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Connecting the World of Process Automation

The **Value** of FDI

ONE Device - ONE Package - ALL Tools

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Abstract

FDI (Field Device Integration) is a new device integration technology for process automation designed to integrate field devices into automation networks with the help of standardized, vendor-independent tools and procedures. This article covers the core of FDI technology and how it simplifies system and device installation, configuration, operations, and maintenance to avoid tedious integration effort — therefore saving time and money.

FDI – Evolution in Device Integration

FDI is a complete solution that recognizes the key end user requirements in the process automation industry. FDI combines the benefits of EDDL (Electronic Device Description Language) and FDT (Field Device Technology) in a single scalable solution, which can work with both simple and complex devices. FDI presents real-time data in a consistent and uniform format that allows the plant personnel to operate in an efficient and effective manner. FDI technology has been developed and supported by the leading technology-standards foundations and suppliers in the process

One core objective of FDI is to dramatically simplify software installation, configuration, maintenance and management of field devices and host systems. FDI standardizes the packaging and distribution of software and tools. The host needs only one FDI Device Package per device type per protocol to successfully integrate each device.

FDI Package: ONE Device – ONE Package – ALL Tools

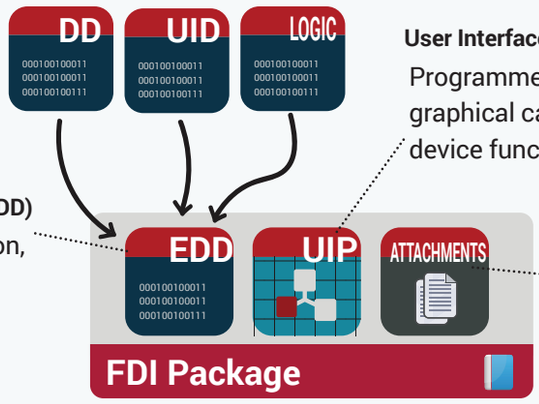
ONE Device – ONE Package

A physical device is virtualized in software as an FDI Device Package. An FDI Device Package is a single file (*.fdix) which contains all the device information including device definitions, user interface plug-ins, certificates, device manuals and other components that are essential for managing the field device in the plant.

An existing EDD file for a particular device can be used by developers to create the FDI Device Package for that device. In order to support sophisticated devices, a UIP (User Interface Plug-in) software component, with its rich Graphical User Interface, can be added to provide superior user experience. Attachments are comprised of device registration

ONE Device - ONE Package - ALL Tools

FDI Device Package Contents



User Interface Plug-In (UIP)
Programmed User Interface with rich graphical capability for complex device functionality.

Electronic Device Description (EDD)
EDD contains Device Definition, User Interface and Business Logic.

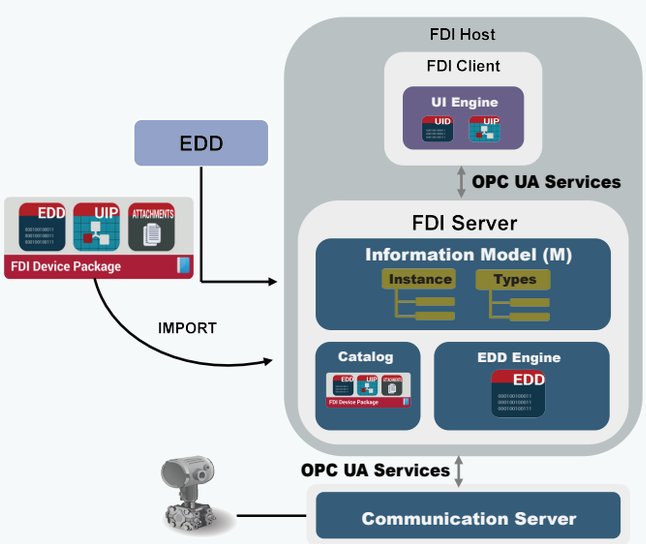
Attachments
Registration Certificates, User Manuals, Device images, Product documentation, protocol-specific files, such as GSD or CFF etc.

FDI Device Packages undergo a series of rigorous compliance tests by FieldComm Group to asssure adherence to FDI Specifications and therefore providing the quality assurance to the end users.

ALL Tools

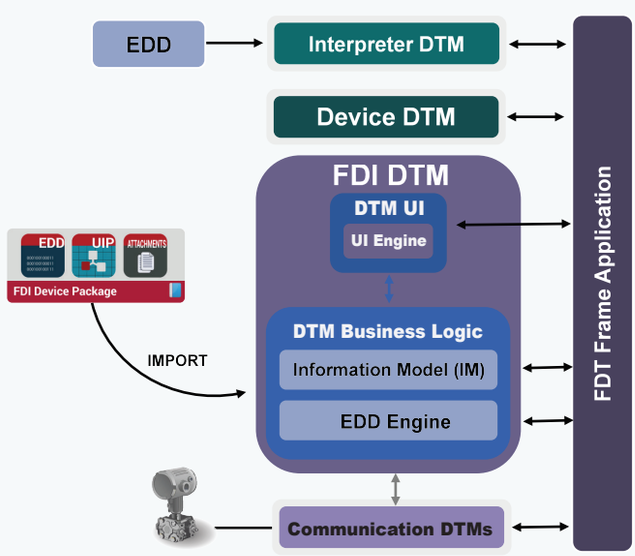
FDI Hosts support legacy EDD files

For the device manufacturer who has invested in EDDL technology, their products can still be used in the FDI enabled host system as FDI provides backward compatibility with legacy EDDs.



FDT Hosts support FDI Packages

FDI Device Packages will continue to work in the FDT Hosts using FDI-DTM technology. Thus, making it a single device integration technology that supports all tools.



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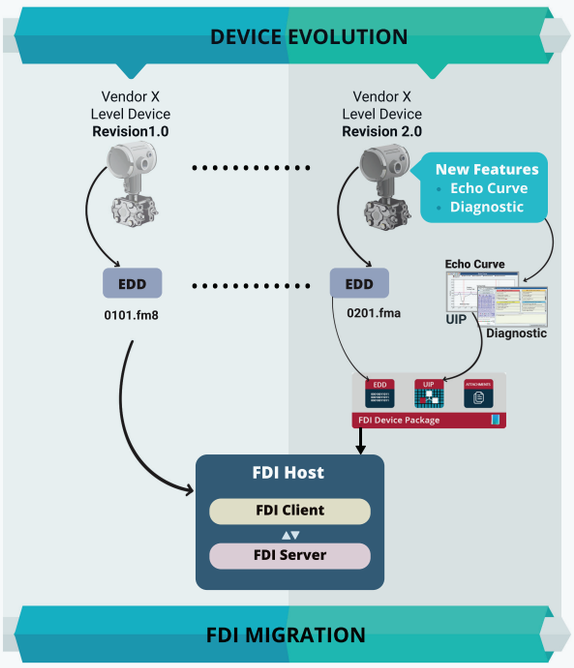
FDI adoption can evolve with your device

The beauty of FDI is that its adoption can be an **evolutionary and incremental step** for the device manufacturer as it protects the investment made in the current technologies like EDDL and FDT. For the device manufacturers who have invested in EDDL technology, legacy EDDs can still be used in the FDI enabled host system. Investment made in DTM can be protected by making it into a UIP in an FDI Package for sophisticated devices.

In the figure shown, Level field device from Vendor X (Revision 1.0) has HART EDD (0101.fm8) which can work directly with the FDI Host.

Once a later version (Revision 2.0) of this device is made to support sophisticated functionality like Echo Curve or NE107 diagnostic capability, then it can be migrated to FDI, where the end user can experience the rich GUI for Echo Curve and diagnostic functionality UIPs provide. This allows the flexibility to adopt FDI technology at the device manufacturers' convenience.



End User Benefits

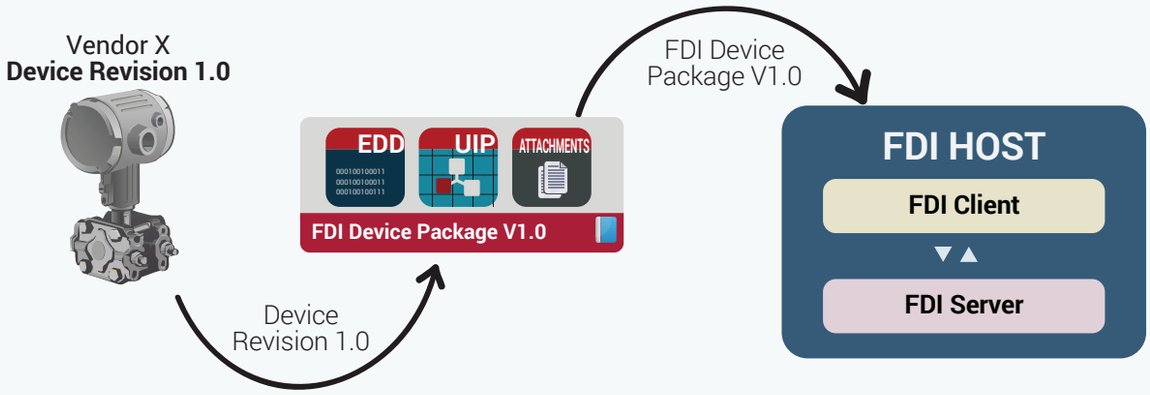
Device replacement made easy

A survey conducted by Control Magazine shows that 46% of "challenges in device integration" arise from "dealing with device drivers and revisions". This is mainly because when the device is replaced with its higher version, most of the legacy hosts will look for the exact device revision in the DD file and this makes the previous version of the DD file completely unusable for the new version of the same device.

With FDI, most of the FDI Hosts support the **automatic FDI Package selection**, which simplifies the device replacement process by the FDI Host logically loading the best-suited FDI Device Package for the device.

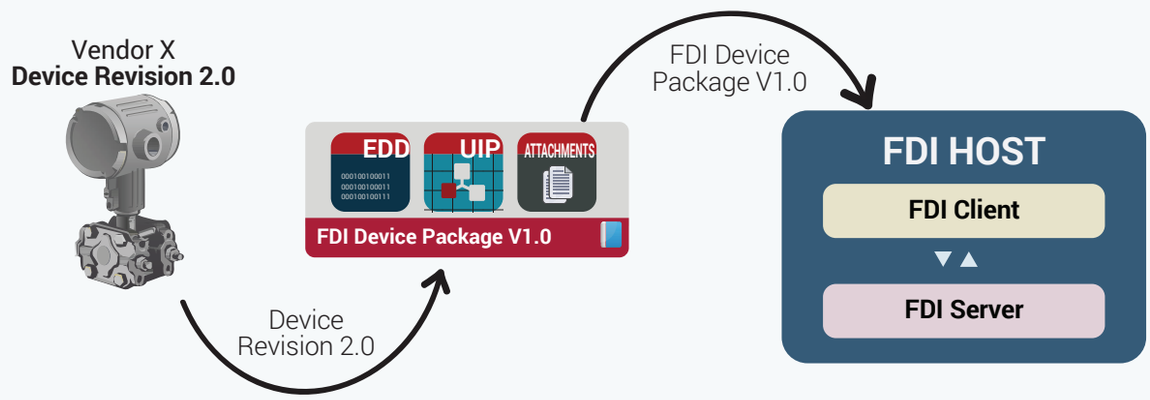
ONE Device - ONE Package - ALL Tools

For example: Vendor X Device Revision 1.0 has the FDI Device Package V1.0 loaded in the FDI Host as shown below.



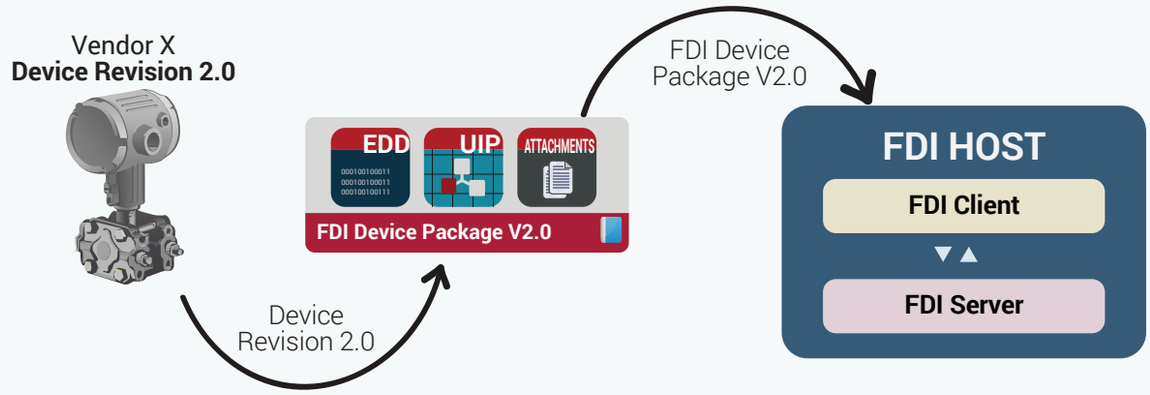
* Device Revision 1.0 has FDI Package V1.0

When this device is replaced with Device Revision 2.0 but a newer version of FDI Package is not available, then FDI Host will still use the existing FDI Device Package V1.0 for Device Revision 2.0 as shown below.



* Device replaced with Device Revision 2.0 still FDI Host uses FDI Package V1.0 for Device Revision 2.0

Now, when the new FDI Device Package V2.0 is made available, FDI Host will use this version to work with Device Revision 2.0.



* FDI Host uses Device Package V2.0 with Device Revision 2.0

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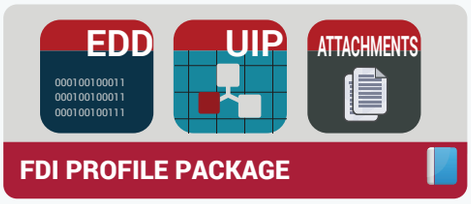
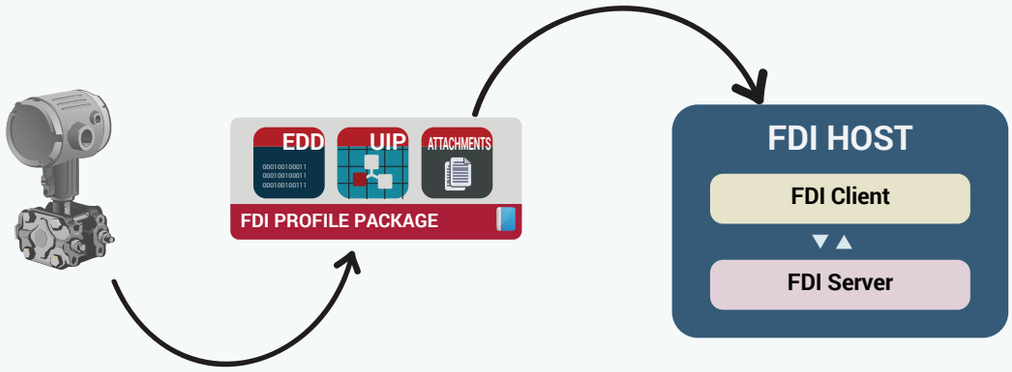
FDI Profile Package supports all device types and variants

FDI Profile Package is similar to an FDI Device Package, however, FDI Profile Package provides information for the family of device variants/types or communication profiles unlike FDI Device Package, which is specific to device type.



FDI Profile Packages only support standard functionalities as defined by the corresponding communication profile. For HART communication profile, it is mandatory for all the HART field devices to support Universal Commands. Hence, HART FDI Profile Package must contain all the information provided by the Universal Commands, which allows it to communicate with any HART field device connected to the network.

During a device replacement procedure as described above, if both FDI Device Package Version 1.0 and 2.0 are not available in the FDI Server, then it loads the FDI Profile Package to support both Device Revision 1.0 and 2.0. If there is a need to access device type specific functionality, beyond the common functionality like Universal Commands, then a specific version of the FDI Device Package is required.



* If no FDI Device Package is available , FDI Server loads FDI Profile Package to support both Device Revision 1.0 and 2.0

FDI Profile Package can be created for any communication profile that provides the common functionality. For instance, PROFIBUS FDI Profile Package would contain all the information provided by physical blocks of the PROFIBUS device.

System maintenance made easy

No system upgrade required for new Device Packages

One of the core requirements defined by NAMUR for FDI is *"All device integration software downloads and installations must be possible without rebooting the DCS. And there must be a uniform download and installation process for a given system".*

FDI technology is designed in such a way that FDI Device Packages are imported and not installed. Hence, it does not manipulate the system registry files and avoids the necessity to reboot the DCS system. This simplifies host system maintenance and allows for live rather than planned updates to system components.

System upgrade does not affect the Device Package

With the fast-changing IT world, it often becomes necessary for the DCS system to be upgraded for security patches, system support and other necessary maintenance. Once the system is upgraded, it is a challenging task to ensure that device integration drivers continue to work properly as most of these depend on the underlying platform and supported software. With FDI, system upgrades do not affect the FDI Device Packages, therefore, saving costs and eliminating risk for the end users.

No license keys

The core of the FDI Device Package is an EDD and no license keys are required for activation of the EDD - a key requirement of NAMUR.

Conclusion

FDI technology makes hassle-free device integration a reality by wrapping all the functionalities necessary for either a simple device like a temperature transmitter, or a complex device like a valve positioner, to integrate into all types of automation host systems. FDI technology provides the simplicity and robustness of EDDL technology as well as flexibility and rich Graphical User Interface capability of FDT/DTM technology. With this simplicity and flexibility, FDI is the natural way forward for device integration in the process automation industry.

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