Meeting the demands of modern day production

EcoStruxure Hybrid DCS
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Introducing EcoStruxure Hybrid DCS
Introduction

Design, engineer, and maintain your plant with a single system

EcoStruxure Hybrid DCS is a single automation system to engineer, operate, and maintain your entire plant. The system enables users to achieve operational profitability from design engineering to meeting the demands of modern day production.

Positioned at the Edge Control layer of EcoStruxure Plant, it is the next-generation process automation system for a digitized and energy-aware plant.

The industry-leading EcoStruxure architecture is based on a three-tiered technology stack, bringing energy, automation, and software together. The stack comprises connected products, edge control, apps, analytics, and services.
Maximize your operational profitability

Interconnect and manage automation architecture
This single automation system combines the management of fieldbuses, instrumentation, intelligent devices, control networks, controllers, operator stations, engineering stations, and alarm management, in a common, single database.

EcoStruxure Hybrid DCS is an essential component of EcoStruxure Plant, interconnecting and managing all components of the automation architecture so plants can maximize their operational profitability. EcoStruxure Hybrid DCS safely supports standard fieldbuses, instrumentation, and best-in-class, intelligent, connected devices. At the heart of the system is a scalable and powerful automation platform.
Tangible value to your bottom line

EcoStruxure Hybrid DCS is the only distributed control system for hybrid industries that can measurably pay for itself within three months of implementation.

Reduce project execution time
Industrial production costs are on average $20,000/hr, so a 25% reduction in time-to-market on a 3-month project would be 3 weeks (i.e., 3x40hrs) = $2.4M in extra production.

Improve profitable reliability
Moving from reactive to prescriptive maintenance can reduce unplanned downtime to almost zero. Downtime costs the average plant 5% of production, so let’s conservatively assume increased maintenance maturity can reduce this to 2% unplanned downtime. For a plant running 40 hours per week, 50 weeks per year at a cost of $20,000/hr, this increases profit by $1.2M per year. In addition, maintenance staff could waste less time performing needless maintenance tasks, which could save the average plant up to $800K per year in maintenance costs.

Possible Business Results

<table>
<thead>
<tr>
<th>Efficiency improvement</th>
<th>Profitability improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce time-to-market by 25%</td>
<td>$2.4 M</td>
</tr>
<tr>
<td>Reduce unplanned downtime to 2%</td>
<td>$1.2 M</td>
</tr>
<tr>
<td>Increase operational visibility</td>
<td>$1.3 M</td>
</tr>
<tr>
<td>Reduce energy use by 30%</td>
<td>$1.8M</td>
</tr>
</tbody>
</table>

*patent protected, **Statements by ARC, ***Data from Alinean
Improve operational profitability

Improve process visibility
Accessing data and turning it into actionable business intelligence delivers enhanced process visibility, which can result in 0.5 to 3% of revenue improvement a year and 3 to 10% of potential margin impact. This can result in over $1.3M of annual bottom-line impact.

Improve energy utilization
Large water treatment plants or industrial facilities, for example can use up to 1.2 M kWh of electricity per year. At an energy cost of 5-cents per kWh, this is $6.02 M per year. Improving process energy use can yield savings of up to 30%, which translates to $1.8M in annual cost savings.

***Data from Alinean  **** Water Research Foundation report sec 4.1
Multi-engineering environment

Introduction

System operation

Hybrid DCS libraries
Single database
EcoStruxure Hybrid DCS global database stores all the configurations for the entire system. This single database enables active services to share information across all automation system components as well as share real-time engineering data with all the users. This centralized repository for the whole system makes maintenance easier.

Configure-once philosophy
A single entry point for all configuration enables faster system design and fewer errors. Asset information data is introduced only once and the design of system follows the Control Instrumentation Diagram, making controls design, installation, and commissioning easier.

A productive engineering approach
EcoStruxure Hybrid DCS provides common services like configuration, deployment, diagnostics, communication, security, connectivity, user collaboration, and data sharing. These services enable you to build a single, unified model that logically represents your process, and a plant Infrastructure that represents the actual equipment. This makes design and maintenance of the system more efficient, more flexible, and less risky. The model also gives essential context to your data, greatly assisting with diagnostics and troubleshooting. It also provides valuable system documentation throughout the system lifecycle.
Object model approach — The foundation of EcoStruxure Hybrid DCS is the Plant Model: the logical representation of the physical equipment and processes being controlled, supervised, managed within EcoStruxure Hybrid DCS. This provides a single, consistent definition of your infrastructure or plant, organized as reusable templates. The model enables you to view your operations from multiple perspectives, including of the equipment: control logic, graphical representation, data acquisition, alarms, trends, documentation, system security, access control, and external interfaces. Through this hierarchical, object-based model, you can view, detect and define abstract visualizations of real-world systems, their relationships, and physical locations.

Which industries can benefit from the EcoStruxure Hybrid DCS platform?

- Mining, minerals, and metals
- Water and wastewater
- Food and beverage
- Chemical and specialty chemical
- Power generation
Flexible engineering

EcoStruxure Hybrid DCS is adaptable to different business needs at every stage of the plant lifecycle. Thanks to its object-oriented model, application object templates that encapsulate and integrate all aspects of an automation object can be used unlimited times to reduce engineering and improve maintenance, without losing quality. This reduces time and risk throughout the lifetime of your system.

Concurrent Engineering
Multiple design teams can work in parallel during the engineering phase, which reduces design time and cost dramatically. EcoStruxure Hybrid DCS engineering system is a scalable and flexible client/server architecture that can be adapted to the size and needs of the plant. EcoStruxure Hybrid DCS enables concurrent engineering in the same system/application with consistency management. The transparent check-in/check-out mechanism optimizes engineering design, and shares, in real time, all the work performed across the different engineering workstations. This means there’s no need to split the project in several pieces and enforce a reconciliation which could lead to inefficiencies and loss of information.
Comprehensive change tracking, embedded simulation

Change Management
EcoStruxure Hybrid DCS provides out-of-the-box engineering traceability and revision control by recording any system configuration changes. This feature helps to support the verification of changes to comply with the requirements of regulated industries.

Simulation
EcoStruxure Hybrid DCS provides embedded simulation capabilities that allow simulation of the entire system at any time via any engineering workstation. This greatly reduces errors during the design phase. It reduces time to market and engineering costs while increasing the quality of the final control system.

Saves you time and cost
EcoStruxure Hybrid DCS engineering benefits you in several ways:

• Centralized hardware and software configuration is uniform throughout the platform, and the engineering system includes integrated field device configuration
• A single, global database and configure-once philosophy eliminates redundant entries and makes data entered available throughout the system
• Pre-configured, tested and validated object template libraries simplify asset configuration
• Reusing existing object templates simplifies duplication of equipment
System operation
Get a complete picture of your production process engineering

The ability to provide operators with clear process information is crucial to driving production efficiency. EcoStruxure Hybrid DCS provides a consistent control and operational interface with a real-time view of your process. The system delivers operators all the services and data they need to make timely and accurate decisions.

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A predefined environment simplifies navigation
The menus and contextual sub-menus and banners enable the operator to access the data easily.

Easily monitor the process
The Faceplate is how operators interact with assets.
Each Faceplate is embedded with:

- A user interface for an operator to monitor the assets
- Visibility into which missing interlocks are causing problems
- Status and information about the assets
- Parameters associated with the assets (e.g. PID)

It is possible to open several Faceplates in parallel.
Advanced diagnostics with Runtime Navigation Services (RTNS)

With EcoStruxure Hybrid DCS, the right person gets the right information at the right time. Problems can be diagnosed and solved faster. You can access any data in real time for any asset or equipment in your system. This includes the control device running in the controllers, all documentation, event historian, asset management, and internet links.

The RTNS is a native service provided by EcoStruxure Hybrid DCS Objects during runtime. These powerful diagnostic services allow the user to access different points of view for each asset, including monitoring control logic, documentation, topological localization, alarms and trends. This innovative service reduces commissioning time, as well as downtime, by quickly identifying the root cause of any issues.
Trending views

Trends seamlessly combine real-time and historical data. When users view a trend page, they can monitor the current activity as it happens, and simply scroll back through time to view the trend history. The distributed trending system handles large amounts of asset data without compromising performance or data integrity. Operators can choose from a selection of pre-configured trend pages that provide clear data representation, with customizable views for quick and simple trend analysis.
Fast access to data reduces downtime

Alarm views
An efficient alarm tool allows users to quickly identify faults within the system or process and take corrective action, thereby reducing plant downtime.

The EcoStruxure Hybrid DCS alarm system is fast and reliable, providing you with detailed information about the status of your plant. Alarms are displayed on dedicated alarm pages, with the most recent alarms visible at all times in the alarm banner on every page. Working in conjunction with the controller, alarms are time-stamped and accurate to a millisecond. Alarms can be filtered according to the application view, enabling the operator to easily zoom into a sub-part of the application.

Operator logs
The operator log enables a plant manager to track all the commands performed by an operator.

The following information is logged:

> Change of process values
> Bypass of interlock conditions
> User activities, like:
  > Manual reset following a failure
  > Consignment of a device; device simulation
  > Change of command mode, Operator-to-Program mode, or reverse
The building blocks for your control system

Integral library of tested, validated, and documented reusable objects jump-starts app development.

The components of the objects within the library are the connection, control, and visualization facets, but these are extended to also include historian reporting and other facets of the DCS.

Weight
The DCS libraries are a set of lightweight blocks that are constructed to meet the needs of the market, providing best in class functionality with minimum code. They can be customized for the site or individual device. The options selected are readily visible in the code (no hidden parameters). The result is a lighter program (needs fewer controllers) and a clearer program that is easier to debug in the field.

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Expert support, easy customization

Support
Schneider Electric EcoStruxure Hybrid DCS libraries are tested, validated and documented, specifically designed to reduce engineering costs and time to market. These libraries allow engineers to focus on the process rather than control configuration. They are embedded with our offers but also used by our testing, delivery and support teams, who can demonstrate that they work well in actual situations. With this testing we can offer support for each block within the libraries. A team is dedicated to their ongoing development and support. Most library components are open and can be viewed as DFBs within the controller and can be simply diagnosed by the engineers within the project.

Customization
There is no perfect library for every customer. The DCS libraries are extensible between objects but can also be customized within the blocks. This is done by allowing the objects to be copied and changed. The customized objects can still use many of the functionalities of the library blocks and are supported as stand-alone code objects in each facet. Customization is expected. The libraries should offer a platform on which this final customized automation system can be delivered in the fastest possible time.
Integrating smart connected products and software applications through libraries
Connecting devices

Libraries enable the integration of Schneider Electric and third party devices via different open protocols, making their data available through the DCS control system.

Supported industrial networks
- Ethernet I/P
- Modbus (TCP and serial)
- Profibus
- HART

Using these networks, the libraries are able to provide data from the available automation and electrical assets. Connecting the rich set of parameters and readings available within your Motor Control Center. For Schneider Electric devices, complete automation blocks are provided to make key data available within the control system. For third party devices, the interface is open for integration partners to leverage the interfaces and expose data from other devices.

Schneider Electric motor and drive management
- Motor Starters (TesysU & TesysT)
- Progressive Starters (Altistart 22, 48)
- Variable Speed Drives (Altivar 31, 312, 12, 212, 32, 61, 71, 600, 900, 1200, 6xxx, 9xxx).

Schneider Electric power management
- Circuit Breakers (Masterpact & Compact)
- Protection Relays (SEPAM 20, 40, 80)
- Power Meters (PM 9C, 700, 800, 1200, 53xx, 82xx)
- Smart UPS (AP 9622)
- Harmonic Filter (Acusine)
Library components

The core library is designed to provide the components you need for the core of your automation process:

**Analog Devices**
- Analog Input (direct, processed or multiple)
- Analog Output (actuators, control valves, motorized valves, pulse width)
- Analog Control (PID, ramp, split range, ratio, ramp, lead-lag, 3-step)

**Digital Devices**
- Digital Inputs (limits or other discrete sensors)
- Motors (direct, dual direction, dual speed, variable speed)
- Valves (fail open, fail close, fail)

**Process Templates**
- Flow Control
- Pump Set Management

**Automation Infrastructure**
- Sequence Management (ISA88 - sequencing)
- Process Management (ISA — equipment module)
- Batch Integration (InBatch phase management)

This functionality extends beyond the classical automation layer to integrate Smart Connected Products and Software applications through the libraries within Edge Control. This brings the IIoT from concept to reality within your control system.
Specific libraries to suit your industry

To enable EcoStruxure Hybrid DCS to develop specialized applications, Schneider Electric has a wide range of libraries for various industries. These include applications devoted to a specific industry, such as mining, cement, or water treatment; or to a specific function, such as power management, energy management, and advanced process control. The libraries also help model specific equipment for the industries, such as penstock for water, and provide templates for specific processes, such as grinding or flotation for mining.

“Thanks to EcoStruxure Hybrid DCS and its seamless integration with Schneider’s electrical devices, including power meters, Premier now has energy metering at almost every level of the plant, from an overall plant level right down to the device level.”

Durban Bakery, Premier FMCG
Industry-specific libraries

Water Library
- Process Templates
  - Aeration
  - Dual Media Filter
- Control Equipment
  - Penstock
  - Flow Measurement (Flume)
  - Flow Measurement (Weir)
- Scheduling
  - Time & Event Scheduler

Mining Library
- Process Templates
  - Ore Volume Control (Belt Conveyor)
  - Wet Grinding Mill
  - Spiral Separation
  - Rotary Cyclone Separation
  - Thickener
  - Rotary Dryer
- Control Equipment
  - Belt Conveyor
- Scheduling
  - Time & Event Scheduler

Cement Library
- Process Templates
  - Kiln Management
  - Gas Analysis
  - Fuel Selection
  - Gear Lubrication
- Control Modules
  - The Cement library uses a dedicated control library which provides functionality similar to the general purpose library for automation.

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Software integration

As part of the Schneider Electric suite of automation, EcoStruxure Hybrid DCS enables access to the most comprehensive set of software offerings on the market. These offers start with historians and batching systems but extend to asset management, planning, supply chain, simulation, training, and other offers.

Ecostruxure Hybrid DCS and its libraries deliver all the data and interfaces necessary to integrate seamlessly with typical industrial software applications like:

- Wonderware Historian
- Wonderware inBatch
- Plant Asset Management

"The integration between EcoStruxure Control Expert and the supervision system is very impressive. It is simple to add new hardware."

John Mackenzie, Senior Research Associate, Hazer Group
To learn more about how EcoStruxure Hybrid DCS can help you meet the demands of modern day production, contact your local Schneider Electric representative or visit schneider-electric.com