T48 - Integrating Your Power and Automation Control Systems
Historically, Rockwell Automation® can help customers effectively meet and exceed Automation & Process Control system requirements

End users want access to data across their facility to fully optimize their processes, including the Process, Automation & Power Distributions systems

Rockwell Automation® can also help customers effectively meet and exceed the Power & Electrical Distribution requirements
Intelligent Packaged Power
Elements of the Initiative

INFRASTRUCTURE
Dedicated team representing multiple business units

SUPPLY CHAIN
Agreements with key component suppliers and assembly partners

TECHNOLOGY
Unified Control & Visualization for Process and Power
Traditional Approach
Independent Electrical SCADA and Process Control system

Process Control System

- Visulization
- Archiving
- Reporting

Logix Controller

- PowerFlex® Drives
- IntelliCENTER® MCC

Electrical SCADA System

- Visulization
- Archiving
- Reporting

Industrial Computer

- Intelligent Switchgear
- IEDs

Added cost and complexity of duplication of reporting, archiving, and visualization

- Limited ability to leverage data from IEDs in real-time control
Modern Approach
A Unified System via Intelligent Packaged Power

Process Control System

- **Single control platform**
  - Data from all devices mapped to controller
  - Available for real time
  - Time stamped / synchronized to master clock

- **Single platform for visualization, archiving and reporting**
  - Reduction of implementation cost
  - Automatic configuration of:
    - FactoryTalk® View Faceplates

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Logix Controller

- Ethenet/IP
- PowerFlex® Drives
- IntelliCENTER® MCC
- Intelligent Switchgear
- iEDs
Intelligent Packaged Power
Value Proposition – Electrical Engineering Leader

**SINGLE PACKAGE**

**Simplification:** Single point of responsibility

**Independence:** Ability to define best combination of components

**DIGITAL**

**Reduction in cost / risk to project**

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>LABOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control wiring</td>
<td>Documentation</td>
</tr>
<tr>
<td>Wireways / accessories</td>
<td>Installation</td>
</tr>
<tr>
<td>I/O interfaces</td>
<td>Commissioning</td>
</tr>
</tbody>
</table>

**INSTALLATION COST**

- $0
- $500,000
- $1,000,000
- $1,500,000
- $2,000,000

**SAVE ON INTEGRATION**
Intelligent Packaged Power
Value Proposition – Control Engineering Leader

INTELLIGENCE

Ability to Unify Systems → Eliminates redundant IT infrastructure
Advanced Integration Experience → Mitigates risk to project schedule

INTEGRATION COST

SAVE ON INTEGRATION

$1,000,000,000
$900,000,000
$800,000,000
$700,000,000
$600,000,000
$500,000,000
$400,000,000
$300,000,000
$200,000,000
$100,000,000
$0

Hardwired
3rd Party
Rockwell Automation®

SAVE ON INTEGRATION
Intelligent Packaged Power
Calculable Savings of Intelligent Solutions

System-Level Information

System Devices
- Intelligent Motor Controlled Devices:
  - Fixed Speed Drive
  - Variable Speed Drive
- Intelligent Electrical Protection Devices:
  - Circuit Breakers
  - Relays

Installation Distance
Average Distance of Devices from Marshalling Panel(1ft).
Intelligent Packaged Power
IntelliCENTER IEC 61850 Integration Unit – Reducing Design Time

Standard hardware offering to deliver the IPP solution

- Scalable & flexible application-specific options help reduce design time to integrate IEC 61850 devices into the control system
- Performance characterization & architecture guidelines help confirm performance requirements are met
- Standard options and layouts streamline designing, quoting, delivery & integration of the IPP solution
Standard hardware offering to deliver the IPP solution

- Scalable and flexible application-specific options to integrate IEC 618650 devices into the Logix IA
- Tested prior to shipment – UL 508A compliant
  - Optional door-mounted PanelView™ Plus & optional Stratix® Security Appliance for connections to untrusted networks

See 3300A documentation for more info:
- IntelliCENTER® IEC 61850 Integration Unit Tech Data
- IntelliCENTER IEC 61850 Integration Unit Installation Instructions
PREMIER INTEGRATION

» Single Software Tool: Studio 5000®
» Access to All Device Parameters
» Eliminates Address Mismatches
CONSISTENT PRESENTATION

Engineering

Operation

Maintenance

INTELLIGENT MOTOR CONTROL – STANDARD SOFTWARE SOLUTION
CONSISTENT PRESENTATION

Unified Visualization Experience with Rockwell Automation® Platform
### RA Library for Electrical Protection Devices

**PlantPAx® September 2017 Release – Reducing Design & Integration Time**

#### Product Name | Description | IEC 61850 / EtherNet/IP
---|---|---
Rockwell Automation 857 | Feeder / Motor Protection Relay | IEC 61850
Rockwell Automation 865 | Transformer Protection Relay | IEC 61850
ABB EMAX2 | Power Circuit Breaker | IEC 61850 & EtherNet/IP
SEL 751A | Feeder Protection Relay | IEC 61850
SEL 710/710d5 | Motor Protection Relay | IEC 61850
SEL 700G | Generator Protection Relay | IEC 61850
SEL 787 | Transformer Protection Relay | IEC 61850

**Direct Download Web Link:** Library of Electrical Protection Devices Reference Manual
Intelligent Packaged Power
Network Architecture Guidelines Reduce Design Time & Project Risk

Designing and Delivering the IPP solution
Power Distribution Control Strategies

SCADA

Control Strategy Functions:
- Data Acquisition
- Manual Control
- Data Logging
- Visualization of Data
- Alarm Management
- SoE

Typical Industries / Markets Served:
- O&G Upstream / Downstream
- Mining / Metals
- CPW
- Building Automation
- etc.

* Control Strategy overlays are typical
**Power Distribution Control Strategies**

Long Time Constant Load Shed

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**Control Strategy Functions:**
- Responding to events typically > 4 cycles (64ms)
- Typically events that won’t immediately disrupt power, but if left unattended will have a negative impact
- Electrical Capacity

**Typical Industries / Markets Served:**
- O&G Upstream / Downstream
- Mining / Metals
- CPW
- Facility Co-Gen
- Onsite Generation
- etc.

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*Control Strategy overlays are typical*
Power Distribution Control Strategies
Integrated Process Controls

Control Strategy Functions:
- Electrical information used to make process decisions
- Optimized control strategy leveraging power and process data together
- Time synchronized data allows for causality analysis

Typical Industries / Markets Served:
- O&G Upstream / Downstream
- Mining / Metals
- CPW
- Building Automation
- etc.

Data Acquisition Strategies
Process Control Strategies
Electrical Protection Strategies

*Control Strategy overlays are typical*
Power Distribution Control Strategies

Generator Synchronization

Control Strategy Functions:
- Auto synchronization provides ability to link onsite generation with utility power
- May be utilized for power export

Typical Industries / Markets Served:
- O&G Upstream / Downstream
- Mining / Metals
- CPW
- Onsite Generation
- etc.

- SCADA
- Integrated Process Controls
- Long Time Constant Load Shed
- Generator Sync
Power Distribution Control Strategies

Black Start

Control Strategy Functions:
- Process of starting power distribution system with zero sources
- Involves bringing online turbines and generators
- Involves base loading and sequencing of loads

Typical Industries / Markets Served:
- O&G Upstream / Downstream
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- CPW
- Onsite Generation
- etc.

Diagram:
- SCADA
- Integrated Process Controls
- Long Time Constant Load Shed
- Black Start
- Generator Sync

* Control Strategy overlays are typical
Power Distribution Control Strategies

Control Strategies Served by IEC 61850

System Size [# IEDs] vs. System Performance [ms]

- **SCADA**
- **IEC 61850 MMS**
- **Integrated Process Controls**
- **Long Time Constant Load Shed**

IEC 61850 Manufacturing Message Specification (MMS):
- Large-scale non-deterministic Ethernet communications
- Designed for SCADA type of networks
- Slower time constant control strategies

**Notes:**
- Control Strategy overlays are typical.
Power Distribution Control Strategies
Control Strategies Served by IEC 61850

IEC 61850 Generic Object Oriented Substation Event (GOOSE):
- High Speed Peer-to-Peer or One-To-Many communications
- Fast acting load shedding
- “Deterministic” Ethernet communications
- Requires VLANs & configuration based on MAC Addresses

Integrated Process Controls

IEC 61850 MMS

Data Acquisition Strategies
Process Control Strategies
Electrical Protection Strategies

SCADA

Long Time Constant Load Shed

IEC 61850 GOOSE
- High Speed Load Shed
- Interlock
- High Speed Bus Transfer

"Control Strategy overlays are typical"
Power Distribution Control Strategies
Control Strategies Served by Intelligent Packaged Power

IntelliCENTER® IEC 61850 Integration Unit:
- Leverages IEC 61850 MMS
- Options for 1, 2, 3, 4 ProSoft IEC 61850 Gateways
- Supports up to 40 IEDs leveraging the PlantPAx IED models
- Leverage multiple Integration Units to provide a scalable and flexible solution

* Control Strategy overlays are typical
Power Distribution Control Strategies
Control Strategies Served by Intelligent Packaged Power

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Intelligent Packaged Power
Sizing Tools for IPP Integration into the Control System

- Laying out the IPP network architecture is the first step but verifying the data is available with the appropriate system response is just as critical.

- The PlantPAx Process System Estimation Tool (within Integrated Architecture Builder) can size IPP solutions and determine control system response performance.

Sizing the IPP solution to deliver the required performance.
Intelligent Packaged Power
Sizing Tools for IPP Integration into the Control System

Provides Calculations for Visualization, Historian, and CPU Utilization!
Intelligent Packaged Power
“E-House” Integration Demo on Show Floor

Visit the Integrated Power and Automation Demo in the IMC Booth!

Replica E-House integrating multiple devices into the control system

HMI experience showing Rockwell Automation® device integration and standard software solutions
Thank You!