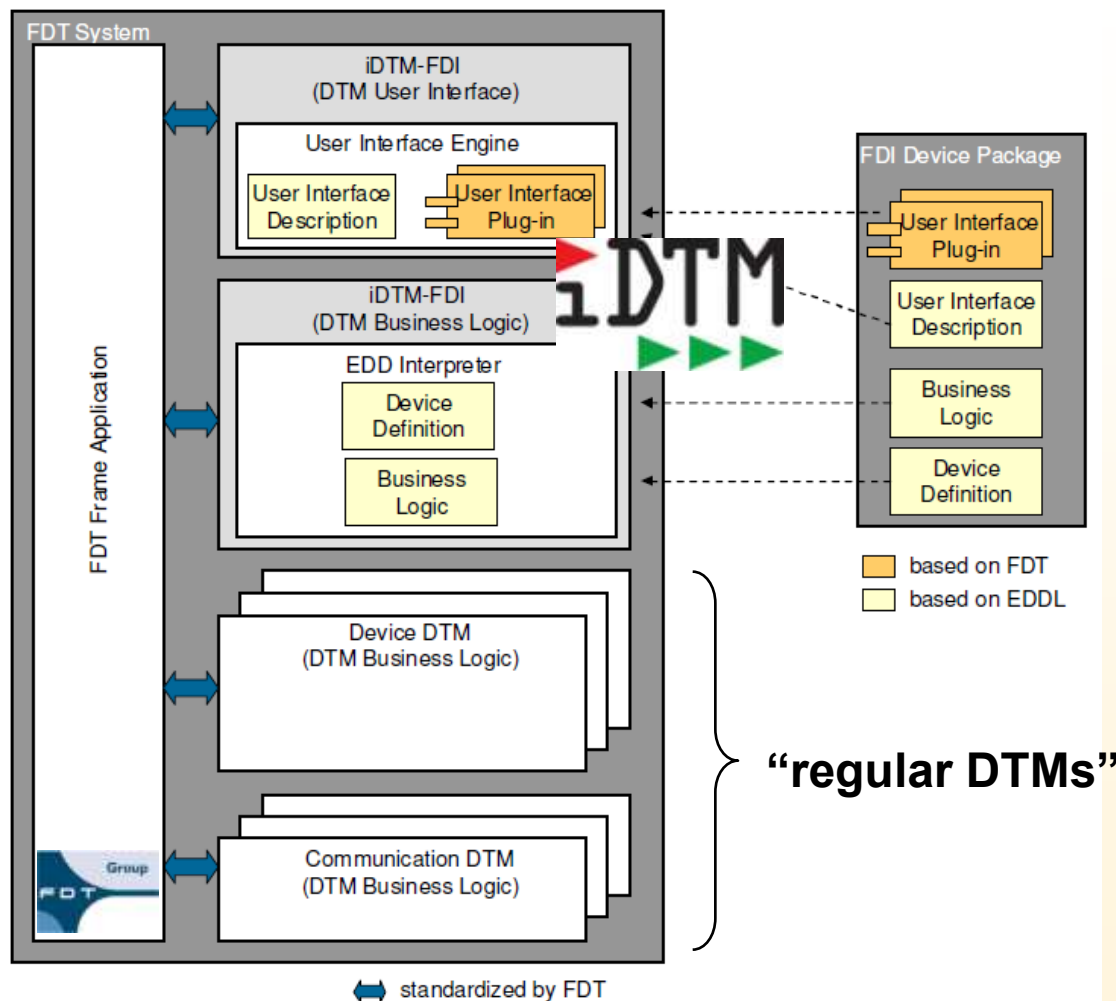
- FDT 2.0 frame applications
- FDT 2.0-DTMs
- FDI-based DCS and/or tools
- FDI Device Packages

Will profit from

- Only one single Device Package per device
- Better device/frame coverage
- Improved overall interoperability and compatibility

CodeWrights Offering

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- ▶ The iDTM for FDI will again allow a seamless integration of descriptive technology to FDT
- ▶ For FDT 2.0 and/or 1.2
- ▶ Uses the Pros of both technologies.

 **End**



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Thank you for your attention!

I am happy to answer your questions now

or later under

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