Easy Integration of Foundation Fieldbus (FF) with DCS

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General perceptions on implementation of FF technology in Projects

- **Fieldbus Implementation is too difficult & complex.**
  - No, AG181 system engineering guide is available and it details design, specification, installation, configuration, commissioning of foundation fieldbus based control systems.

- **Highly qualified skills are required in order to configure Foundation fieldbus devices.**
  - No, Automated Engineering Tools & Advanced Features are made available in Control System in order to configure FF devices.

- **Are Foundation devices are interchangeable?**
  - Yes, End users can substitute a registered Foundation device from one manufacturer with that of another manufacturer on the network without the loss of degree of integration.
General perceptions on implementation of FF technology in Projects

- Does FF technology allow traditional centralized control to be located in the DCS?
  - Yes, FF technology provide end users with freedom to control in the control system (CIH) or in the field devices (CIF).

- Is Foundation solution an open technology for all suppliers?
  - Yes, A key tenet of FF is that the protocol is non-proprietary and available to all companies wishing to include it in their product.

- Integration & Commissioning of FF devices take too much time.
  - Using this paper I will share my Foxboro Control System experience, and ease of integrating FF devices.
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- **Supporting Offline Configuration**

  - In Legacy DCS systems, FF device configuration was only possible when device was physically connected.
  
  - Foxboro Evo DCS supports offline configuration.
  
  - Hence it reduces the engineering & commissioning time & efforts.
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- **Templates to Dramatically Reduce Engineering Time**

  - The use of device & control templates allows users to configure control loops once and replicate them many times.

  - Consistency and standardization across the plant and reduce potential for errors in configuration. Changes are required only on master templates.
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- Enhanced Block Support

  - FF specification defines many standard parameters in blocks used for process control. Device vendors & DCS vendors are free to add their own custom parameters and blocks to these standard FF blocks, hence enhancing the features e.g. Bump less initialization etc.

  - Moreover FF blocks like MAI, PIDFF, ISEL blocks are part of present DCS library in order to easily extract FF device values.
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- Bulk Generation of Field Devices
  - Drastically reduces the engineering Time & Efforts
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- **Match Device Wizard**
  - Match wizards automatically match Device configured in DCS Database with Devices Physically connected in Segments.
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- **Bulk Devices/Bulk Segments Commissioning**
  - Prepare wizards push configurations like address, tag, system management parameters into the device.
  - Prepare Utility can be invoked at, I/O level, processor level or multiple processor levels to which FF devices are assigned.
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- **Automatic Macrocycle Validation before deployment**
  - Control Editors calculate the macrocycle schedule for each segment.
  - Deployment of blocks is permitted if the schedule is accomplished within the specified macrocycle period and satisfy the percent free time.
  - Hence system pre-detects engineering errors.
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- **Taking Multiple Devices Online**

  - Multiple Devices can be brought online in one go by selecting “Enable Communications” for multiple devices.
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- Template Cloning in case of upgrading or interchanging device
  - Easy device replacement with different DD version. This feature drastically reduces the re-engineering efforts.
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- Superior Device Management
  - Field Device Manager is innovatively combined with EDD, FDT, Vendor Device Type Manager technologies.
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- Backup LAS Made Easy
  - DCS I/O Card serves as the primary scheduler of the segment, however the user may assign one or several devices to serve as backup active scheduler in the event both sides of a fault tolerant pair of I/O cards have failed.
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- Inbuilt application similar to FDI Tools in order to show FF Device Diagnostics with NAMUR NE 107 compliance on Alarm & Asset Management & Control HMI

- Improved operator efficiency

<table>
<thead>
<tr>
<th>Status signal</th>
<th>Color</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal; valid output signal</td>
<td><img src="image" alt="Green" /></td>
<td><img src="image" alt="Green" /></td>
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<tr>
<td>Maintenance required; still valid output signal</td>
<td><img src="image" alt="Blue" /></td>
<td><img src="image" alt="Maintenance" /></td>
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<tr>
<td>Out of specification; signal out of the specified range</td>
<td><img src="image" alt="Yellow" /></td>
<td><img src="image" alt="Warning" /></td>
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<tr>
<td>Function check; temporary non-valid output signal</td>
<td><img src="image" alt="Orange" /></td>
<td><img src="image" alt="Function Check" /></td>
</tr>
<tr>
<td>Failure; non-valid output signal</td>
<td><img src="image" alt="Red" /></td>
<td><img src="image" alt="Failure" /></td>
</tr>
</tbody>
</table>
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- Device Maintenance using EDD & Vendor DTM’s
  - Recent fieldbus features allows EDD displays to be added at a device level, allowing information presented on one display to come from multiple blocks
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- **FDT Audit Trails**
  - Vendor DTM’s and Field Device Manager are based on FDT standard which defines an optional audit trail interface for tracking of changes.
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• From this paper, we have seen clear connection between innovative technology, consistency in small/large scale implementations, no special skill demand, and applied knowledge which are ultimately responsible for successful adoption of fieldbus technology

  • Reduced Engineering Efforts
  • Faster Device Commissioning
  • Intelligent applications of diagnostics and monitoring technology to benefit operations

• Hence Foundation Fieldbus is easy to integrate with DCS Systems across industries
THANK YOU