



HYDROCARBON PROCESSING*

IRPC 2012

MILAN, ITALY | 12-14 JUNE

Event Host Sponsor:



Gold Sponsor:



www.HPIRPC.com

Integrated Power Automation

- Executive Summary
 - A presentation to highlight the benefits of fully integrating power automation together with process and safety automation solutions
 - What do we mean by Integrated Power Automation?
 - What are the benefits?

What is Integrated Power Automation

- **Integrated Power Automation** in the context of this presentation is the integration of **Power Automation** with **Process** and **Safety Automation** into one system



Process Automation

Process Instrumentation

Measurement and control of pressure, temperature, flow...

Process Electrification

Monitoring and control of motors, pumps, fans...



Power Automation

Substation Automation

Protection, monitoring and control of generators, transformers, switchgear...

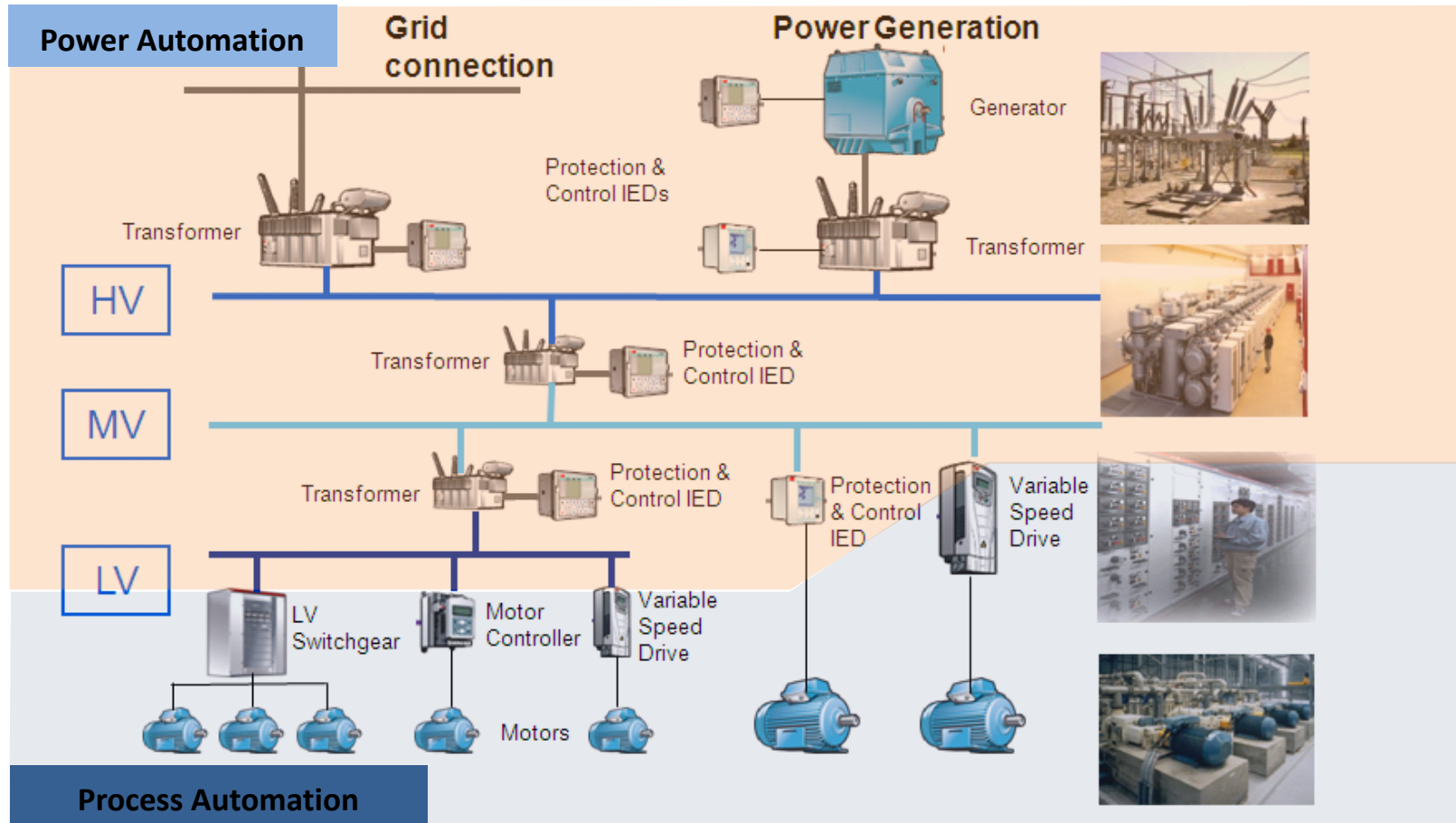


Power Management

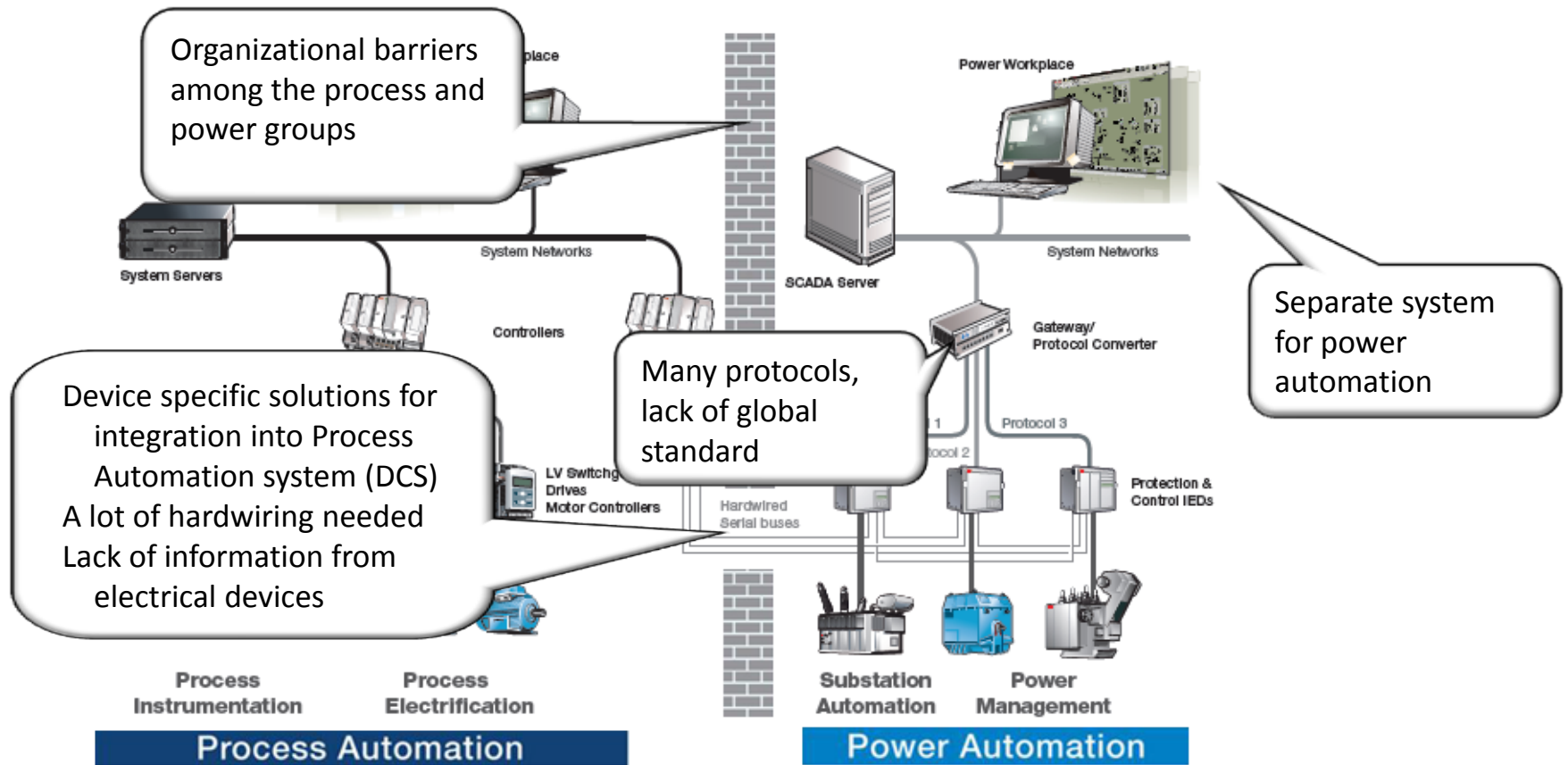
Advanced control of power distribution



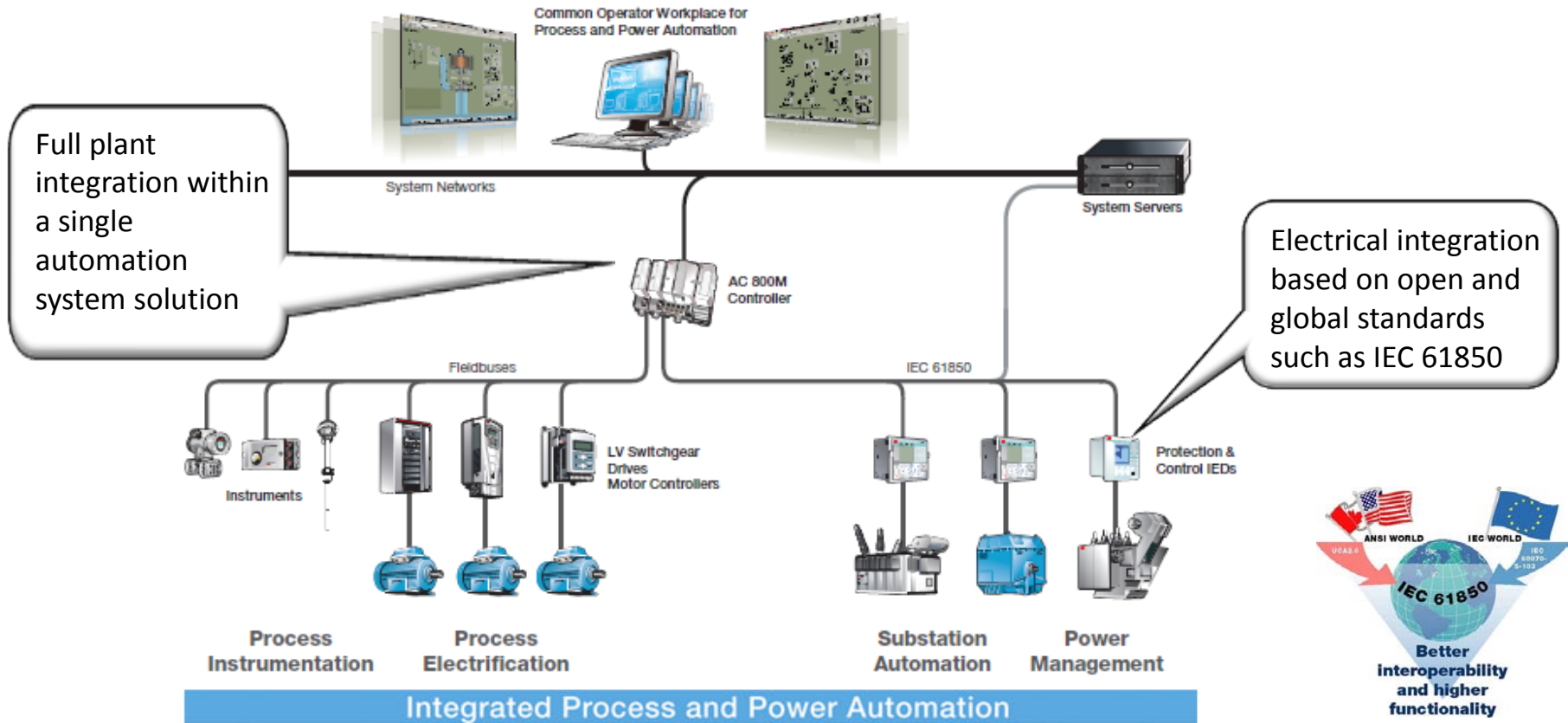
What is Integrated Power Automation



The Traditional Approach



The Integrated Approach



The IEC 61850 Standard

- Global standard for substation automation systems
 - Provides interoperability between Protection & Control IEDs (Intelligent Electronic Devices)
 - Open and flexible standard for future extensions
 - Future proof by choice of Ethernet based communication for cost effective, fast and reliable data transmission

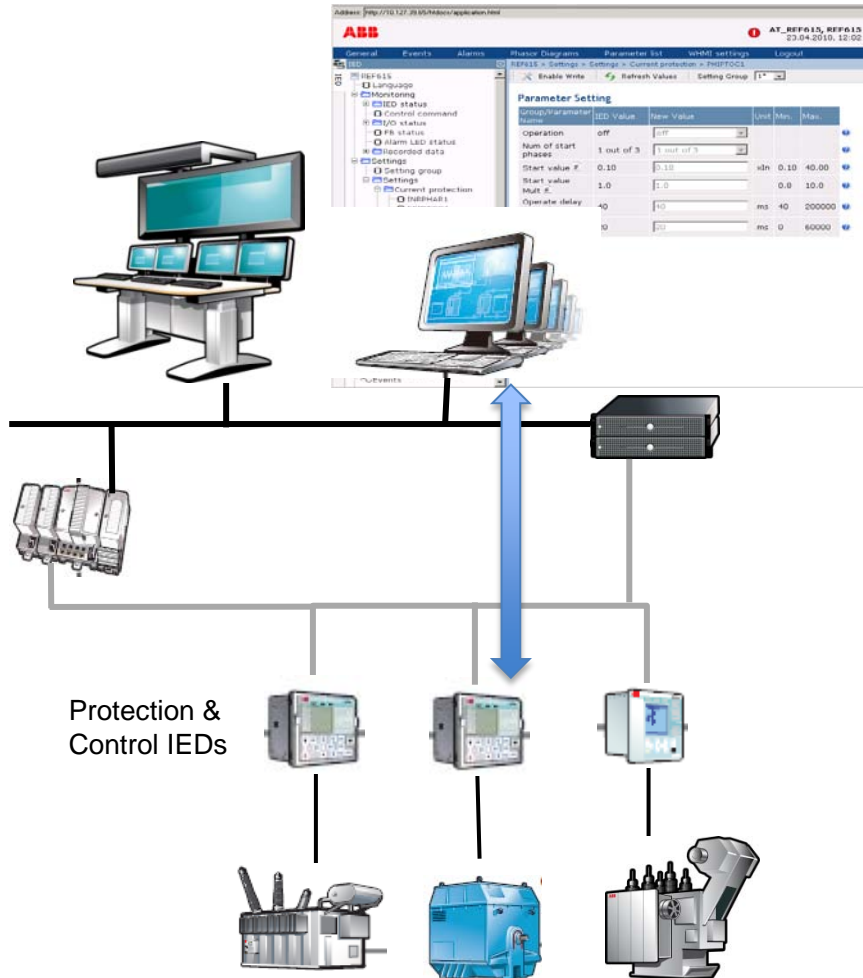


The IEC 61850 Standard

- Global standard for substation automation systems
 - Essentially does for Power Automation what Foundation Fieldbus does for Process Control



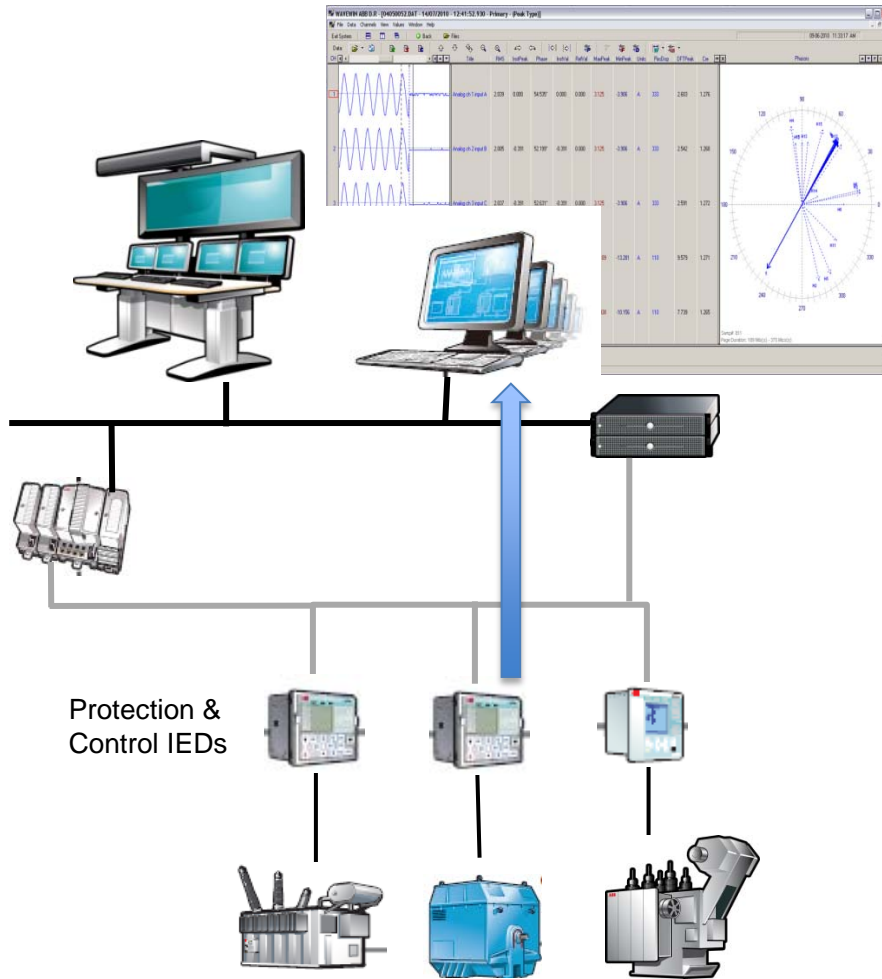
The IEC 61850 Standard



Vertical communication provides potential for access to relay parameters (configuration)



The IEC 61850 Standard

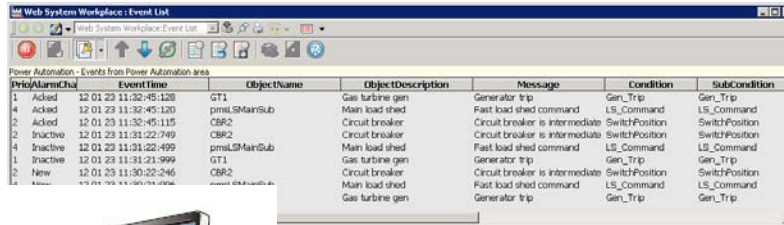


Vertical communication provides potential for access to extensive diagnostic data such as transient fault disturbance data

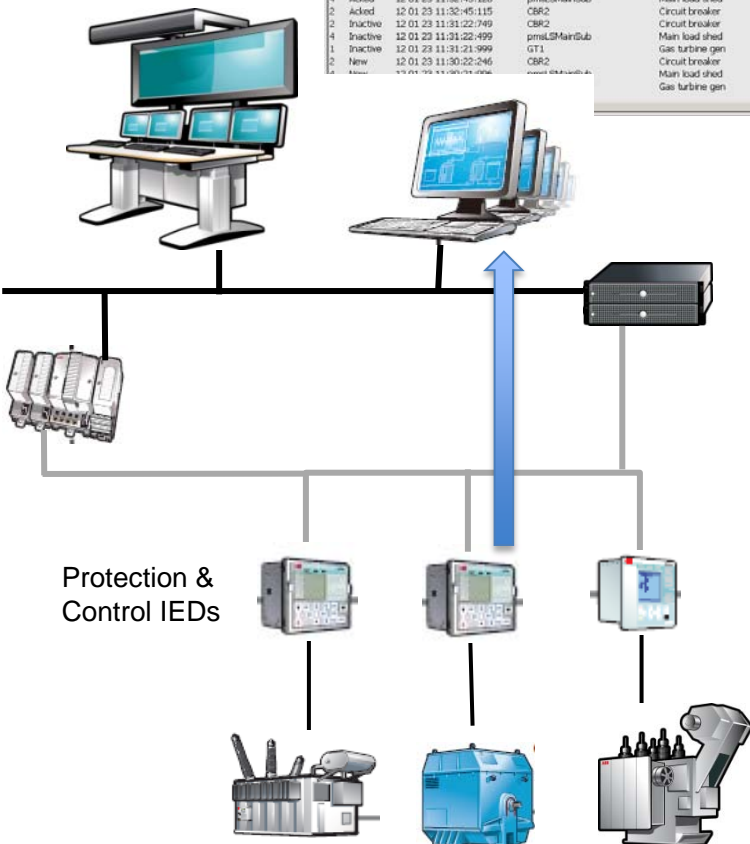
Potential for single power, process and safety asset management



The IEC 61850 Standard



Priority/Alarm/Chk	Event Time	Object Name	Object Description	Message	Condition	SubCondition
1	Acked 12 01 23 11:32:45-120	GT1	Gas turbine gen	Generator trip	Gen_Trip	Gen_Trip
4	Acked 12 01 23 11:32:45-120	pm1LSMainSub	Main load shed	Fast load shed command	LS_Command	LS_Command
2	Acked 12 01 23 11:32:45-115	CBR2	Circuit breaker	Circuit breaker is intermediate	SwitchPosition	SwitchPosition
2	Inactive 12 01 23 11:31:22:749	CBR2	Circuit breaker	Circuit breaker is intermediate	SwitchPosition	SwitchPosition
4	Inactive 12 01 23 11:31:22:499	pm1LSMainSub	Main load shed	Fast load shed command	LS_Command	LS_Command
1	Inactive 12 01 23 11:31:21:999	GT1	Gas turbine gen	Generator trip	Gen_Trip	Gen_Trip
2	New 12 01 23 11:30:22:246	CBR2	Circuit breaker	Circuit breaker is intermediate	SwitchPosition	SwitchPosition
2	New 12 01 23 11:30:22:246	CBR2	Main load shed	Fast load shed command	LS_Command	LS_Command
2	New 12 01 23 11:30:22:246	GT1	Gas turbine gen	Generator trip	Gen_Trip	Gen_Trip



Vertical communication provides potential for access to time stamped alarm & events to 1ms

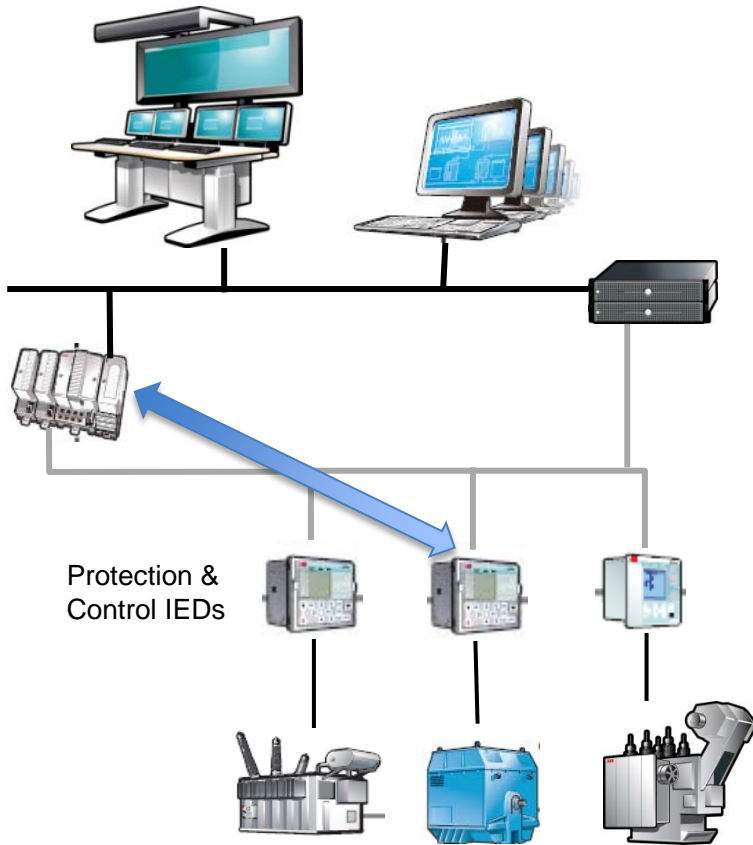
Power, process and safety automation alarms to appear in one single summary list to aid root/cause analysis



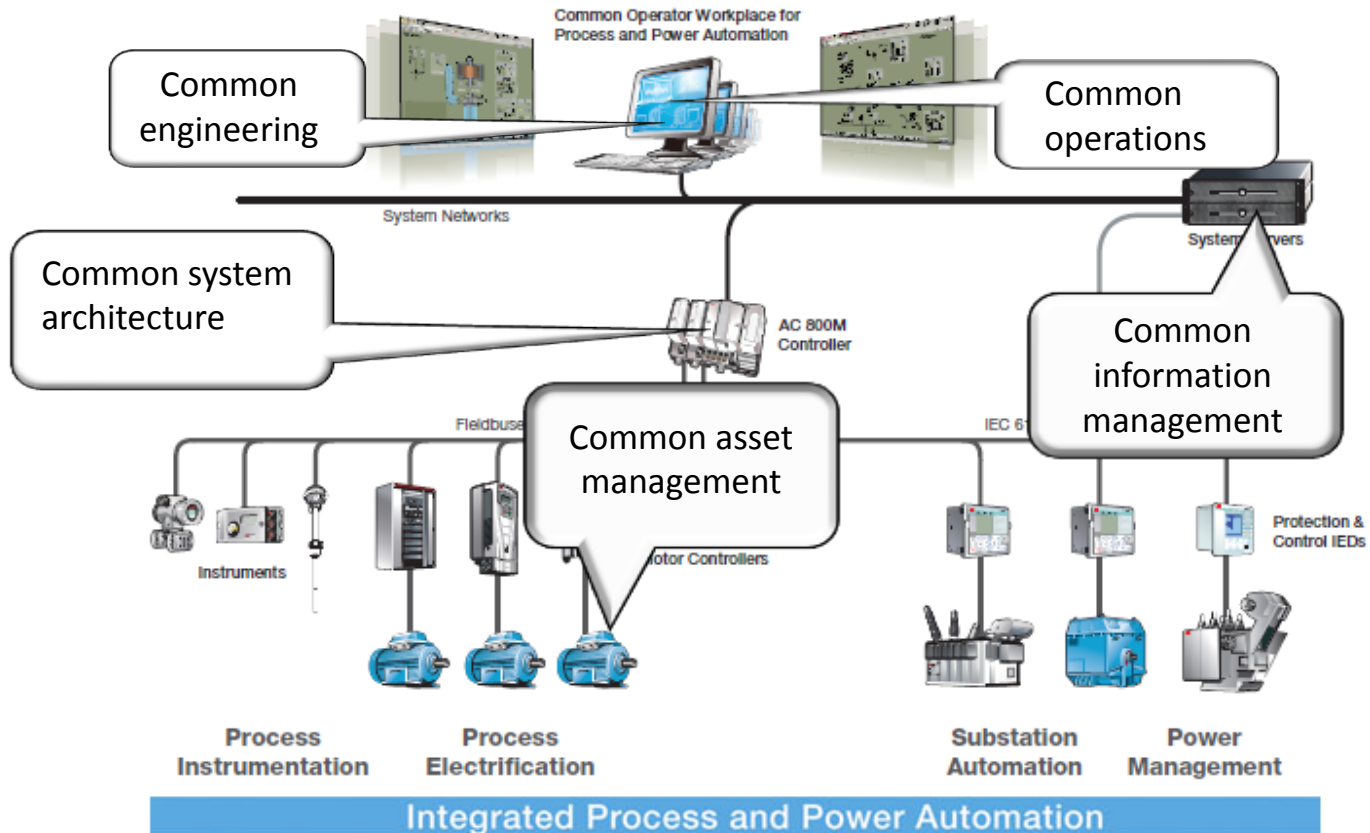
The IEC 61850 Standard

Horizontal (GOOSE) communication provides potential for fast (<4ms) peer-to-peer communications

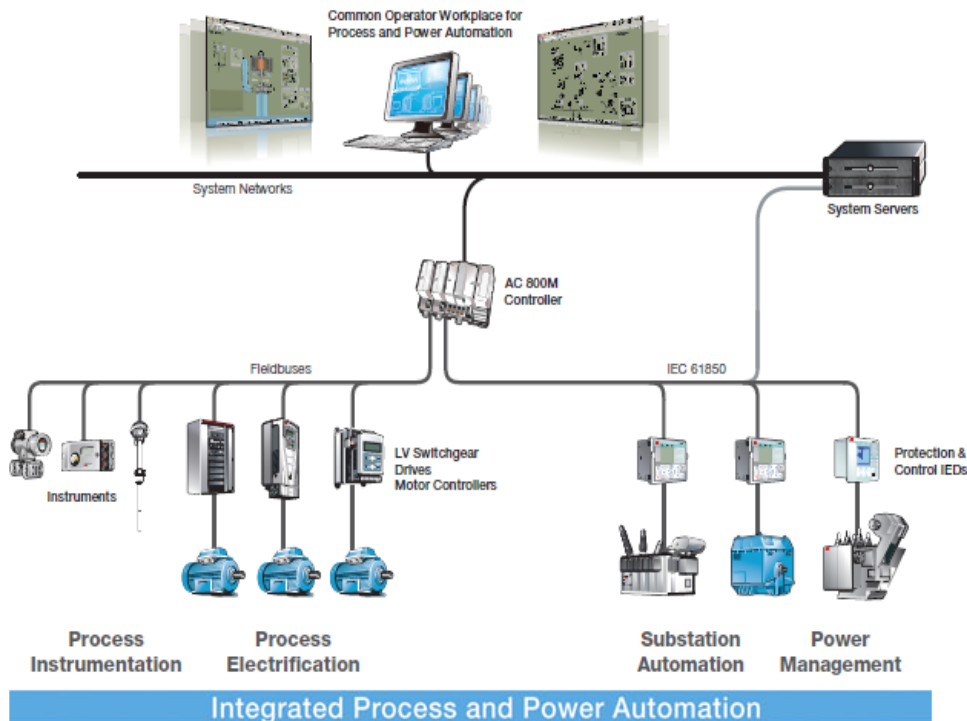
Potential for software based protection and interlocking schemes and/or digital communication of load shed commands in power management applications



The Integrated Approach



What are the Benefits?

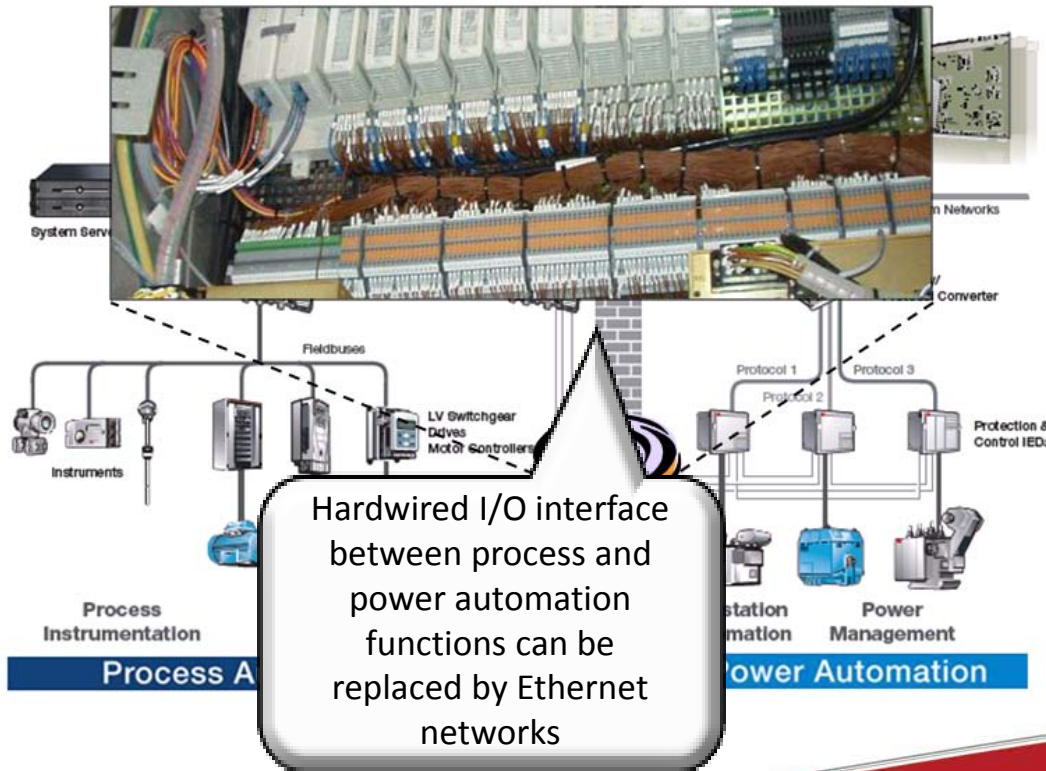


- ✓ Reduced system foot print with single solution
- ✓ Reduced wiring with Ethernet based protocols
- ✓ Common spare parts
- ✓ Reduced project delivery time

***Reduced
Investment
Cost***

What are the Benefits?

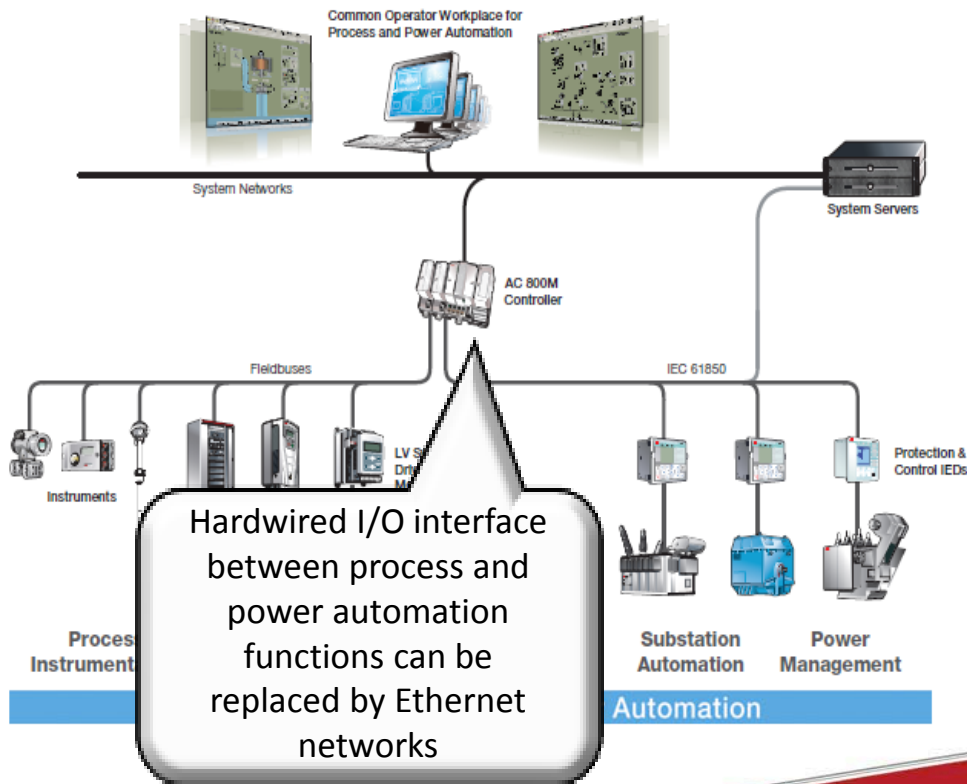
- Reduced wiring with Ethernet based protocols...



**Reduced
Investment
Cost**

What are the Benefits?

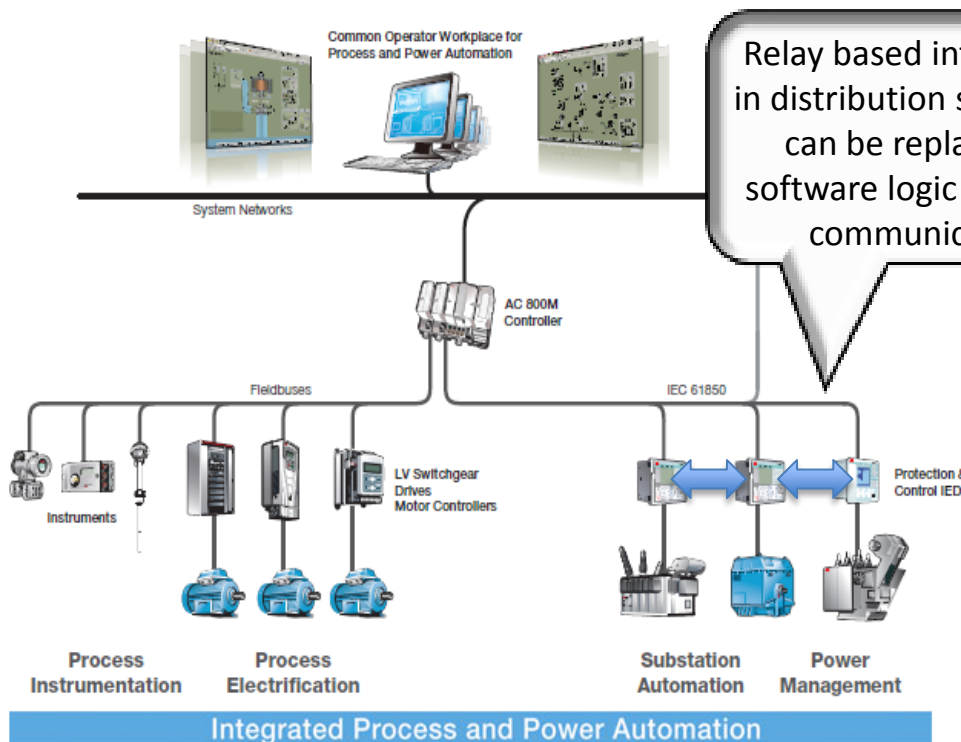
- Reduced wiring with Ethernet based protocols...



**Reduced
Investment
Cost**

What are the Benefits?

- Reduced wiring with Ethernet based protocols...

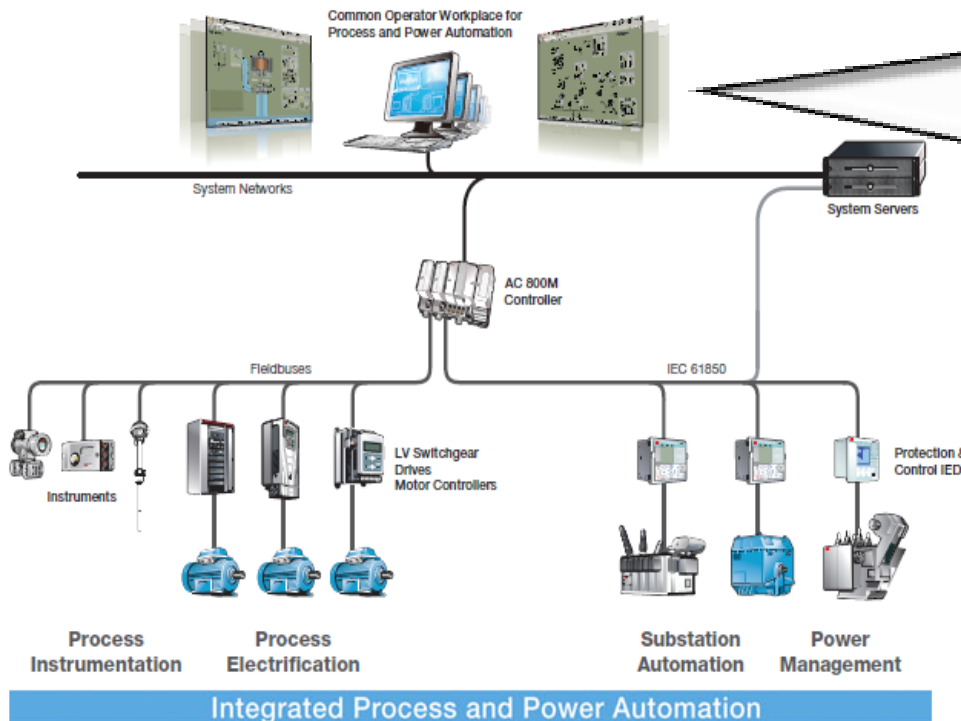


Relay based interlocking in distribution switchgear can be replaced by software logic & GOOSE communication

**Reduced
Investment
Cost**

What are the Benefits?

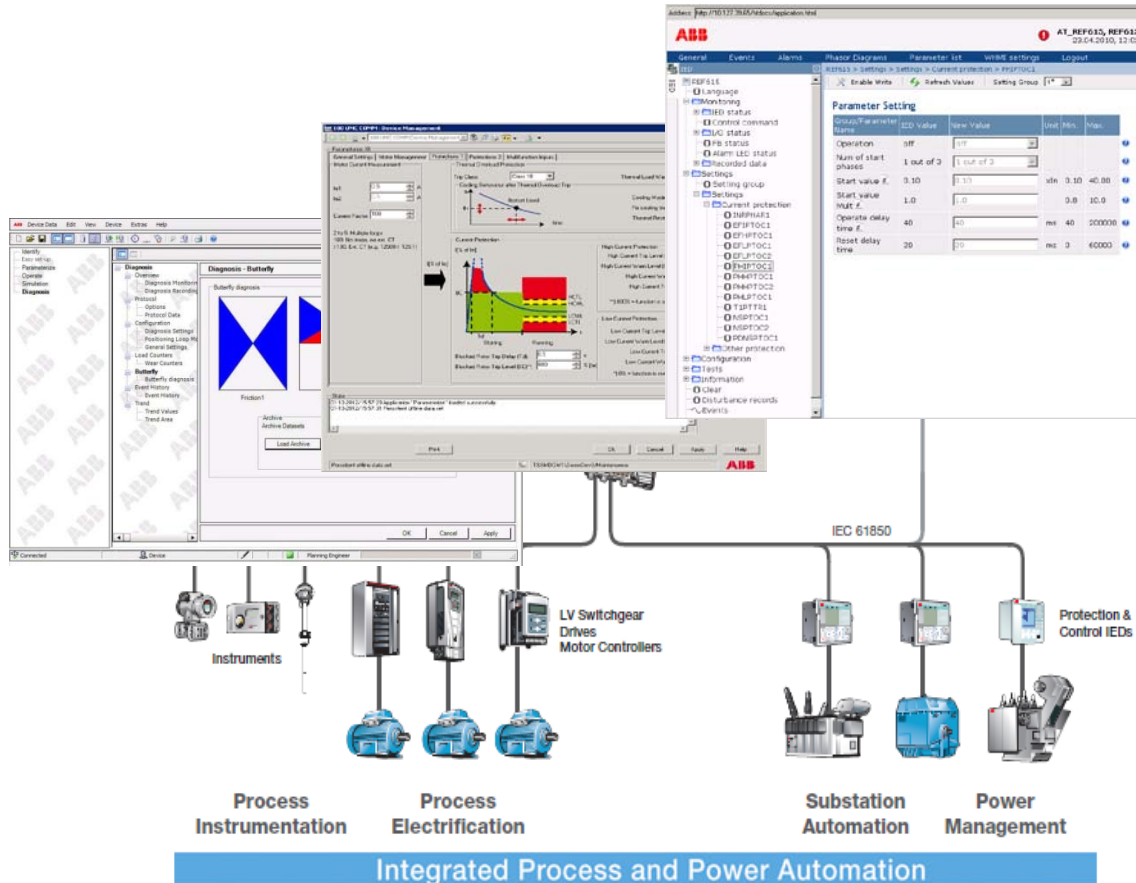
- Reduced project risk and contingencies



Reduced project risk and contingencies can be gained by procuring from one automation Vendor with a complete product portfolio, experience and know how in both power and automation including safety automation

**Reduced
Investment
Cost**

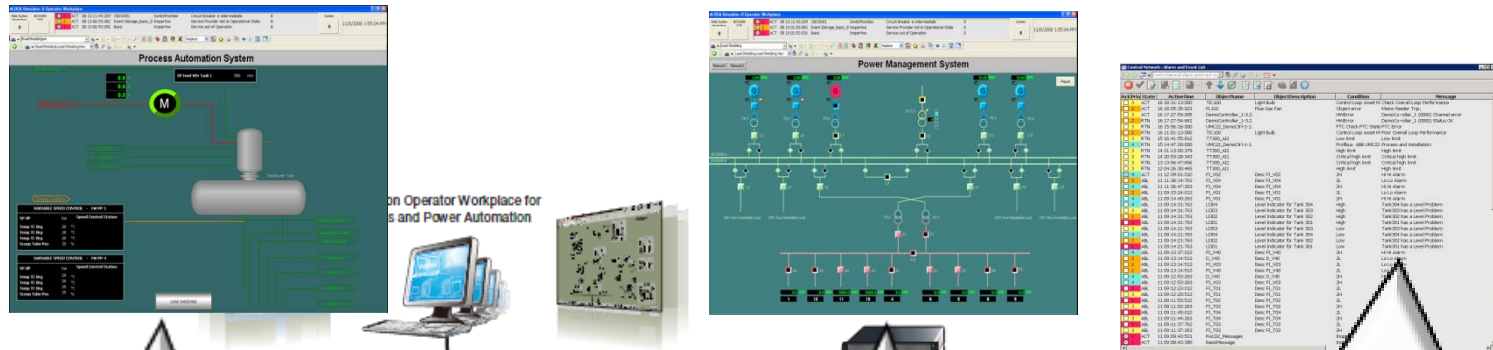
What are the Benefits?



- ✓ One single engineering view of all integrated devices
- ✓ Reduce time for configuration and commissioning
- ✓ Detailed diagnostics available at any time

**Reduced
Investment
Costs**

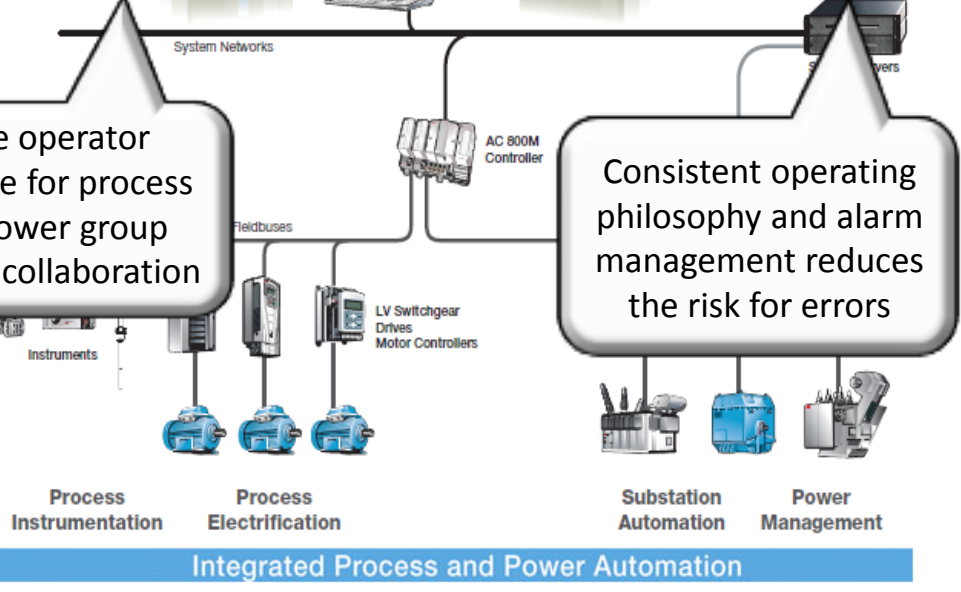
What are the Benefits?



Same operator interface for process and power group enables collaboration

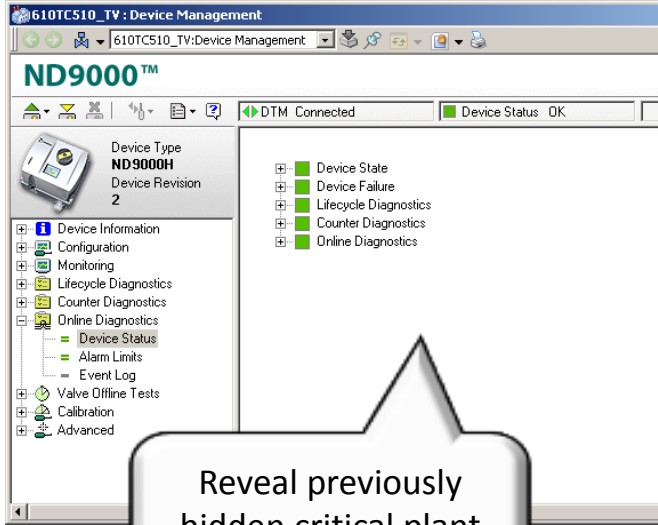
Consistent operating philosophy and alarm management reduces the risk for errors

Common access point for both process and power data provides faster error analysis

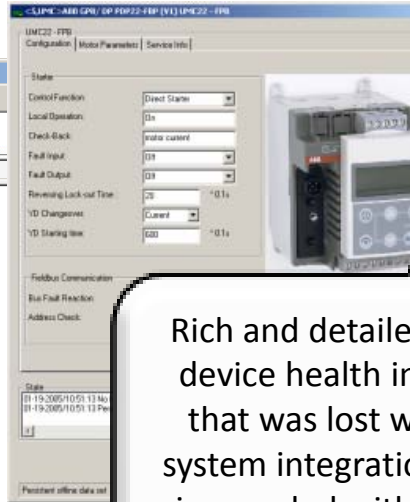


Improved Operator Effectiveness

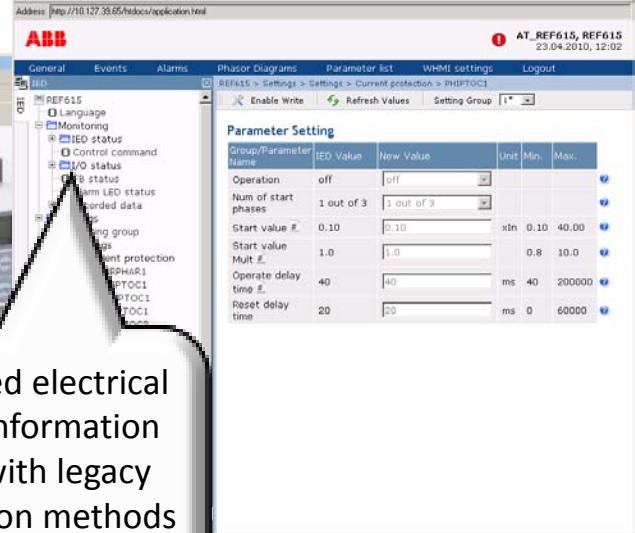
What are the Benefits?



Reveal previously hidden critical plant equipment status

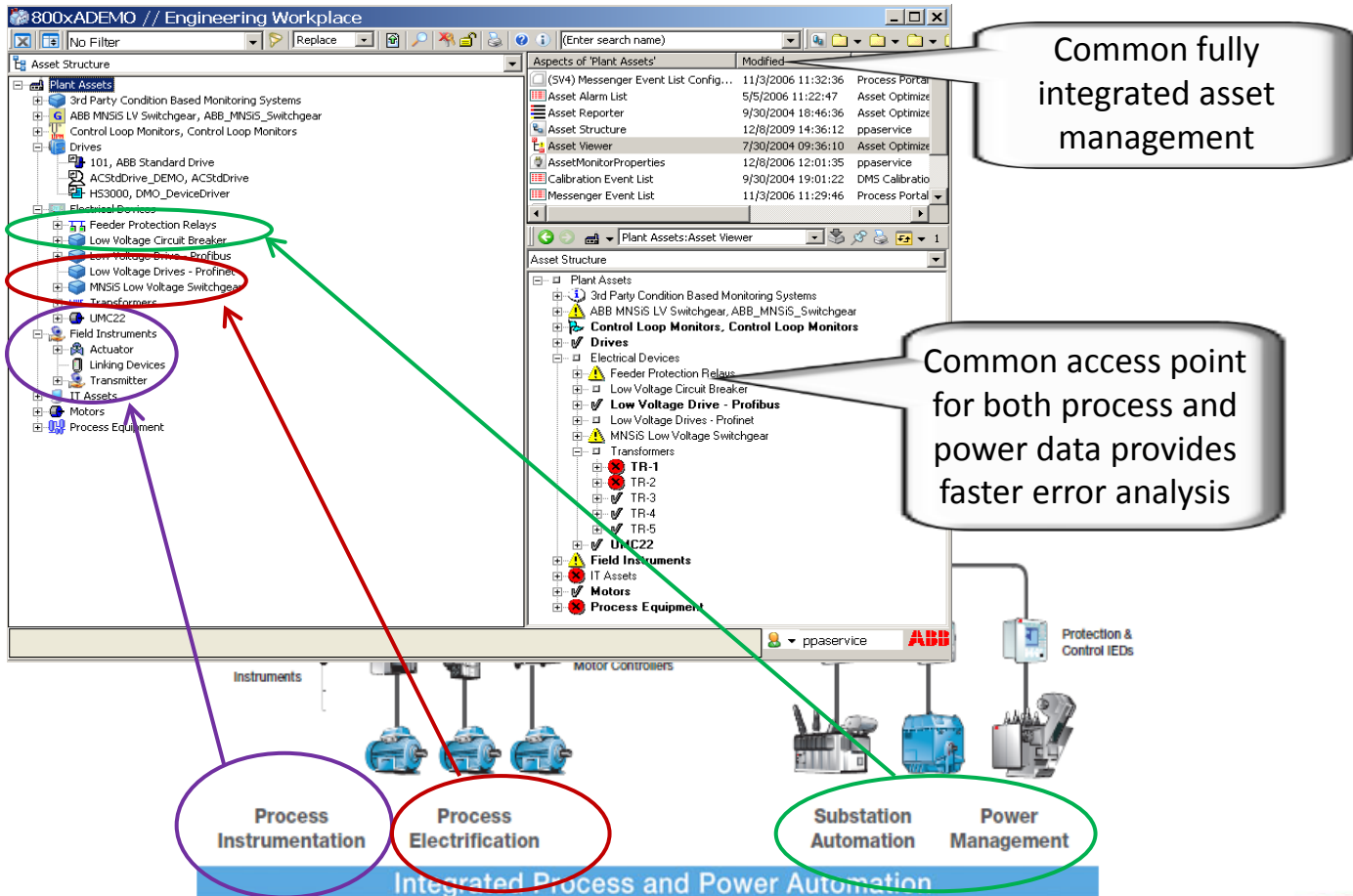


Rich and detailed electrical device health information that was lost with legacy system integration methods is revealed with IEC 61850



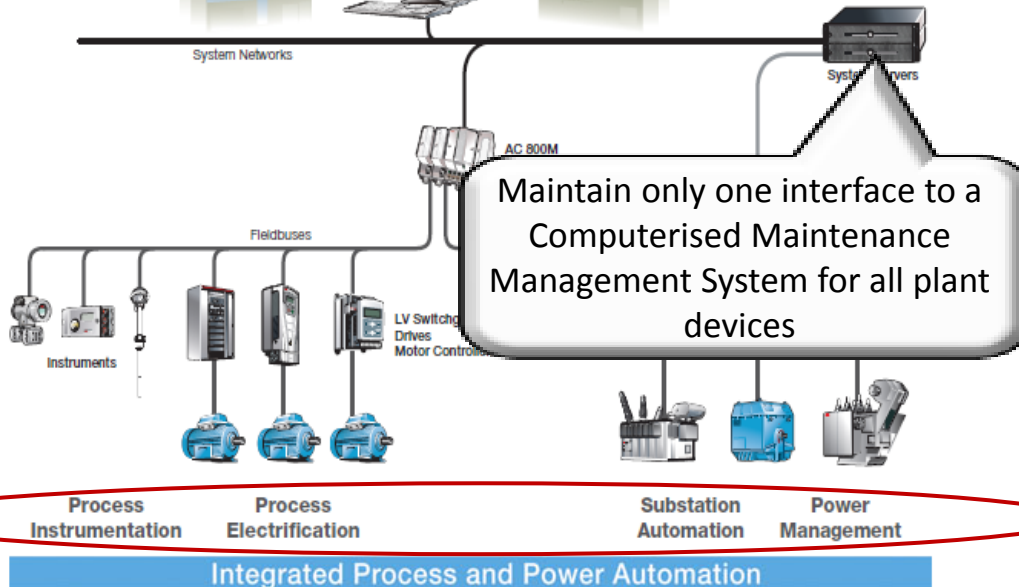
Reduced Maintenance Costs

What are the Benefits?



**Reduced
Maintenance
Costs**

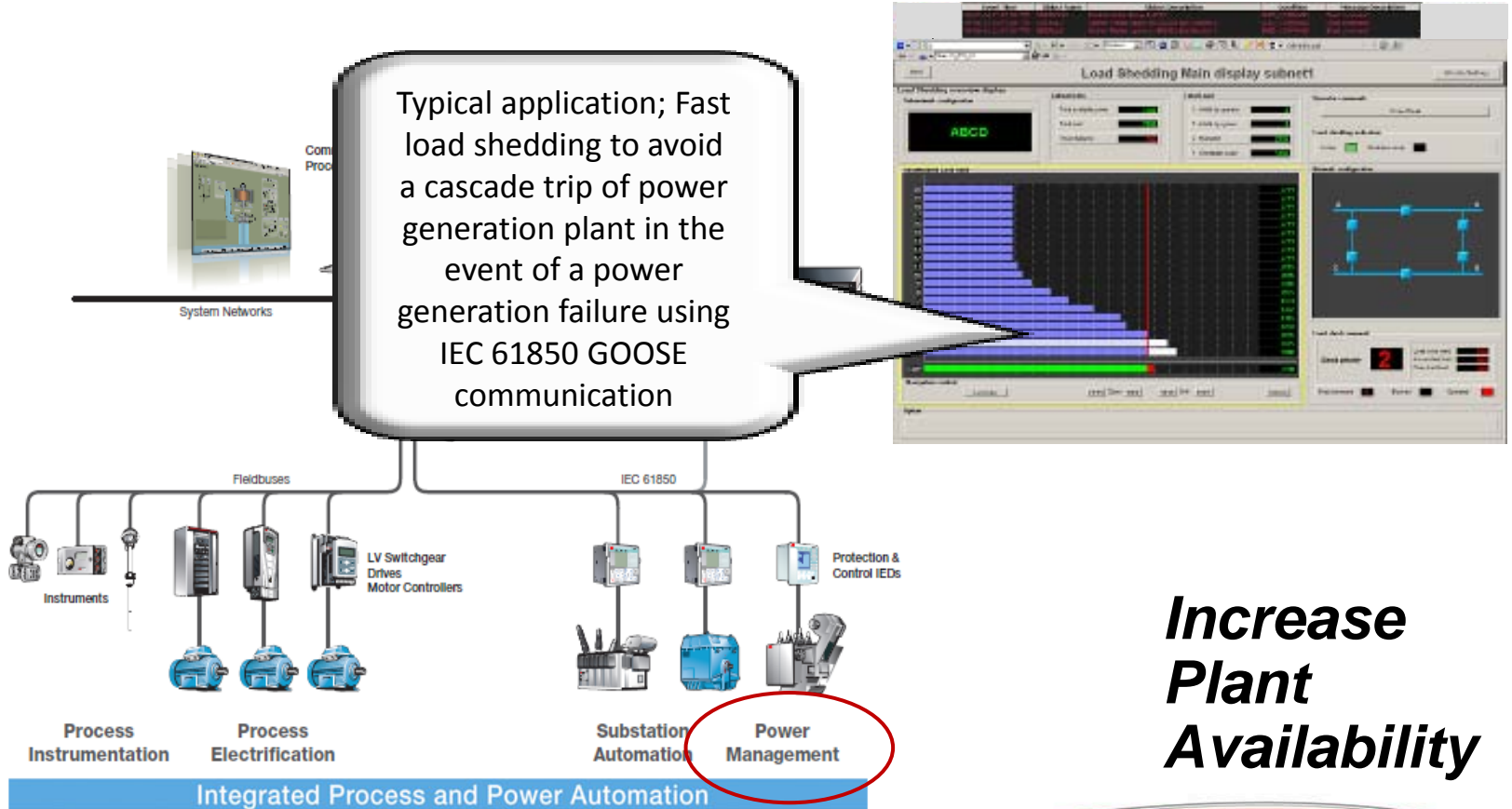
What are the Benefits?



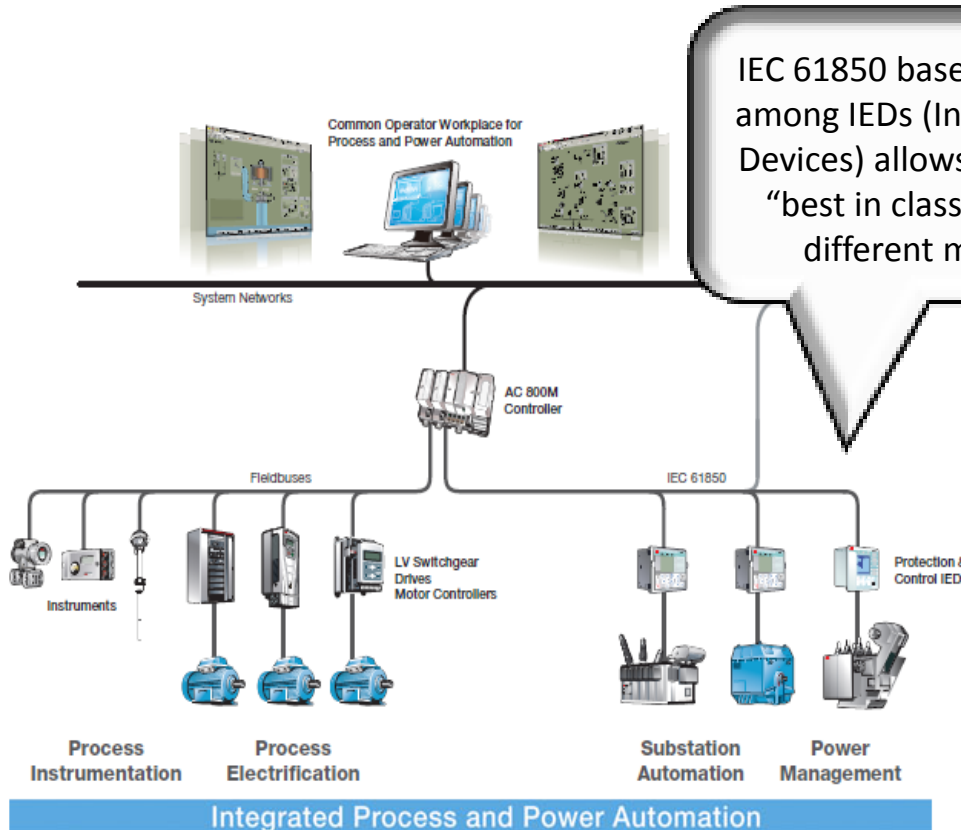
**Reduced
Maintenance
Costs**



What are the Benefits?



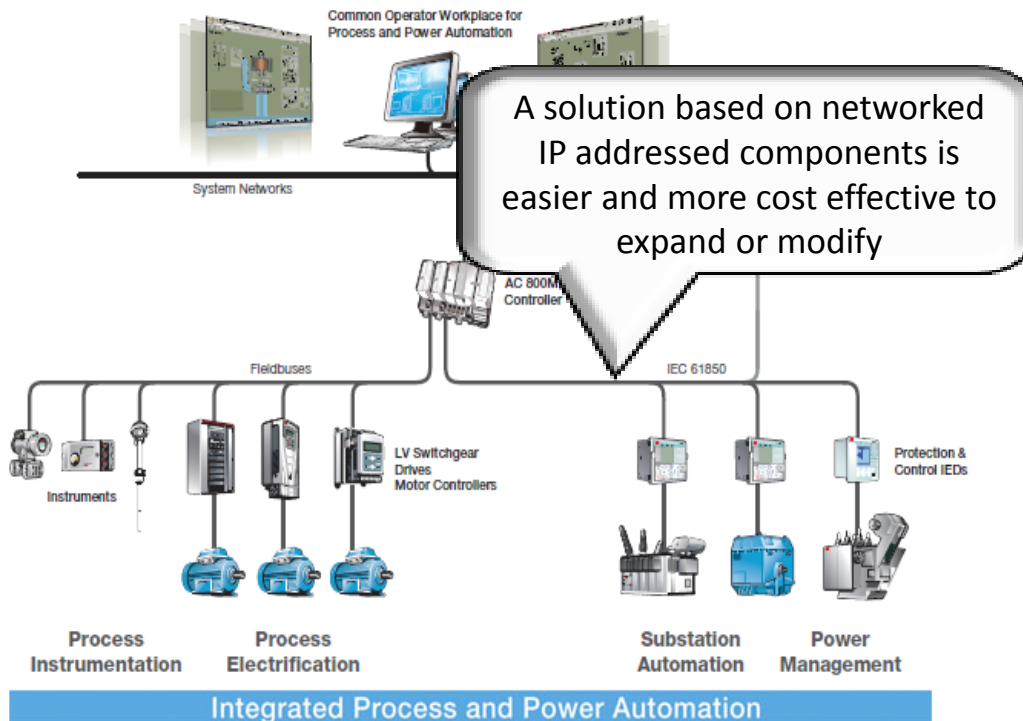
What are the Benefits?



IEC 61850 based interoperability among IEDs (Intelligent Electrical Devices) allows end-users to use “best in class” products from different manufacturers

Achieve “Best in Class” Solutions

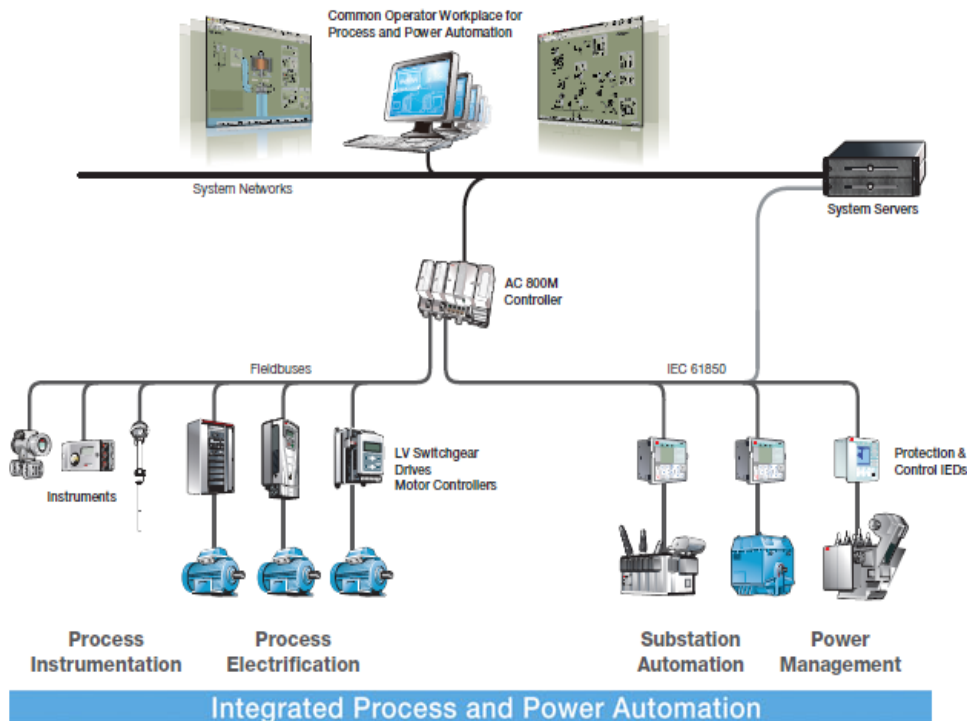
What are the Benefits?



***Lower Improvement
& Expansion Costs***

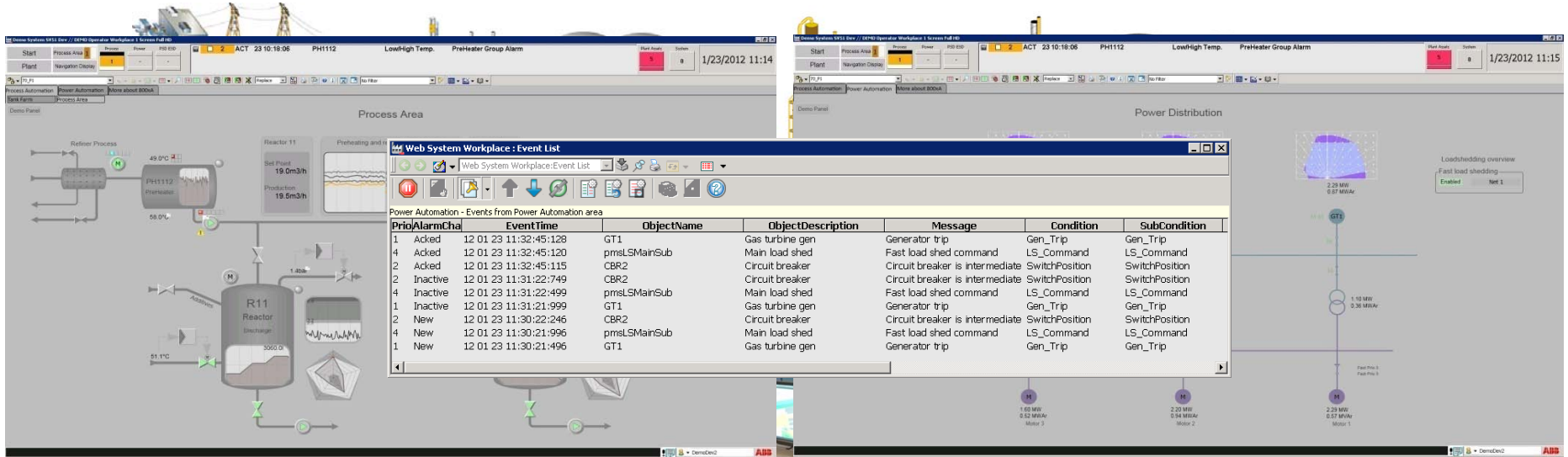
What are the Benefits?

- There are more but we are limited by time...!



So in Summary

- Integrated Power Automation can provide us with.....



Process group



Control room consolidation and collaboration

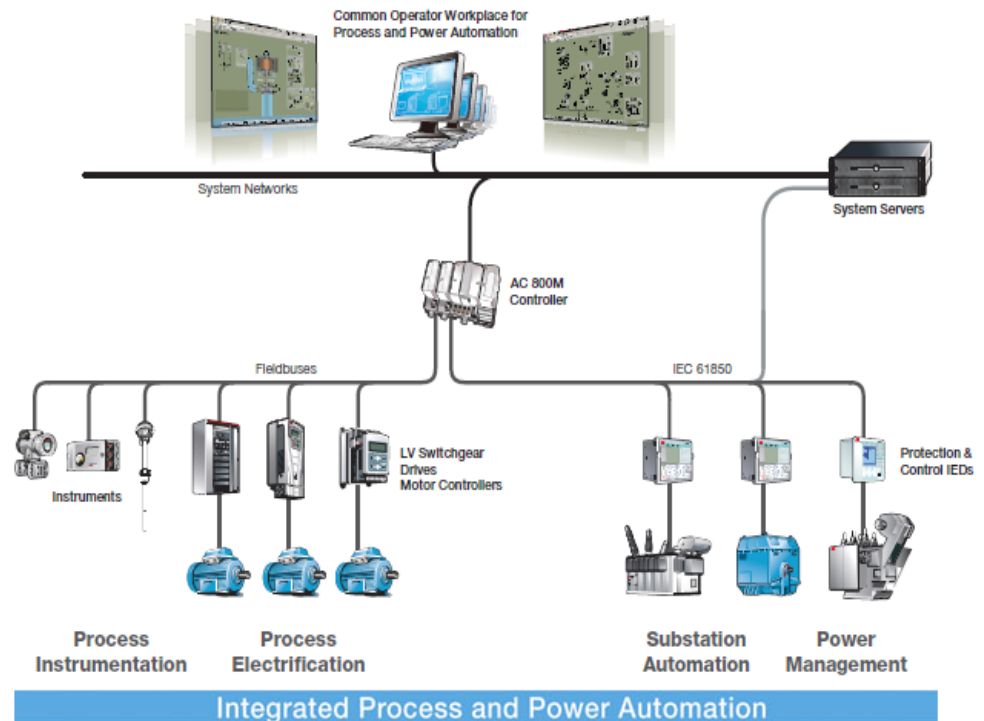


Power group

So in Summary

- Integrated Power Automation using IEC 61850 can provide us with.....

- ✓ Reduced Capital Investment
- ✓ Improved Plant Wide Operator Effectiveness
- ✓ Reduced Maintenance Costs
- ✓ Lower Improvement and Expansion Costs



A Big Thank You For Listening

- Any Questions?