Article

PLANT LIFE CYCLE MANAGEMENT SEES INCREASED VALUE WHEN A PROJECT STARTS WITH THE END IN MIND

Planning for end goals boosts success rate. Focused strategies improve product selection and simplify industrial commissioning and setup.
(article 1 of a 3 part series)

OVERVIEW

Making automation decisions for new construction, upgrades or even small retrofit projects takes careful planning and a short / long term strategy that combines what is effective for the operation of the plant today and in the future. These decisions impact all phases of the plant's life cycle or specifically the industrial automation life cycle which, in many cases has a shorter life cycle horizon than the other more physical infrastructure elements of the plant.

This article is part 1 of a three part series that will identify the benefits FDT Technology delivers in the first few phases of the life cycle including planning/engineering, installation, commissioning and startup. Part 2 will take an in-depth look at the operational and service/maintenance phase, then part 3 will address device replacement and the on-going services phase of the automation life cycle.

BUSINESS DRIVERS

With industry trends toward smaller work force, information access and delivering "actionable" information throughout the enterprise (via the Internet of Things), the automation industry needs to consider a culture change toward modular or more flexible project engineering and construction techniques. In our information-oriented business culture, the project themes seem to be driving toward faster, smarter and lower cost. With a few work process changes and a focus on the use of the information from your intelligent measurement devices, the earlier phases of a plant life cycle can be dramatically improved by the use of FDT Technology in the form of enabled systems and devices that support the integration of device and process information.

Today's business drivers include; reduced downtime, improved plant reliability, lower operation costs and regulatory compliance in areas such as safety and environmental. Remaining in compliance requires the selection and use of a technology that is host or control system independent, protocol independent and device supplier independent. FDT-enabled solutions meet all of these requirements delivering value in all phases of the plant life cycle in both new (greenfield) and existing (brownfield) applications.

BEGIN WITH THE END IN MIND

Although Stephen Covey referred to this idea as one of his *7 Habits of Highly Effective People*, it applies to many programs and projects we do in the automation industry. When it comes to a plant upgrade, new construction or a simple device replacement, it helps to begin the project with a clear definition of what is expected at the end of the project. When automation decisions are made, considering how the plant will be run, maintained and optimized might provide some guiding practices.

There are many questions to be asked as a project scope is outlined and end is kept in mind. For example, how do we best use intelligent measurement and control devices? With an estimated 80 – 90% of all measurement and control devices shipping today with intelligence, users should start using the full capability of these devices and make effective use of and integrate all the available information that will positively affect your end result. Once we obtain the information from our devices, how will it be used by the different departments or groups in the plant? Who within those groups will use it? The answers to these questions and many more will have a direct impact on many phases of the Plant Life Cycle. FDT Technology is the enabling solution that facilitates device information integration and helps simplify device/system assimilation at all phases of the plant life cycle. Let's take a stroll down the life cycle road to see how.

PLANNING AND ENGINEERING

During the important planning and engineering phase of a project, keeping the end "goal" in mind will help mold a lasting competitive strategy. If the plant is going to be expected to remain competitive for the foreseeable future, decisions on purchase and use of intelligent measurement devices, field protocols, enabled I/O and host systems that can easily integrate the information for the devices need to be made. Including FDT in the requirements documents and specifications is a good way to ensure the right technology is selected.

Here are a few ways FDT Technology provides benefits in the planning/engineering phase of the life cycle:

- Intelligent devices are flexible and forgiving as project specifications and measurement ranges change since many devices can be adjusted to accommodate the changes without replacing the device.
- As the engineering is done, topology overview, network configuration, device tags, measurement parameters and other information can be captured and saved to be used for off-line device configuration and access throughout the enterprise.
- When additional measurements are required, it might be possible to use a secondary or tertiary variable from an existing device for that measurement – eliminating the need for multiple devices. This requires an intelligent or multi-variable device connected by a communication protocol such as FOUNDATION fieldbus, HART, Profibus or others to access the additional variables.
- When an FDT-enabled host system (referred to as a Frame Application in the FDT Specification) is specified and selected (i.e. DCS, PLC, SCADA, safety, asset management, configuration or other applications), it necessitates the selection of field communication protocol and protocol-enabled I/O or some other means of accessing the device information such as smart multiplexers, wireless or remote I/Os.

INSTALLATION

The installation phase of the plant life cycle also benefits from having intelligent devices that are DTM enabled, a communication protocol, an FDT enabled host system or universal stand-alone configuration application. With the planning and engineering done, devices are being delivered to the project site and ready to be installed.

Here's how FDT Technology contributes to the installation phase of the cycle:

- Devices can be ordered with their TAG numbers to make identification of the right device for the right installation.
- As devices are installed, they can be easily checked to make sure the correct measurement ranges are available in the device, multi-variables (if required) are included and the revision level of the device confirmed. This is done with a tablet + app or a notebook running an FDT-enabled device configuration application.
- Devices can also confirm their use in specific applications such as Safety, Ex proof, IS rated, etc.
- Confirm the device includes the specified configuration and if the options selected are working properly. Options such as default/failure mode direction (full scale for example), compensations, digital display, wetted parts material, remote seals, math or multifunction capability, etc.

COMMISSIONING AND CONFIGURATION

Once devices are installed, it's time for the next phase – device commissioning and configuration. This is where the benefits of beginning with the end in mind (sorry, had to say it again) can provide significant benefits.

FDT-enabled applications deliver BIG value during the commissioning/configuration phase in many ways including:

- Device FAT (Factory Acceptance Test) and loop checks are done quickly and efficiently because of remote access to the device. Some of the traditional steps in the FAT may be reduced or even eliminated.
- Even before the device is installed, the configuration can be created and stored in the host application as part of the system database. Many applications provide the capability of configuration without the need to have the device connected – known as off-line device configuration. And, with the trend moving from fixed I/O to more intelligent or configurable I/O, additional project savings and benefits can be realized.
- Device configuration can easily be done by a download from the application database to the device – saving time and money because it uses the configuration in the system. Device diagnostics can be quickly checked and in some cases applications simulations can be evaluated.
- Changes to the measurement range or scale can be done without the need to replace the device or to go out in the construction area to access the device. Remote access also saves time and money and eliminates potential safety issues. Depending on the communication protocol (wired and wireless), late additions or changes to the system and auxiliary measurement and control inputs can be implemented without the need for additional wiring or changes to the I/O. Changes can then be documented providing a permanent record.

STARTUP

If all is done with the (say it with me …) the "end in mind", startup goes well and the plant is up and running. Well, maybe we should expect a few unexpected events!

Let's look at how the startup phase of the life cycle can be improved by using FDT Technology.

- Last minute changes to device ranges, alarm set points and other parameters can be adjusted from the safety of the control room, engineering building or the instrument shop. For example, out of measurement range limits or input scales can quickly be addressed.
- Secondary measurements can be used as a debugging tool to help diagnose measurement or device problems.
- Multi-variable device measurements can provide a quick solution when additional values can be helpful.
- Other useful data includes diagnostics such as: differential measurement, compensated output, offsets, linearization, totalization, body temperature, bad electrodes, plugged impulse lines and many more.

If a device replacement is required, the switchover can be quick and easy since we have gathered this documentation from the beginning of the project. More details on this phase of the lifecycle will be discussed in part 2 of this series.

THE END INFLUENCES THE BEGINNING

There are many trends toward modular or more flexible project engineering and construction techniques. With a few work process changes and a commitment to the use of information from your intelligent measurement devices, the first few phases of the plant life cycle can be dramatically improved by specifying and using FDT Technology in the form of enabled host systems and devices that support / implement the technology. When the expected end of a project includes a predictive maintenance strategy, high plant reliability and the need to remain competitive for many years to come, the beginning requires the selection and use of a technology that is system independent, protocol independent and device supplier independent. FDT–enabled solutions meet all of these requirements. Ask your automation providers for their FDT enabled solutions and don't forget to (you know it's coming) begin with the end in mind!

Reference: Overcoming Automation Challenges, ARC Advisory Group, January 2015