

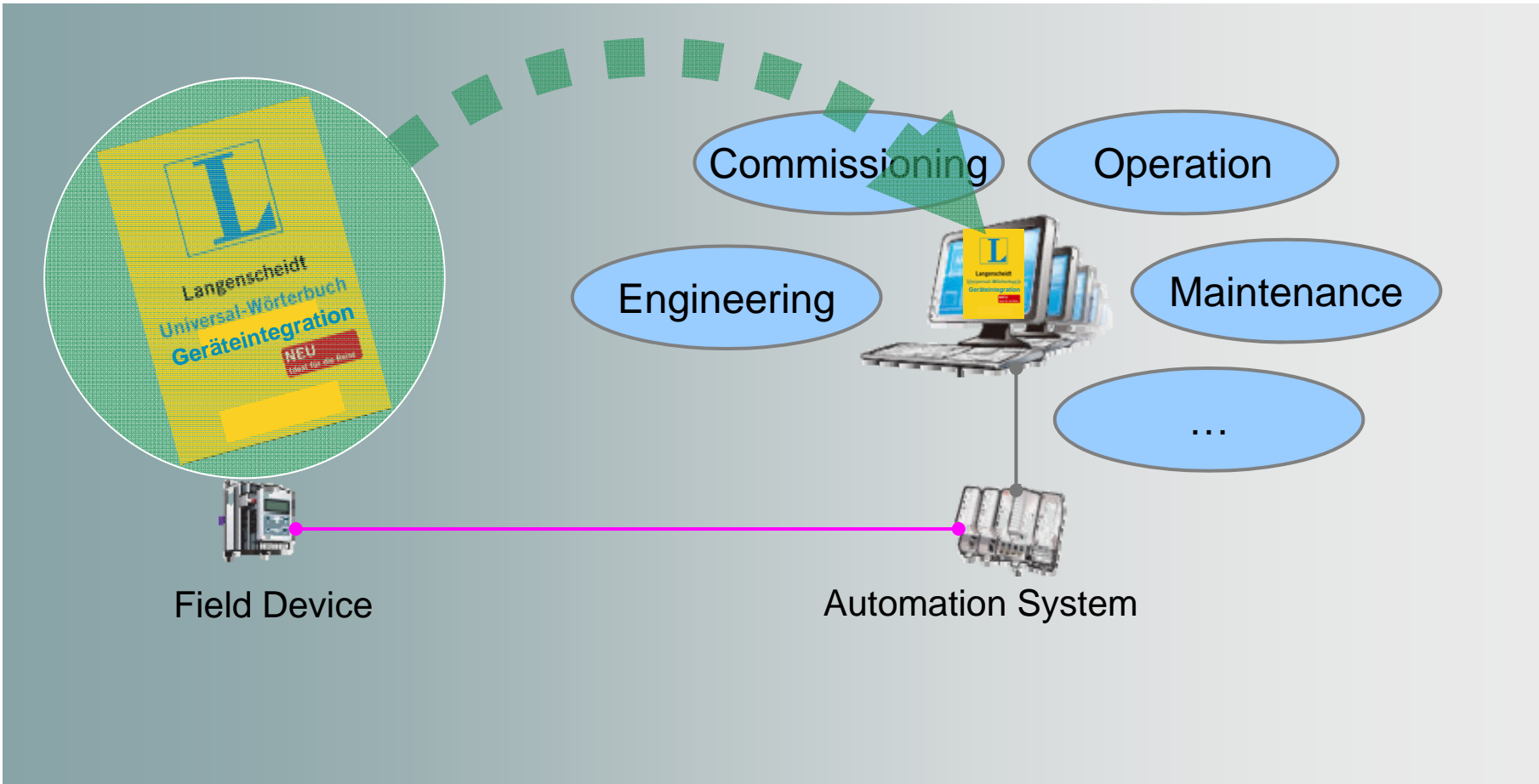


Field Device Integration





Integration of Field Devices





Device Integration Technologies

EDDL™

- Descriptive technology
- Strength in integration for engineering of automation systems
- Technologies with complementary strengths often used together in plants
- High degree of overlap in functionality creates complexity for users
- Duplicated effort for system and device vendors to support both technologies



- Technology based on software application
- Strength in diagnostics and advanced asset management



Field Device Integration FDI

- Global automation suppliers jointly support the harmonization of FDT and EDDL technologies for the benefit of all users and vendors
 - Take the best of both existing integration technologies
 - Use state of the art base technologies
 - Add improved concepts for lifecycle management and interoperability

FDI Project

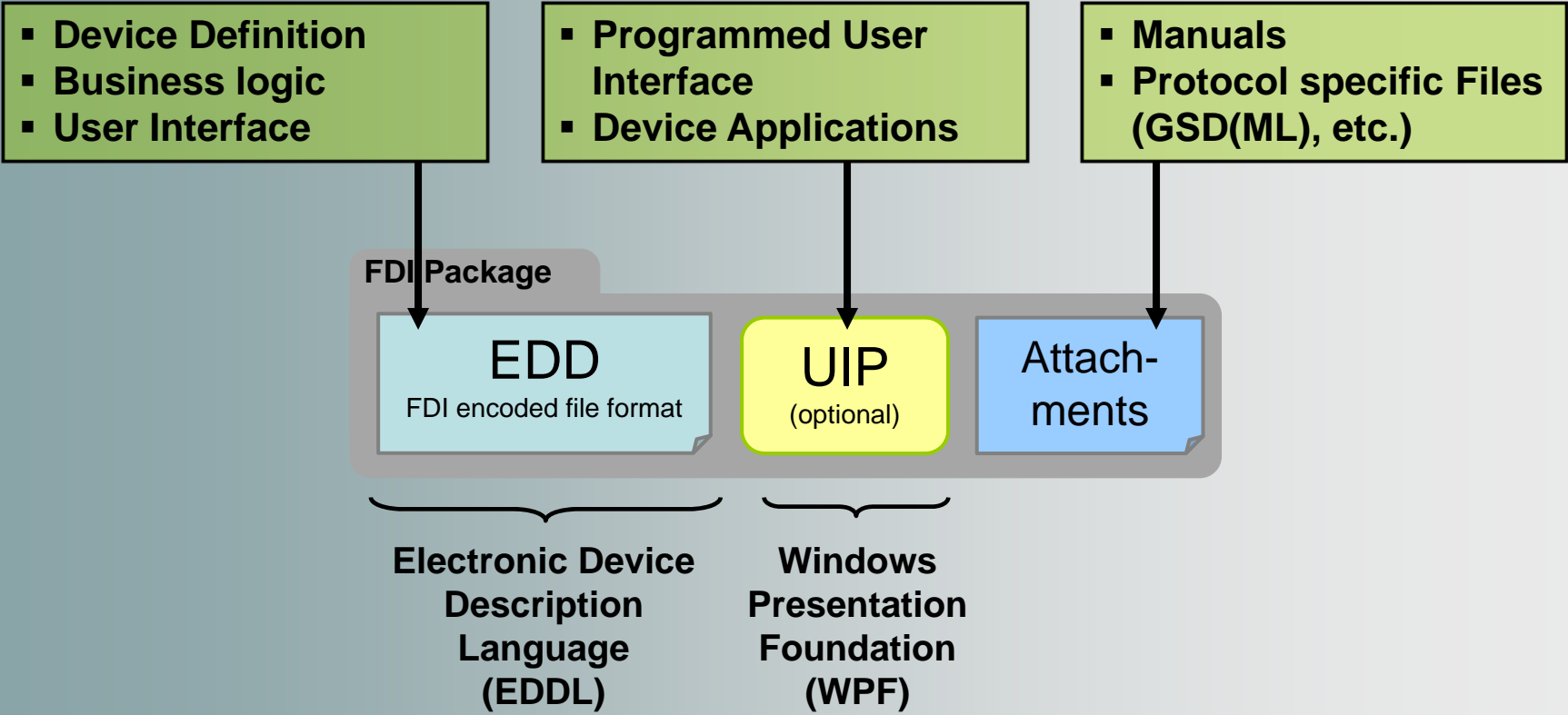


Field Device Integration – F D I



FDI Device Package

The Device Vendor's Contribution





Example Device Definition

```
VARIABLE myVariable1
```

Declaration

```
{
```

```
  LABEL [myLabel];  
  HELP  [myHelp];
```

Display and Help Text

```
  TYPE UNSIGNED_INTEGER (2)
```

Data Type

```
{
```

```
    DEFAULT_VALUE 128;  
    MIN_VALUE     32;  
    MAX_VALUE     512;
```

```
}
```

```
...
```

```
}
```

EDD
Device
Definition



Example Business Logic

```
METHOD myPostReadAction
```

```
{
```

```
    DEFINITION
```

```
    {
```

```
        int TmpValue1;
```

```
        int TmpValue2;
```

```
        TmpValue1 = ivar_value(myVariable1);
```

```
        TmpValue2 = ivar_value(myVariable2);
```

```
        if ((TmpValue1 == 0xFF) &&  
            ((TmpValue2 == 0x00) ||  
             TmpValue2 == 0x10))
```

```
        {
```

```
            iassign(myVariable3, 0x0A);
```

```
        }
```

```
    }
```

```
}
```

EDD
Business
Logic

Dependency



Example User Interface Description

CHART myChart

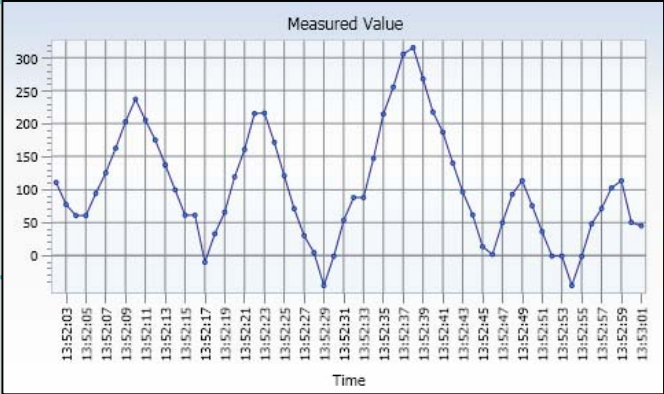
```

LABEL [myLabel];
Help [myHelp];
  
```

EDD
User Interface

```

TYPE SWEEP;
LENGTH 120000; //ms
CYCLE_TIME 1000; //ms
WIDTH LARGE;
HEIGHT LARGE;
  
```



MEMBERS

```

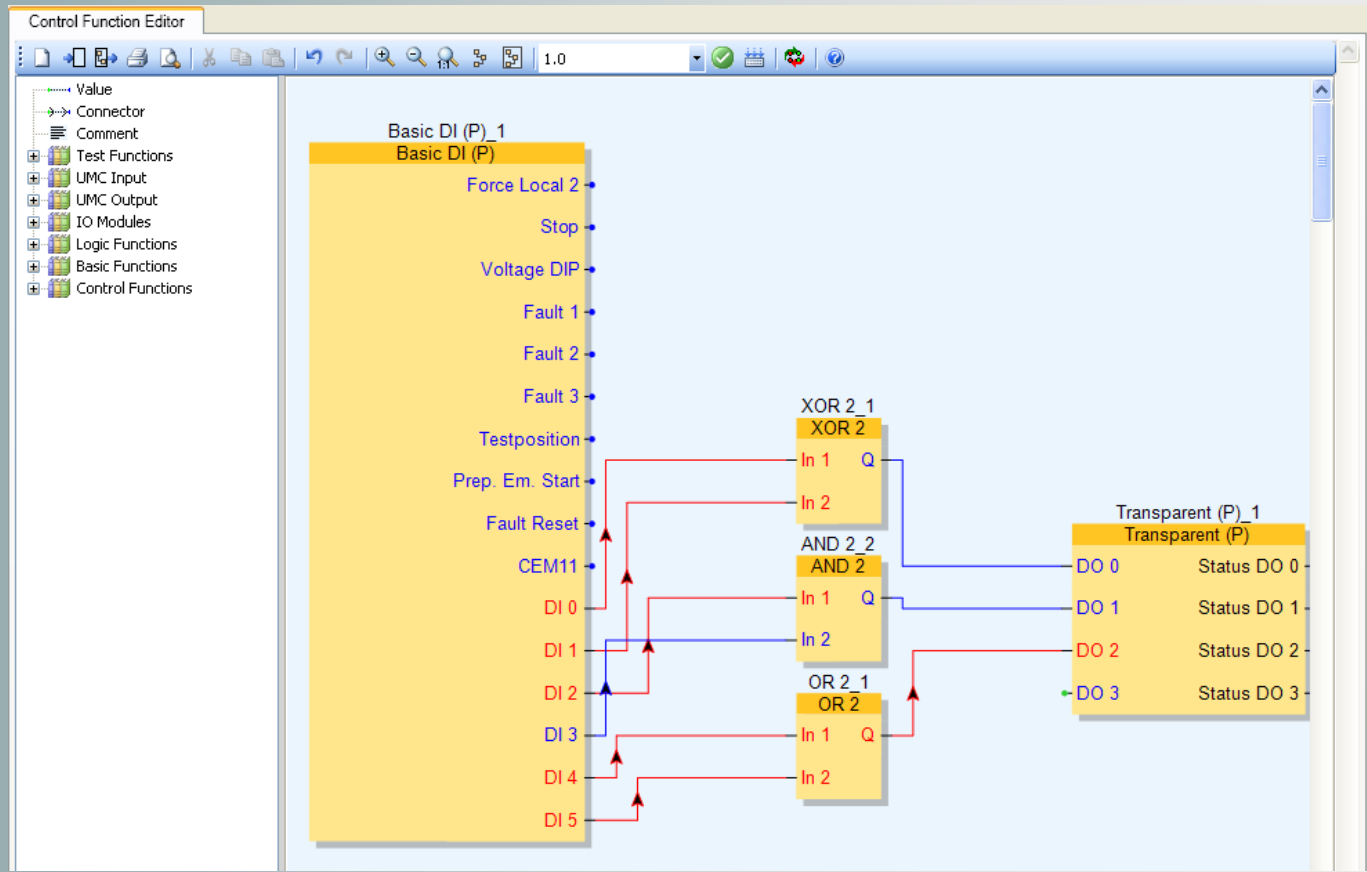
{
    Source1, mySource1; //e.g. PV
}
  
```

Values to Display



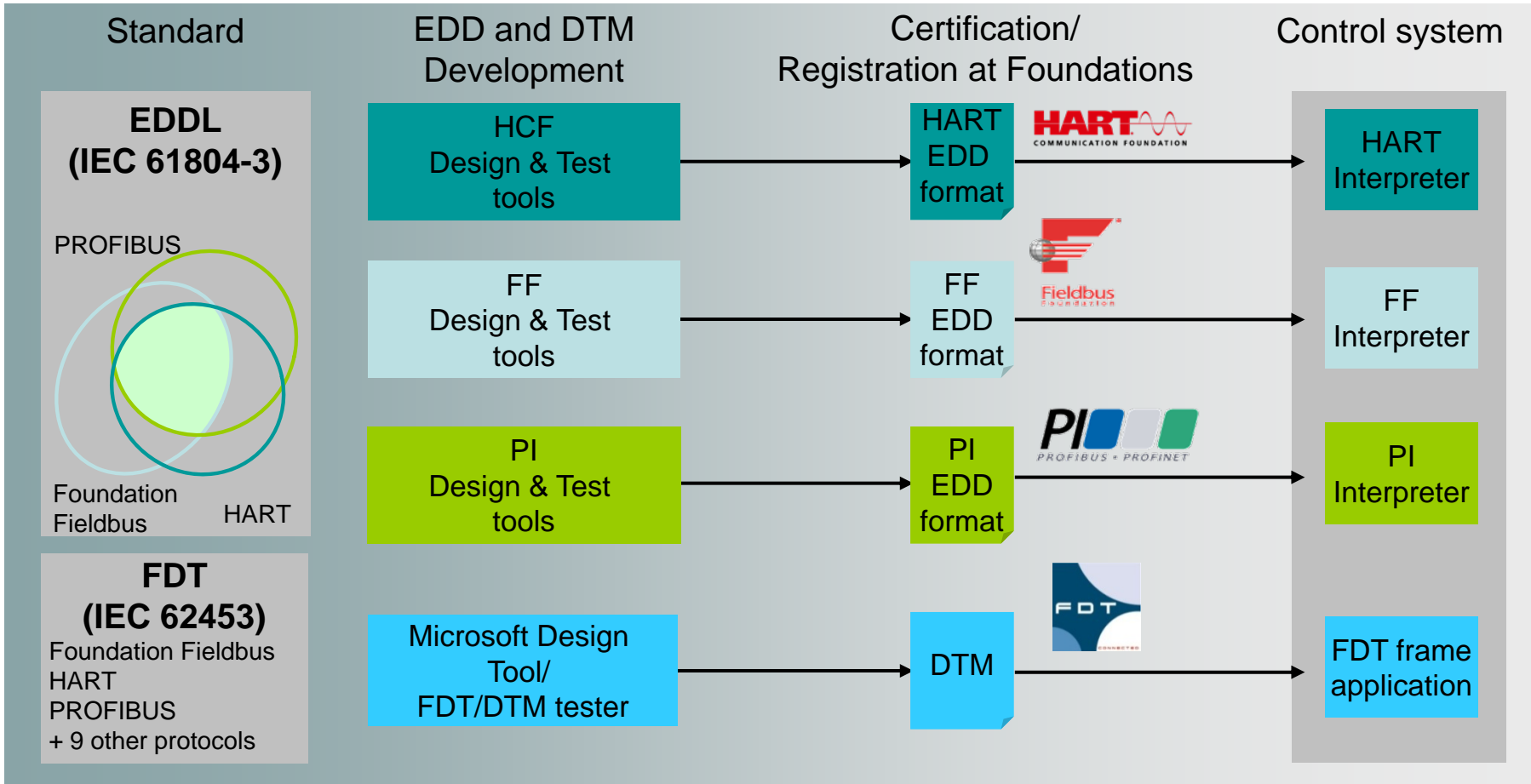
Example User Interface Plugin

UIP
(optional)



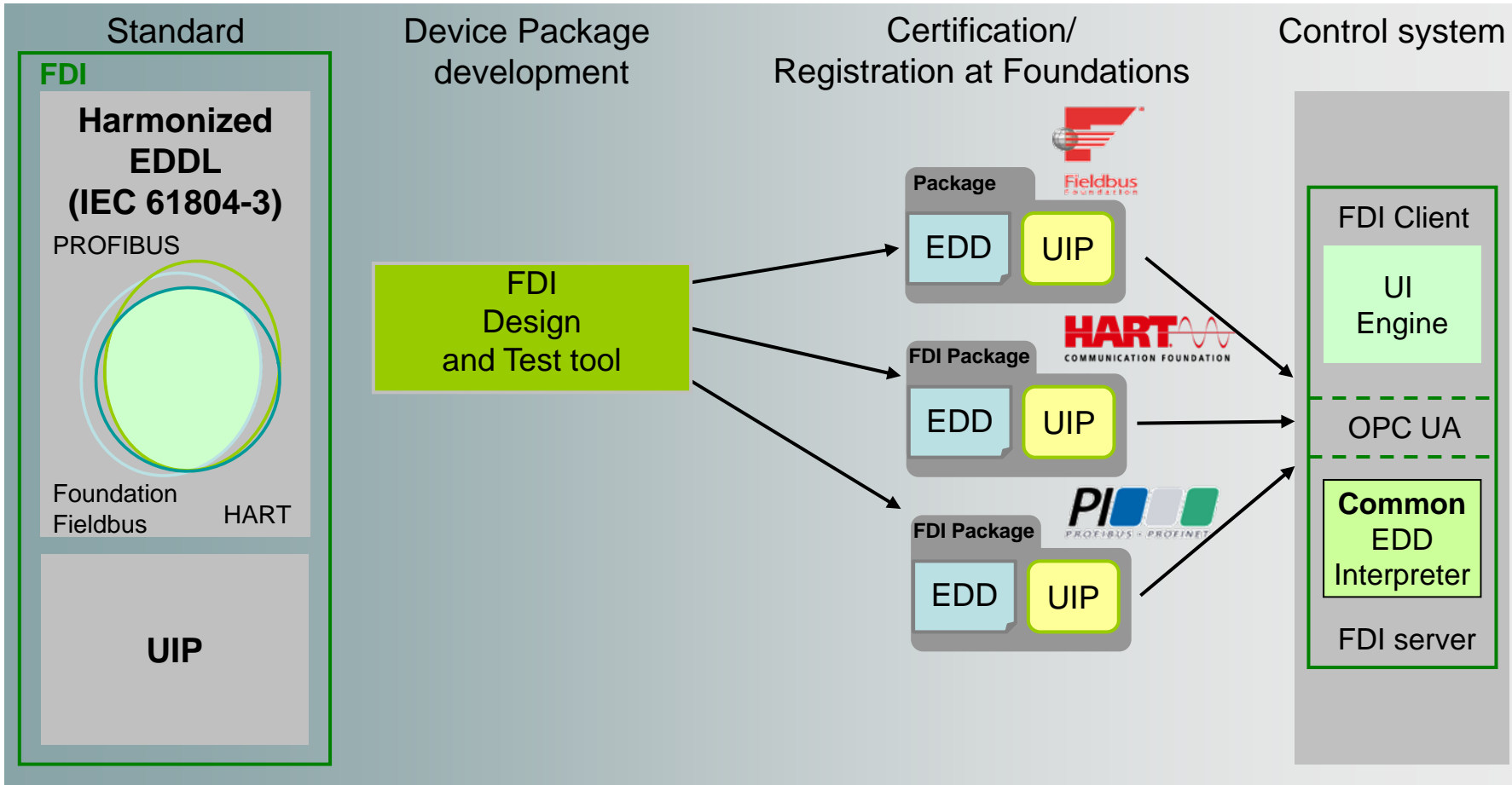


Device Driver Workflow – Status Quo





Device Driver Workflow – with FDI





FDI Advantages for Device Vendors

Reduced effort to create device driver

- Single technology
- Reduced costs => re-use of device packages
- Better time to market

Improved scalability

- Simple EDDL for base functionality and simple devices
- Sophisticated, programmed User Interface Plug-in for advanced functionality

Less variants in description technology

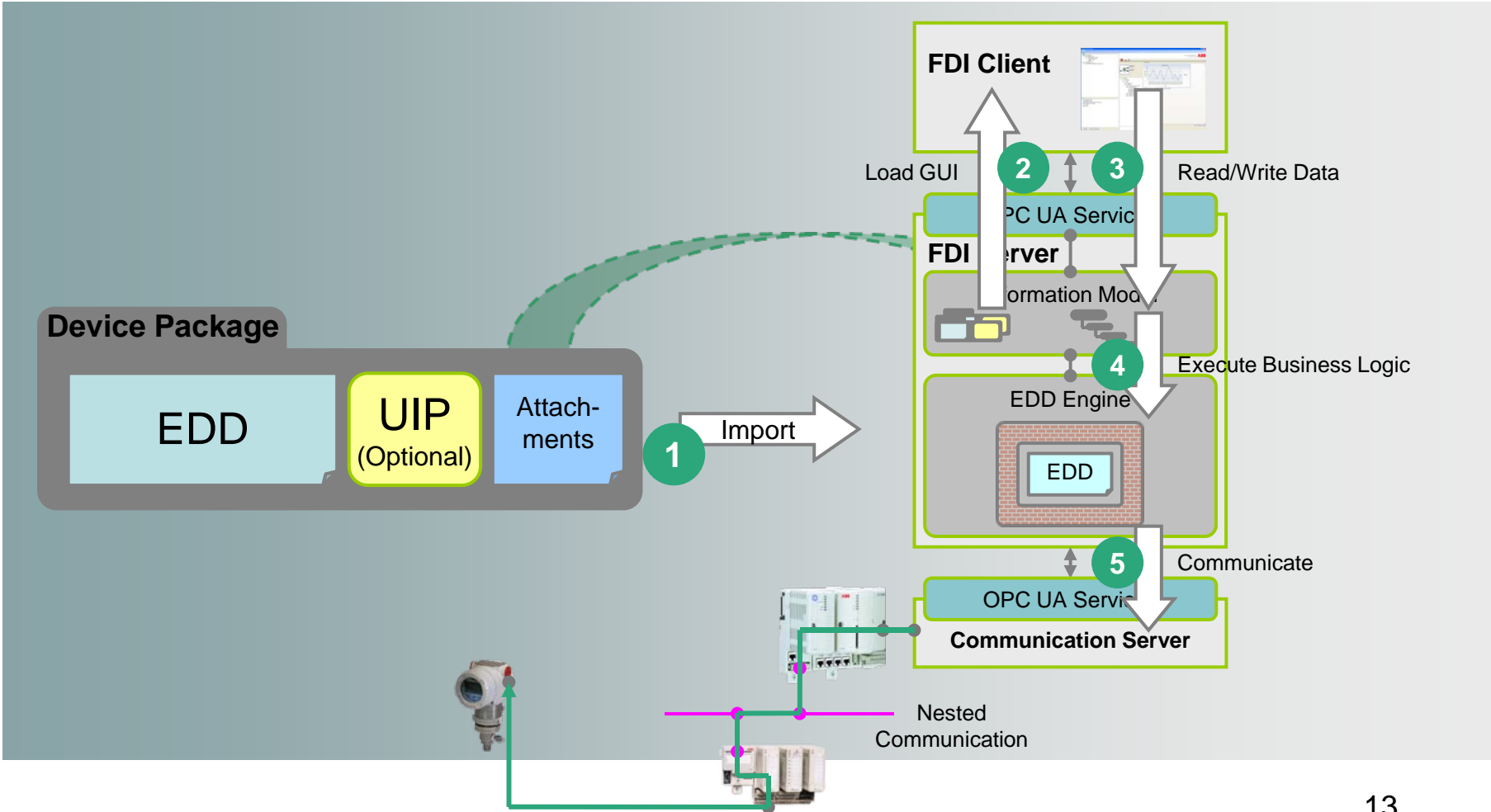
- Reduced maintenance effort
- Focus on quality and features

Reduced interoperability challenges

Reduced IT platform dependency

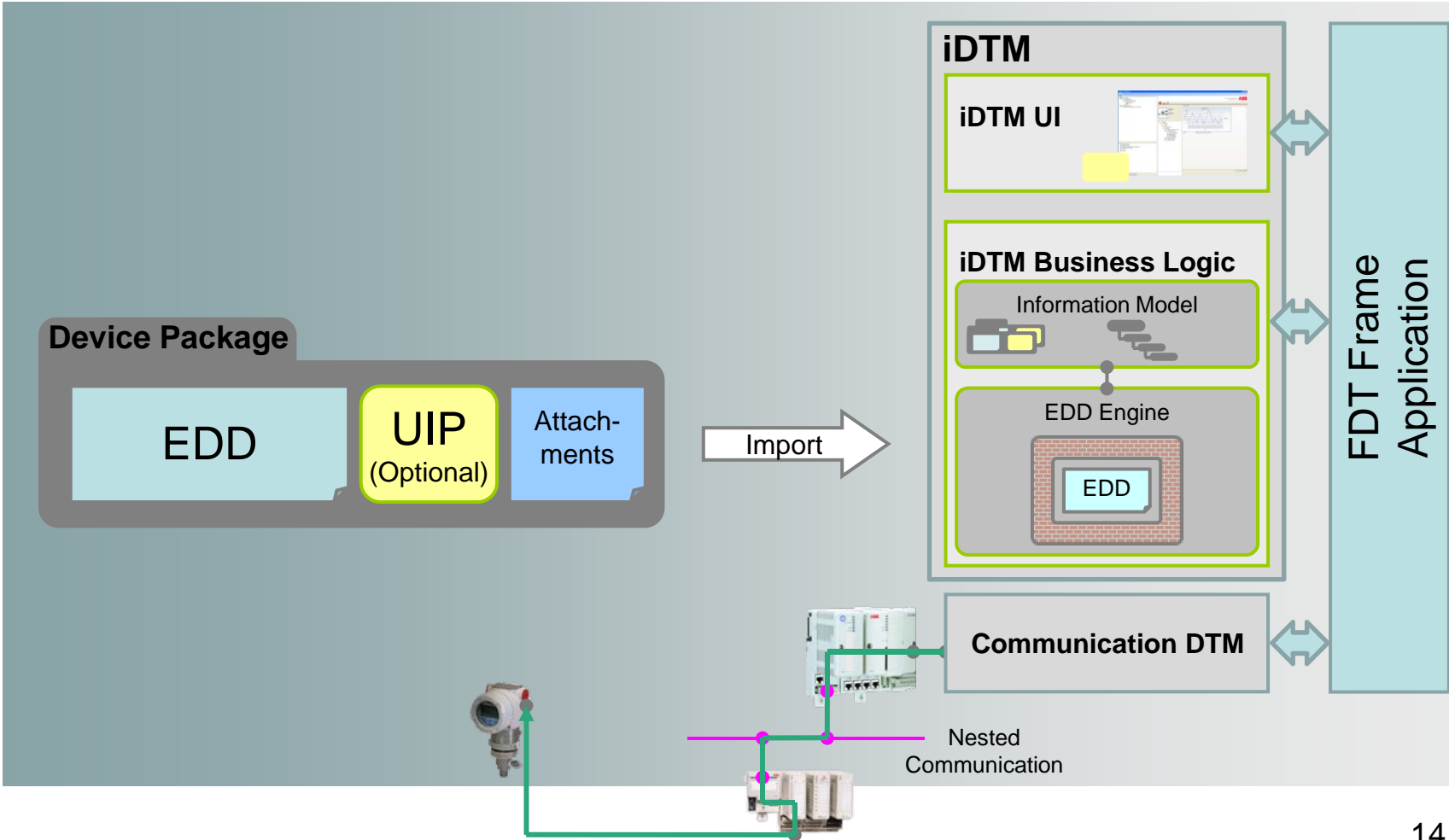


FDI System Integration





FDI - FDT System Integration

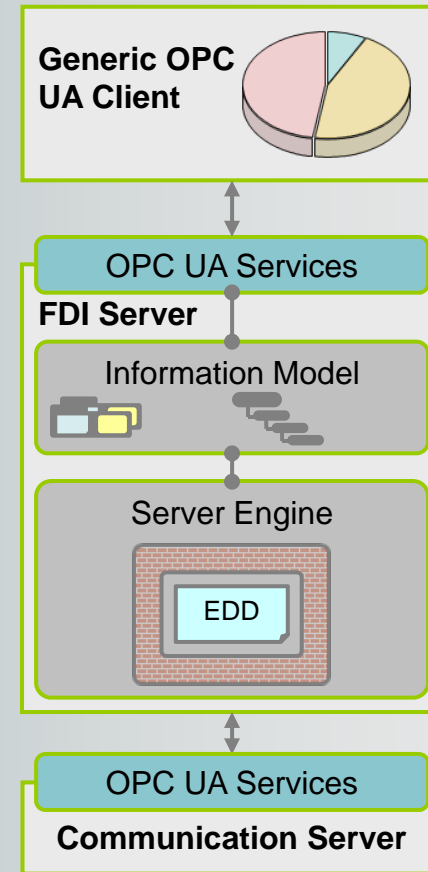




FDI Information Model

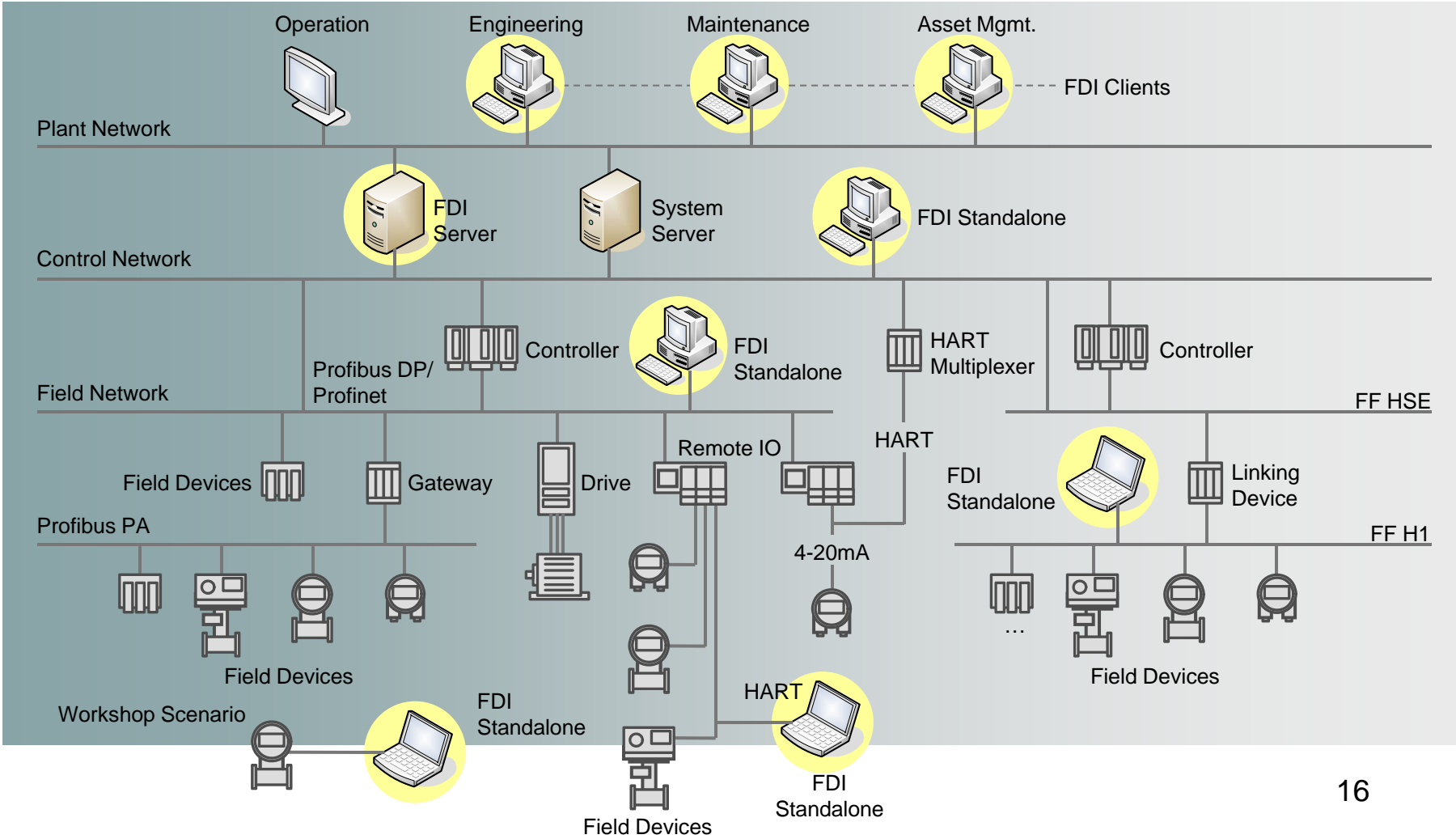
- FDI Client-Server applications can also support generic OPC UA Clients
- Specification of FDI interaction rules will guarantee that generic OPC UA clients cannot access sensitive parts of the Information Model
- FDI Server has the complete control over the access rules

Improved standardized access to device information compared to today's technologies



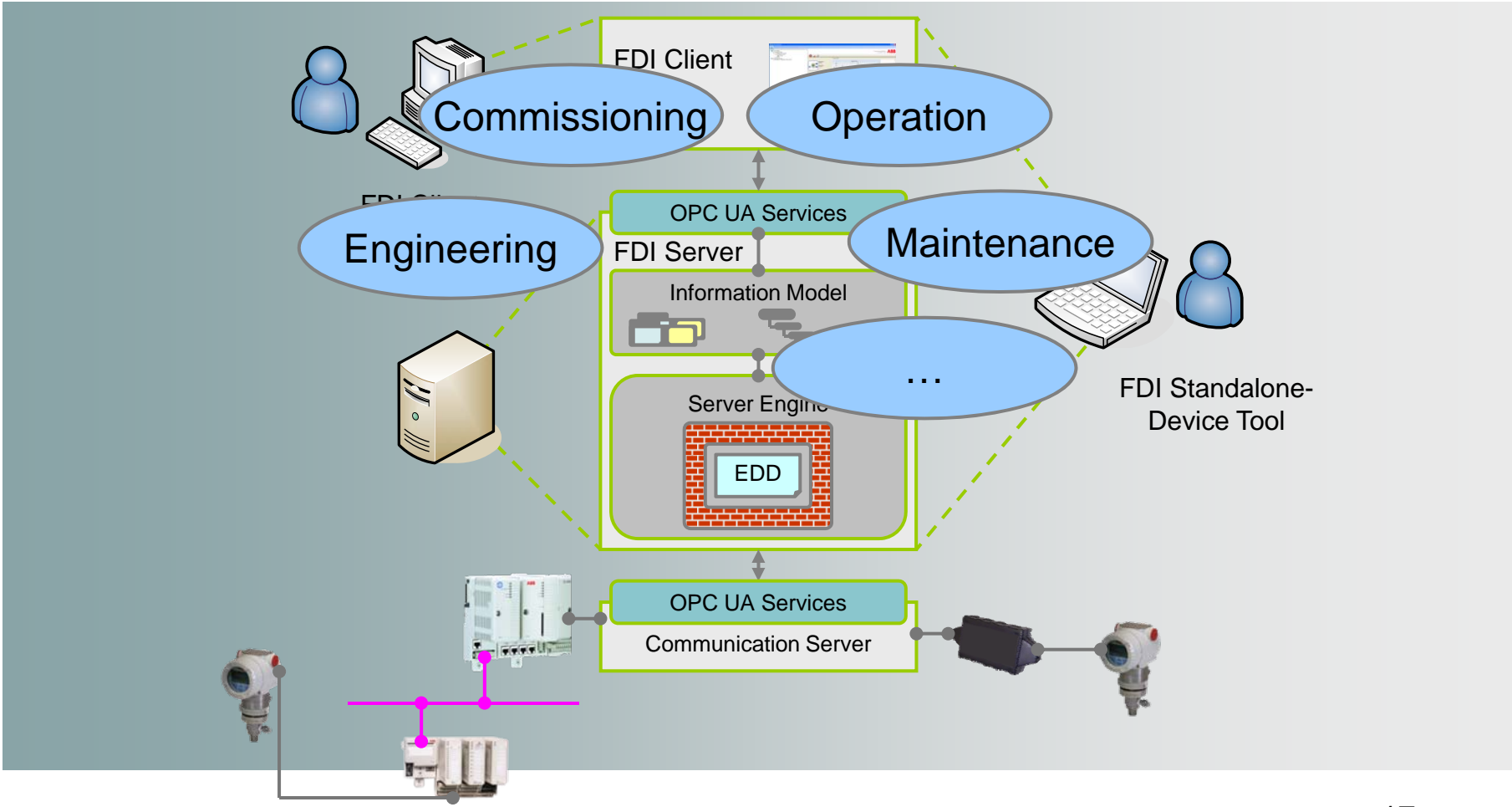


FDI Applications in System Context





FDI Scalability





FDI Advantages for System Vendors

- Increased robustness by interpreter-based execution
- Reduced interoperability challenges due to common interpreter
- Reduced IT platform dependency
- Reduced effort as only one technology needs to be supported
- Scalability
- Opportunity for system-specific applications based on Information Model



FDI Advantages for End Users

Reduced interoperability challenges

- Common interpreter
- Common test tool

Reduced IT platform dependency

- Less lifecycle concerns
- Better support for long plant runtime

Easier deployment

- No Software installation

Unified technology basis

- From Handheld type Device Configuration Tool to sophisticated Asset Management Tool



Summary

FDI = Combination of best features from EDDL and FDT plus OPCUA ...

Common benefits for End Users, Device Vendors, and System Suppliers

- Unified technology
- Less complexity
- Less interop challenges
- Reduced IT platform dependency



Thank You !





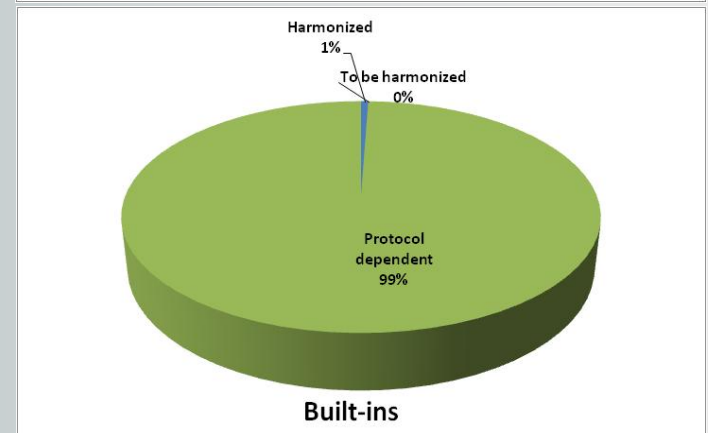
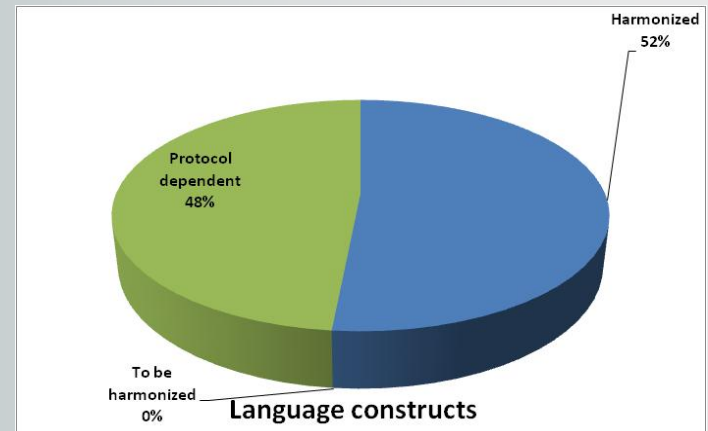
EDDL Harmonization (version 2.0, end 2009)

EDDL language

- 135 out of 262 constructs harmonized
- 127 protocol specific

EDDL built-in harmonization

- 2 out of 343 built-ins harmonized
- 341 protocol specific





EDDL Harmonization (end 2010)

EDDL language

- 215 out of 262 constructs harmonized
- 30 remain protocol specific

EDDL built-in harmonization

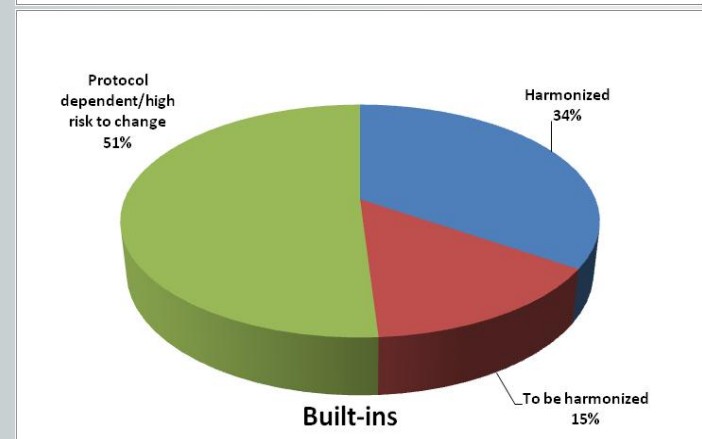
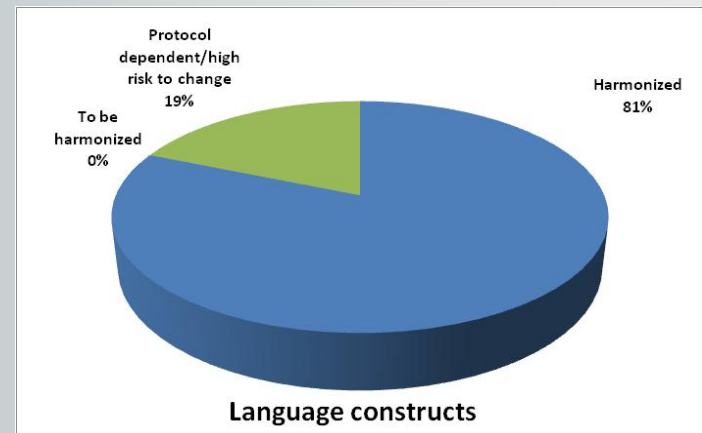
- 118 out of 343 built-ins harmonized
- 50 to be harmonized until Feb 2011
- 175 remain protocol specific

Benefits

- Simplification of IDE and test tool
- Less effort for device vendors
- Less interoperability issues

Next steps

- Finalize harmonization in workshop in April 2011





Status of work

- FDI specification version 0.10 was released for development of cross protocol FDI package development tools and the common interpreter
- EDDL harmonization will be completed. More than 80 % of the language constructs and nearly 50 % of the so called built ins will then be harmonized across the three protocols FF, HART und PROFIBUS/PROFINET.
The remaining not harmonized EDDL elements map protocol specifics. EDDL harmonization includes the definition of a common encoded file format.
- FDI FDT interoperability: FDT and FDI experts have specified the interfaces for the FDI User Interface Plug-in jointly. FDI makes use of the interfaces being specified in FDT 2.0 for the DTM User Interface component.
- Tools development: Requirements specifications for the common interpreter and the FDI Package Integrated Development Environment (IDE) have been completed. The requirement specification for conformance test tools is being worked on. Development project for Tools and Components has been kicked-off.