

# Process, Power and Marine Division

## SmartPlant Electrical & SmartPlant Instrumentation Integration

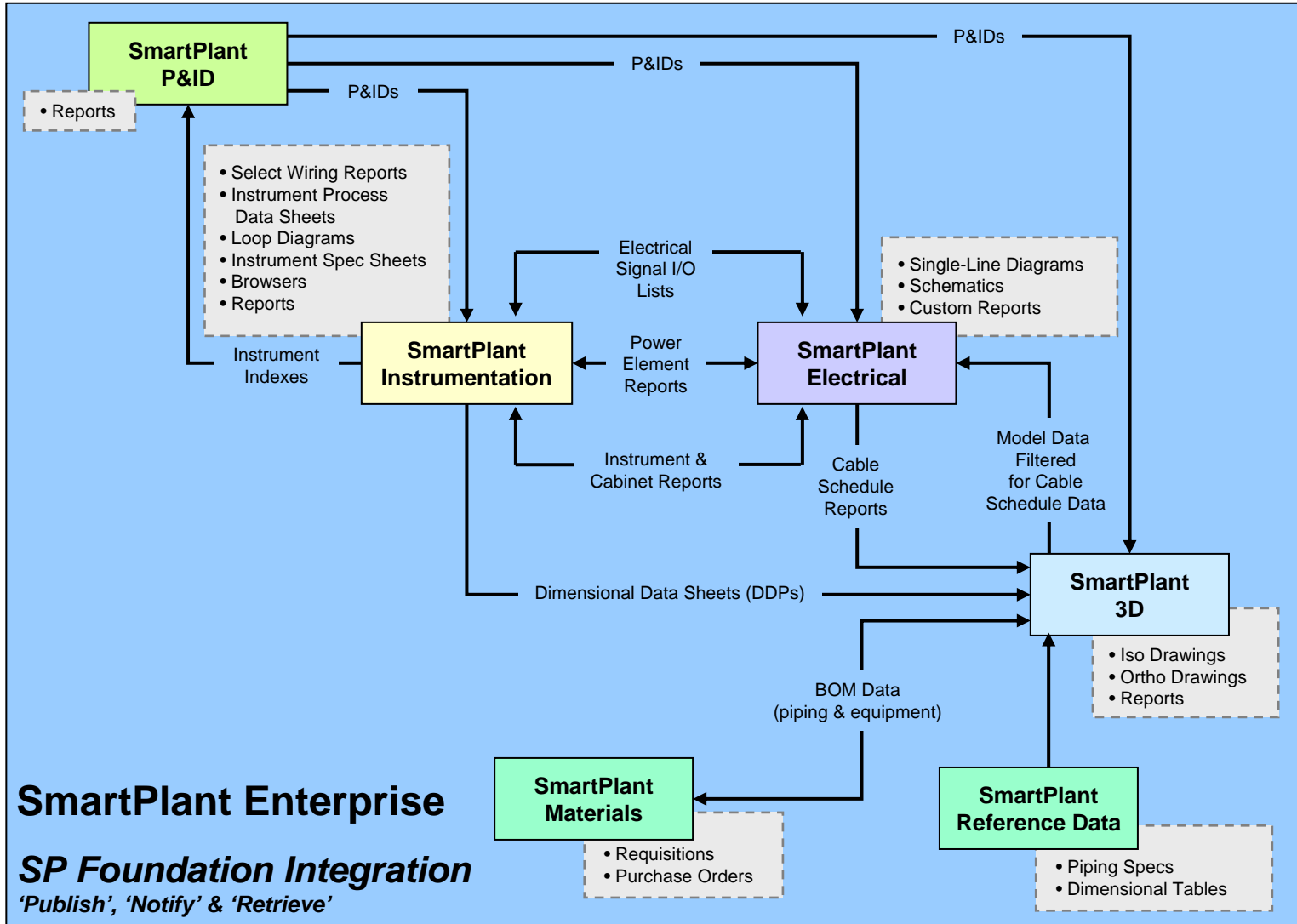


# Integration Opportunities



- **Manually by Engineers**
- **Importing**
  - SPP&ID, SPEL, SPI, and SP3D
- **Point-to-Point**
  - SPP&ID to SPI, SPI to PDS, and SPEL to SPI
- **Basic SP Enterprise Integration**
  - SPP&ID to SPI, SPP&ID to SPEL
  - SPI to SP3D
  - SPEL to SPI, SPEL to SP3D
- **Full SP Enterprise Integration**
  - Publish (& Notify) and Retrieve (& Compare)

- Data Transfer Among Tools (publish and retrieve)
- ▭ Published to SPF Only (no data transfer to other tools)



# Manually by Engineers



- Manual Interface
  - Relies on the expertise of the Engineer
  - Requires:
    - Manual checking of data between disciplines
    - Manual checking of data by each department
  - Very little integrations of departments
    - Islands of technology, very little product integration
    - Duplication of data entry (Process data)
    - Risk of adding errors
  
- Only as good as your engineers
  - Costly due to experience:
    - Good engineers at a premium
    - Shortage of engineers with experience

# Importing



*Everything has its place*

## Advantages

SPI / SPEL Import module - Data take on

- Provides a good means for capturing site data.
- Requires sanitation of data before import.
- Unlikely that all of the data is available on site, particularly for SPEL.

## Disadvantages

With repeated transfer between products:

- Data is likely to be overwritten or destroyed
- Engineers become experts at import and not at engineering.
- Requires constant sanitation of data before Import.
- Requires in-depth knowledge of SPI structure.

# Point-to-Point Integration



## SPPID - SPI

### Advantages

- Open SPP&ID database direct
  - Allows macro expansion
  - Uses set of predefined links

### Disadvantages

- Only one way - to SPI
- Requires in-depth knowledge of SPI structure
- Complicated to set-up and run
- Can overwrite changes when re-run if configured incorrectly
- Requires Instrument Engineers interaction and correction of supplied P&ID data.
- Integrator provides more opportunities to transfer information between SP Enterprise products.

# Point to Point Integration



## SPI – SPEL

### Advantages

- Based on XML file transfer
  - Bi-direction link
  - Uses SmartPlant client technology
  - Allows transfer of Control Signals both ways.
  - Transfers Panel electrical requirements to SPEL

### Disadvantages

- Integrator provides more opportunities to transfer information between enterprise products
- Must be based on Plant / Area / Unit

# Point to Point Integration



## Vendor Interfaces

- Via SmartPlant Client, a series of vendor interfaces are provided using XML transfer.

This requires MSSQL or Oracle version of:

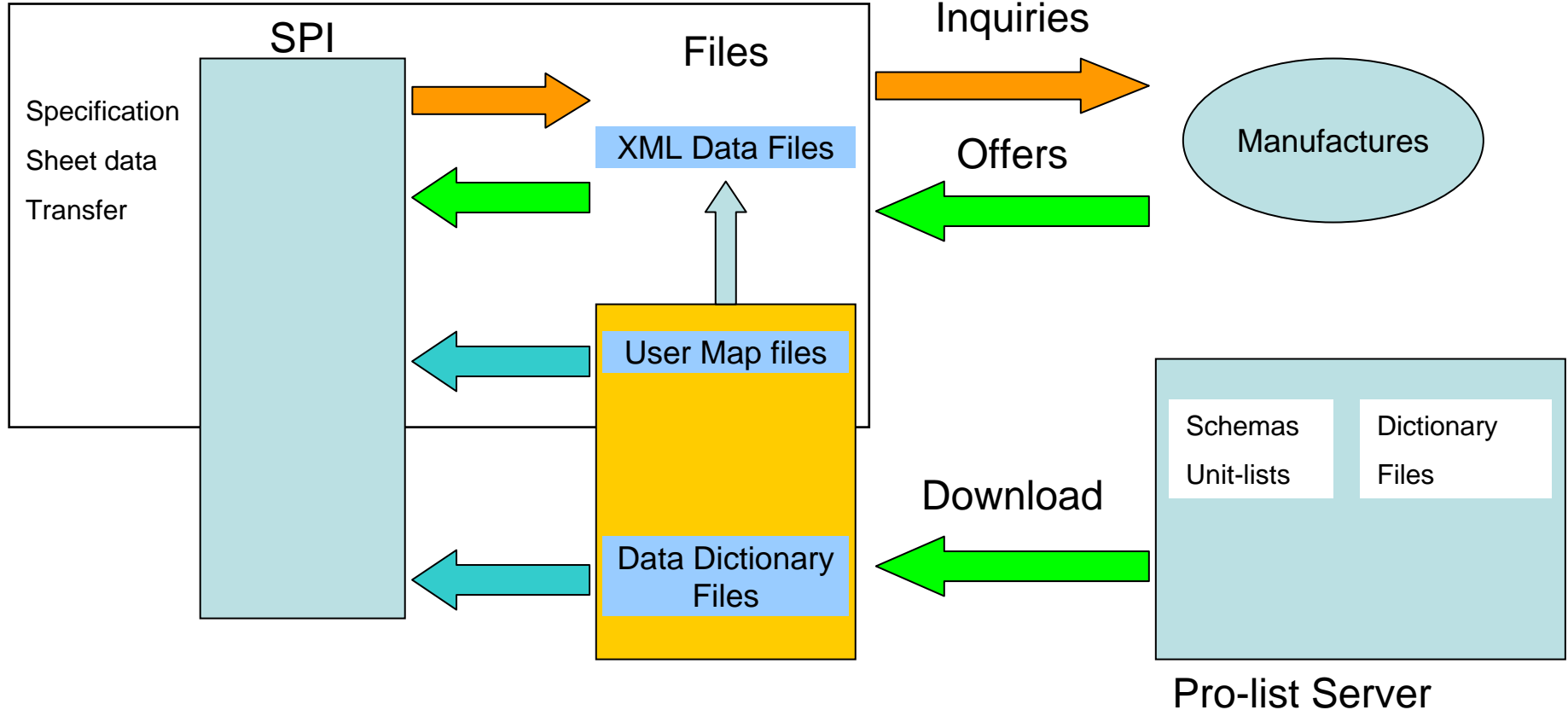
- ABB
  - Yokogawa
  - Honeywell
  - Emerson Delta V
- 
- External Editor / Process Data Editor
    - File transfer of data via exclusive file types.

# Point to Point Integration



European Initiative for instrument transfer  
Support NE-100 (as Described by Namur)

## SPI 2007 Existing Configuration



# SP Enterprise Integration



## Enterprise wide – Basic or Full

### Advantages

- Bi-directional links in most cases
- Uses SmartPlant Foundation data exchange services (included free with all client side applications)
- Similar processes in all products:
  - Publish (& Notify) / Retrieve (& Compare) / To-do lists
- Standard configuration set up based on Plant / Area / Unit
  - **Customisable Plant structure as required**
- Modification of links via mapping files
- Move of SmartPlant Instrumentation, P&ID and Electrical to an Engineering Manager for plant creation

### Disadvantages

- SP Foundation installation required

# Plant Creation and SPI

*The same plant structure is key to integration*



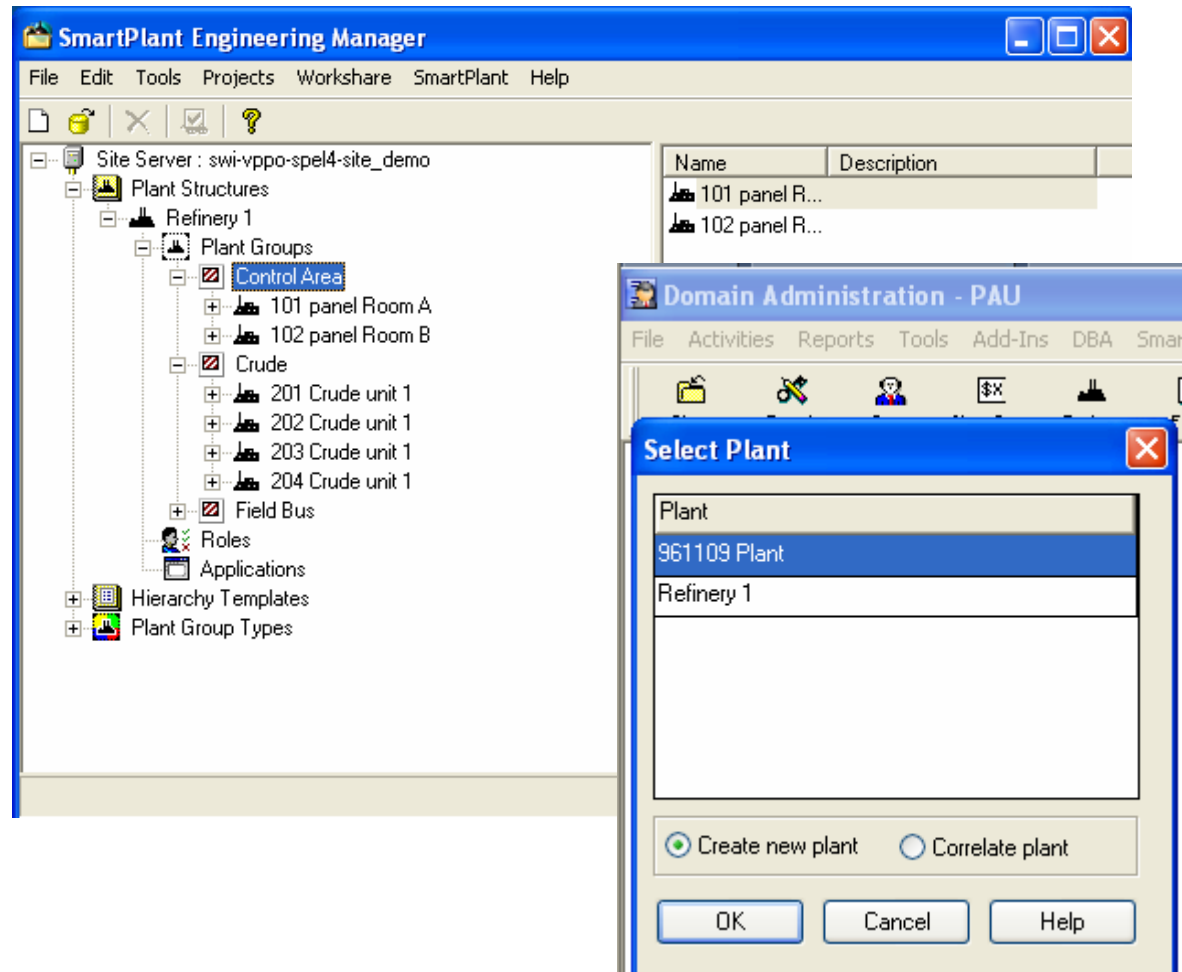
## SmartPlant Engineering Manager 2007

- Can be user to setup SPI domains & plant structure
- Expect to see more movement in this area.

Or

## SP Enterprise Integration

- Provides tools to correlate plant structures



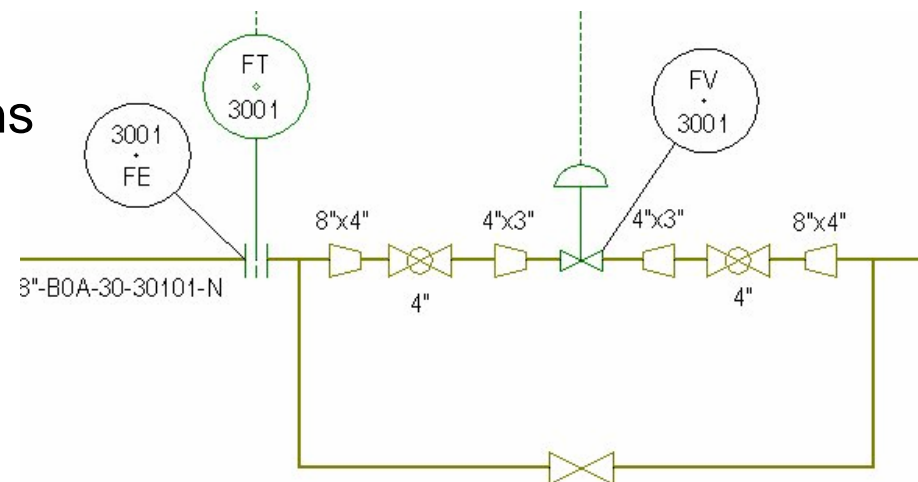
# SPPID / SPI Workflow



## Out of the Box

### SmartPlant P&ID

- Set instrument and loop structure to match SPI
- Place in-line and off-line instruments into lines as required.
  - No macro expansion.
- Publish the SPPID sheet(s)
  - The process maps 42 SPI instrument types based on the symbol
- P&ID Instrument symbols contains
  - Instrument type
  - Instrument description
  - Process function



# SPP&ID / SPI Workflow

*Out of the Box*



## SmartPlant Instrumentation

- Retrieve SPP&ID data
- Review SPI To-do list
  - Select items to retrieve
  - If tag exist, or previously created by a previous retrieve, then data is updated.  
If not new item is created
    - Instruments Instrument type is changed.
    - Line tag data is changed.

*Interface is simple and easy to use*

- See updated current data in SPI instrument index browser.

Task Type	Item Type	Item Tag	Created Date	Created By	Modified Date
✓ Update	Cabinet	PLC-1	1/16/2008 7:10...	Administrator	1/16/2008 7:11...
✓ Update	Cabinet	TESTA	1/16/2008 7:10...	Administrator	1/16/2008 7:11...
✓ Create	Instrument	201-FT -100	1/16/2008 7:10...	Administrator	
✓ Update	Cabinet	PLC-1	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
✓ Create	Cabinet	TESTA	10/31/2007 1:2...	Administrator	
✓ Move	SignalRun	201-DMSP-M12	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
✓ Move	SignalRun	201-DMST-M12	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
✓ Move	SignalRun	201-DMIR-M12	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
✓ Move	SignalRun	201-DMIF-M12	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
✓ Create	SignalRun	201-DMIF-M12/A	10/31/2007 1:2...	Administrator	
✓ Update	SignalRun	201-DMF-M4	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
✓ Create	Cabinet	PLC-1	10/25/2007 2:0...	Administrator	
✓ Update	Cabinet	DCS-ELECTRIC...	10/25/2007 2:0...	Administrator	10/25/2007 2:0...
✓ Move	SignalRun	201-DMSP-M11	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
✓ Move	SignalRun	201-DMST-M11	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
✓ Move	SignalRun	201-DMIR-M11	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
✓ Update	SignalRun	201-DMFAB	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
✓ Update	SignalRun	201-DMF-M4	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
✓ Create	SignalRun	201-DMIF-M11	10/25/2007 1:5...	Administrator	
✓ Create	SignalRun	201-DMFAB	10/25/2007 9:5...	Administrator	
✓ Create	SignalRun	201-DMF/AA	10/25/2007 9:5...	Administrator	
✓ Update	SignalRun	201-DMF-M4	10/25/2007 9:5...	Administrator	10/25/2007 10...
✓ Update	SignalRun	201-DMIR-M4	10/25/2007 9:5...	Administrator	10/25/2007 10...
✓ Move	SignalRun	S-13	10/25/2007 9:5...	Administrator	10/25/2007 10...
✓ Move	SignalRun	201-DMST-M3	10/25/2007 9:5...	Administrator	10/25/2007 10...
✓ Move	SignalRun	201-DMIR-M3	10/25/2007 9:5...	Administrator	10/25/2007 10...
✓ Create	Cabinet	DCS-ELECTRIC...	10/10/2007 3:2...	Administrator	

# SPP&ID / SPI Workflow

*Out of the Box*



## SmartPlant P&ID

- Retrieve SPI data
- Review SPP&ID to-do list
  - Select items to retrieve
  - Instruments
    - Existing published instrument
      - Instruments Tag is changed in-line with SPI
      - Instrument Type is part of the symbol and cannot be changed.
    - New Instrument - created in Engineering Data Editor / Stockpile for later use
    - Existing published line tag changed
      - Information changed as per mapped fields

Task Type	Item Type	Item Tag	Created Date	Created By	Modified Date
Update	Cabinet	PLC-1	1/16/2008 7:10...	Administrator	1/16/2008 7:11...
Update	Cabinet	TESTA	1/16/2008 7:10...	Administrator	1/16/2008 7:11...
Create	Instrument	201-FT -100	1/16/2008 7:10...	Administrator	
Update	Cabinet	PLC-1	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
Create	Cabinet	TESTA	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
Move	SignalRun	201-DMSP-M12	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
Move	SignalRun	201-DMST-M12	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
Move	SignalRun	201-DMR-M12	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
Move	SignalRun	201-DMF-M12	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
Create	SignalRun	201-DMF-M12/A	10/31/2007 1:2...	Administrator	
Update	SignalRun	201-DMF-M4	10/31/2007 1:2...	Administrator	10/31/2007 1:2...
Create	Cabinet	PLC-1	10/25/2007 2:0...	Administrator	
Update	Cabinet	DCS-ELECTRIC...	10/25/2007 2:0...	Administrator	10/25/2007 2:0...
Move	SignalRun	201-DMSP-M11	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
Move	SignalRun	201-DMST-M11	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
Move	SignalRun	201-DMR-M11	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
Update	SignalRun	201-DMFAB	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
Update	SignalRun	201-DMF-M4	10/25/2007 1:5...	Administrator	10/25/2007 1:5...
Create	SignalRun	201-DMF-M11	10/25/2007 1:5...	Administrator	
Create	SignalRun	201-DMFAB	10/25/2007 9:5...	Administrator	
Create	SignalRun	201-DMF/AA	10/25/2007 9:5...	Administrator	
Update	SignalRun	201-DMF-M4	10/25/2007 9:5...	Administrator	10/25/2007 10...
Update	SignalRun	201-DMR-M4	10/25/2007 9:5...	Administrator	10/25/2007 10...
Move	SignalRun	S-13	10/25/2007 9:5...	Administrator	10/25/2007 10...
Move	SignalRun	201-DMST-M3	10/25/2007 9:5...	Administrator	10/25/2007 10...
Move	SignalRun	201-DMR-M3	10/25/2007 9:5...	Administrator	10/25/2007 10...
Create	Cabinet	DCS-ELECTRIC...	10/18/2007 3:2...	Administrator	

*Interface is simple and easy to use*

# SPP&ID / SPI Workflow

## Modified Workflow



### Changing the control to The SPI package

- SPI has approximately 150 Instrument types
- P&ID operator not expect to understand instrumentation
  - Maintain limited number of symbols for operator to use
  - Reduce risk of built in errors
- Re-map P&ID instrument type fields to instrument UDF's.

### Publish and Retrieve

- Does not set or change the instrument type
- Uses the Browser options to set the instrument type
- Use the instrument index options to updated instruments
- Must ensure the instrument tags match.

### Work flow is now optional

- P&ID to Instrumentation
- P&ID at the same time as Instrumentation
- Instrumentation prior to P&ID

Browser View - New Tag Number [ Filtered ]

Tag Number	Instrument Type Desc	Instrument Type	Process
201-FS -2213	DCS INDICATION	AI	Genera
203-FE -900	D/P TYPE FLOW ELEMENT	FE	Flow
203-FE -905	D/P TYPE FLOW ELEMENT	FE	Flow
203-FE -906	D/P TYPE FLOW ELEMENT	FE	Flow
203-FE -907	FAH HIGH-FLOW ALARM		Flow
203-FE -908	FAL LOW-FLOW ALARM		Flow
FE -24506-CAD_L2	FC FLOW CONTROLLER		Flow
FE -24506-CAD_L3	FE D/P TYPE FLOW ELEMENT		Flow
FE -24503-WJB001	FE D/P TYPE FLOW ELEMENT		Flow
201-FE -100	FE FLOW ELEMENT		Flow
202-FE -201	FE FLOW ELEMENT		Flow

Tag Number	Service	Instrument Type	Process Function Type	IO Type Name
201-PI -100	Heat Exchange	PI	Pressure	
201-PI	Tag Number Activities	PI	Pressure	
201-PI	Loop Number Activities	PI	Pressure	
201-FE		FE	Flow	
201-FT	Open Supporting Table...	FT	Flow	AI
201-FV		FV	Control Valve	
201-FY	Count Records...	FY	Control Valve	Δ0
201-FE	Apply Profile			
201-FT	Generate Process Data Sheet			
201-FE				
201-FT	Maintenance			

Apply All Profile Options

Generate Specification Sheet

Create Control System Tag

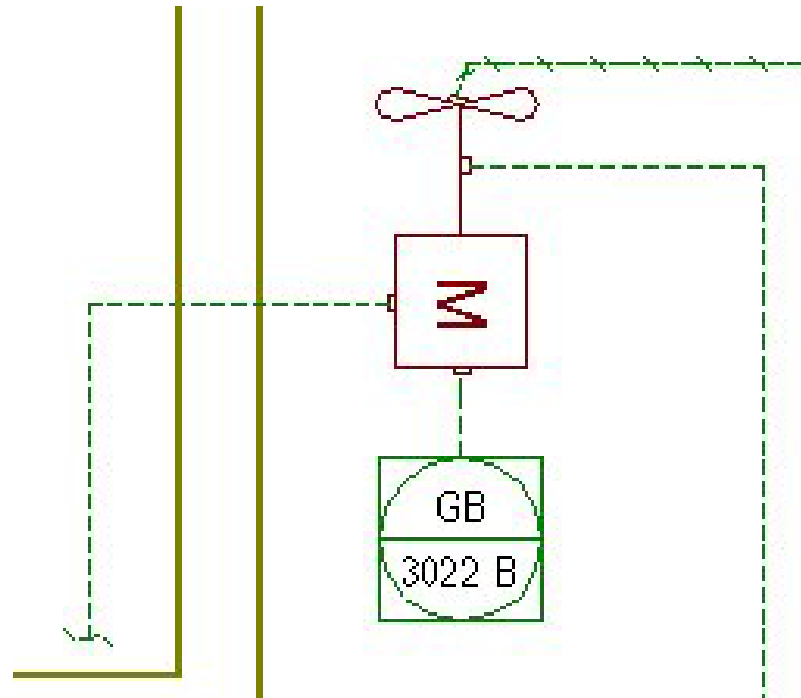
Create Device Panel and Cable

# SPP&ID / SPEL

## *SPP&ID requirements*



For P&ID to transfer motor information,  
the SPP&ID must contain Motor symbols attached to the Pumps, etc.



# Process, Power & Marine Division



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