
# EcoStruxure Automation Expert

Software Centric Automation for WWW

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Life Is On Schneider Electric

# El Nacimiento del PLC

## Primer Salto Cualitativo en Automatización y Control Digital

## 1968: Control Digital Modular

- En los años 60 Richard E. Morley identificó una fuerte necesidad de mayor flexibilidad en la producción industrial
- Las limitaciones de potencia de cálculo, memoria y acondicionamiento de señal le llevaron a una idea brillante: ejecutar instrucciones (peldaños) de forma cíclica
- Así, inventó el primer controlador lógico programable y fundó la empresa Modicon

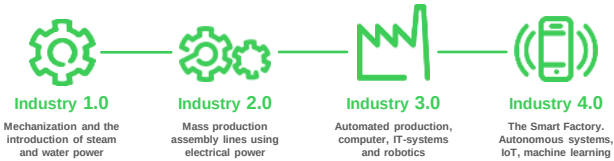
# El futuro no es lo de siempre

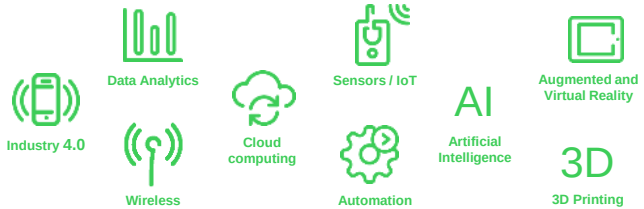
## El próximo salto cualitativo en automatización industrial

## 2020: Automatización basada en Software

- Después de 50 años, no es el hardware sino el software lo que está impulsando la automatización al siguiente nivel.
- La transformación digital impulsada por el software se ve impulsada por el aumento de la potencia de cálculo y la conectividad.
- Abordar los imperativos de nuestros clientes requiere una flexibilidad, interoperabilidad y eficiencia sin precedentes de las operaciones industriales.
- El estándar **IEC 61499**, con su enfoque distribuido, orientado a objetos y basado en eventos, está ampliando y mejorando el estándar IEC 61131, permitiendo que los sistemas de automatización aprovechen las tecnologías IT

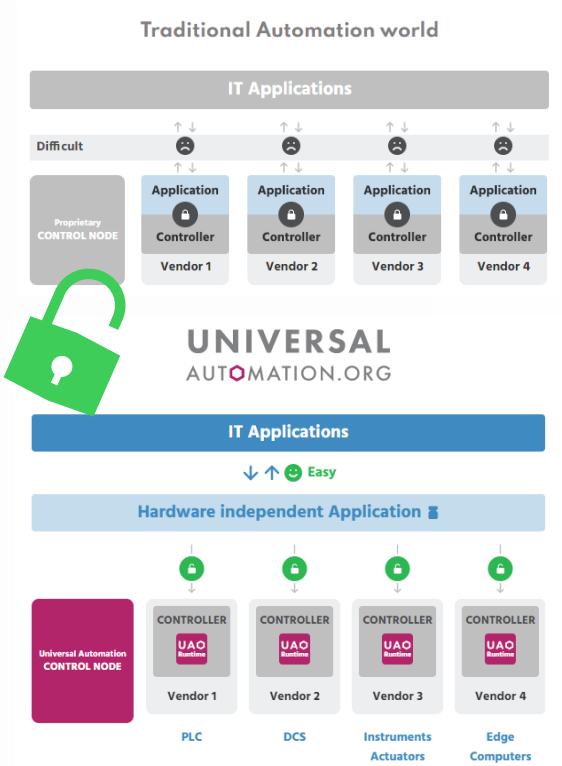
### The Four Industrial Revolutions



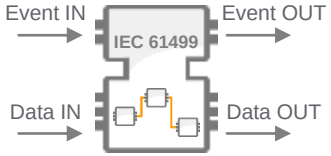

**Automation is key** - where the physical meets the digital to close the loop from "***insight to action.***"

# No single company or person can make it alone



# El nuevo paradigma habilitado por el estándar IEC 61499

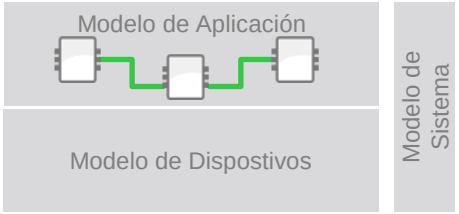
## Bloques de función basados en eventos




- Componente de Software
- Principio de “Black Box”
- Programado en cualquier lenguaje de IEC 61131
- Real-time + Right-time

Programación gráfica cercana al IT

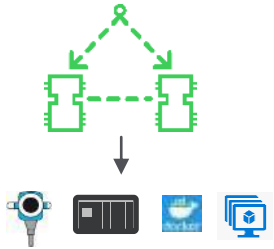
## Independencia del Hardware




- IEC 61499 rompe la dependencia entre Hardware y Software
- Single Line engineering

Permite abstracción del hardware e independencia de fabricantes

## Distribución



- Despliegue en dispositivos de campo, controladores, edge computing, para crear arquitecturas altamente flexibles

Soporta arquitecturas de automatización flexibles

UNIVERSAL AUTOMATION.ORG

# EcoStruxure Automation Expert

## Best-in-Class Technology

### Orientación a Objetos nativa

Representación de activos reales como objetos y librerías software listos para usar. Proporciona los bloques para construir los sistemas cyber-físicos.

Orientación a Objetos

Abstracción del Hardware

### Plataforma abstracta al hardware

Independencia total entre Software y Hardware durante la ingeniería y todo el ciclo de vida garantizando total re-usabilidad.

### Aplicación distribuida

Despliegue flexible del proyecto de automatización en los controladores mediante “drag&drop”. Comunicaciones cruzadas (P2P) generadas automáticamente.

Inteligencia Distribuida

Aplicación única

### Orquestación del Sistema

Escalable, gestion sencilla de arquitecturas de sistemas distribuidas incluyendo la integración de hardware de terceros.

### Ingeniería Eficiente

Entorno de desarrollo integrado para todas las tareas de ingeniería y gestión de sistemas de automatización.

Ingeniería Integrada

Consistencia del Dato

### Listo para la Industria 4.0

Integración natva con sistemas IT con acceso directo a datos de campo con estampado de tiempo en origen.

# Plataforma runtime común

## Para todos los segmentos y aplicaciones - variadores, PAC, iPC, y servidores

### Módulo ATV dPAC

- Rendimiento optimizado
- Sin bus de campo
- E/S especializadas
- Para ATV 340-600-900

### M251 dPAC

- Rendimiento medio
- Cabecera IO distribuida
- Bus de campo optimizado.
- Escalabilidad de E/S limitada
- Gama de E/S TM3

### M262 dPAC

- Alto Rendimiento
- Procesador doble núcleo
- Cabecera IO distribuida
- Buses de campo optimizado.
- Gama de E/S TM3

### M580 dPAC

- Alto rendimiento
- Buses de campo completos*.
- Escalabilidad de E/S ampliada
- Gama de E/S x80
- Módulos expertos*

### Soft dPAC

- Rendimiento escalable
- PLC Virtual y edge computing
- Alta integración con sistemas IT
- Gran flexibilidad

Todas las plataformas integran un runtime común

Todas las plataformas pueden ser utilizadas en cualquier aplicación

La herramienta de Ingeniería es la misma para todas las plataformas

* Future Automation Expert releases

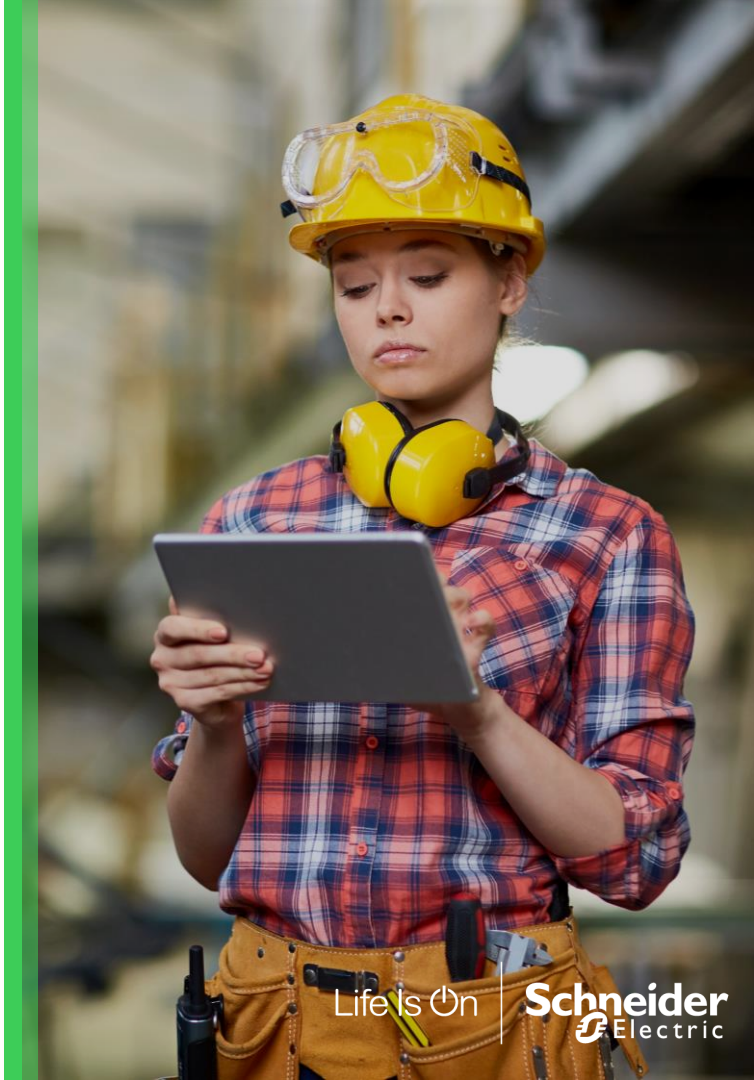
 

# Empower your automation system to thrive in the digital economy

## Driving to 100% engineering efficiency

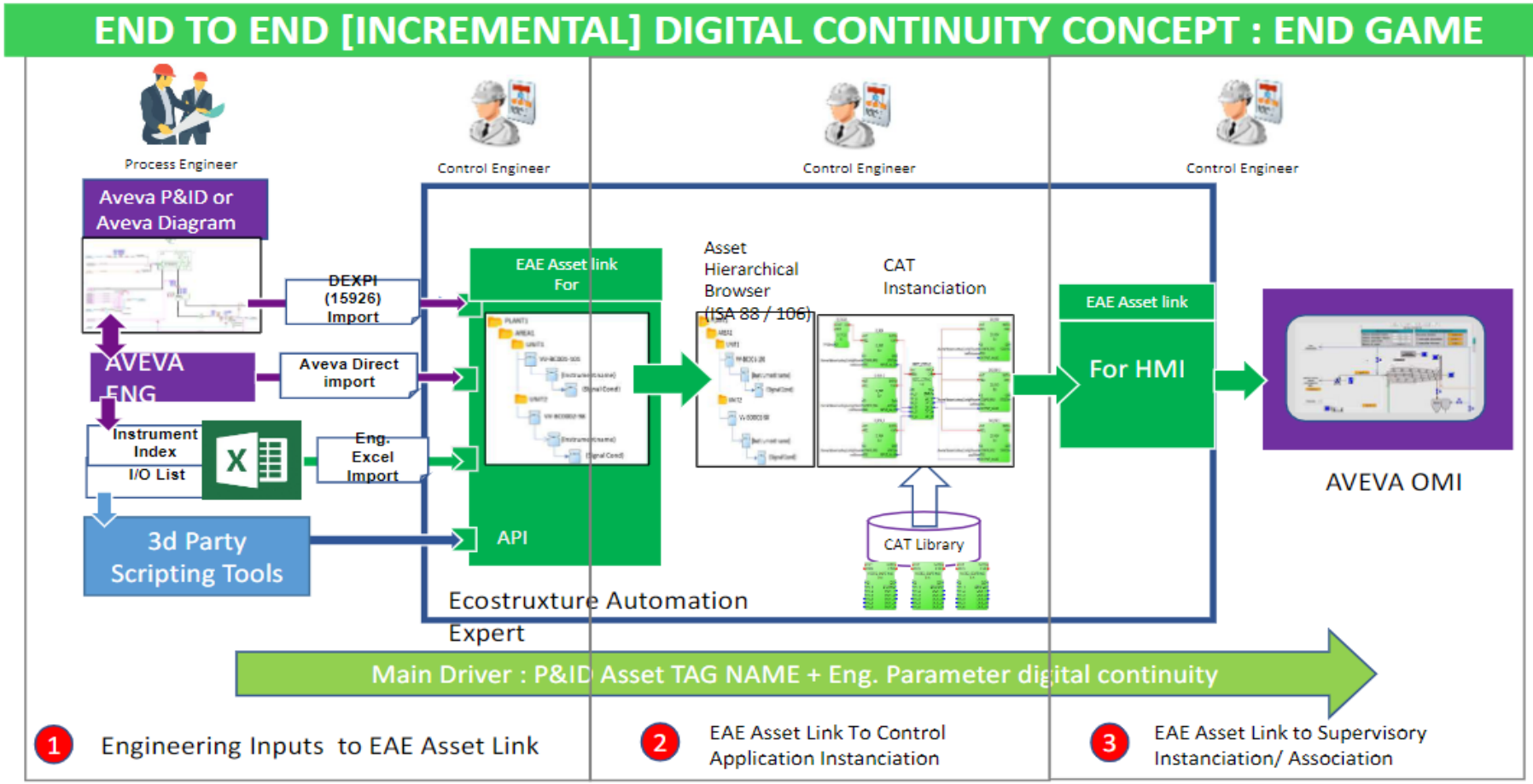
## Ready for 100% effectiveness

## Now 100% future-proof



# Digital Continuity

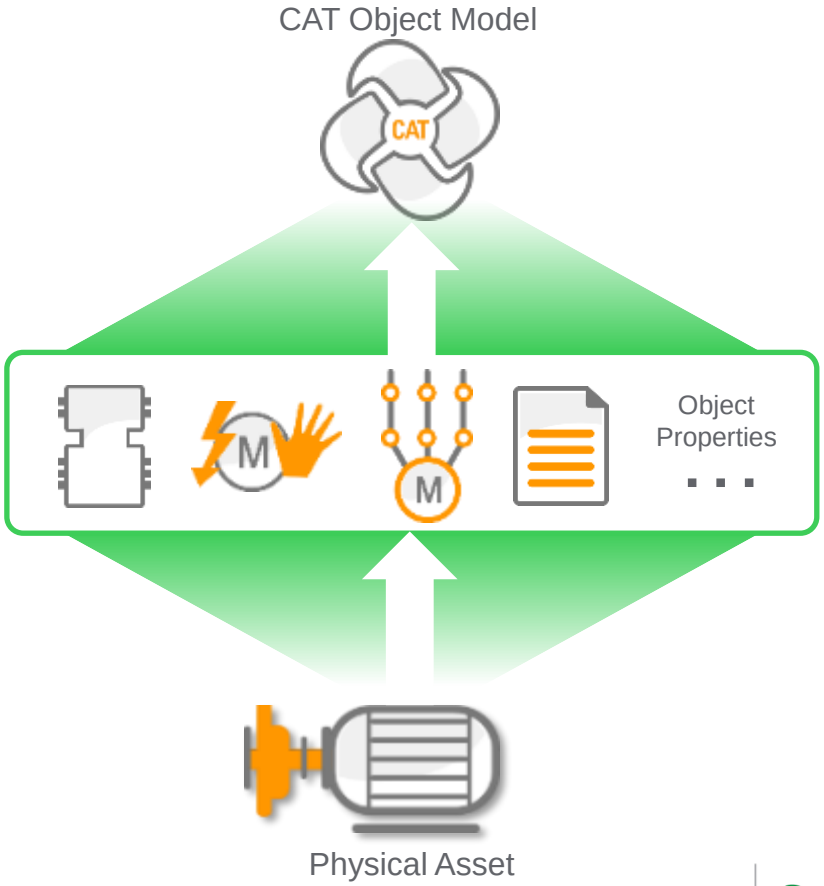


# Asset Orientated Engineering

## Next Generation Engineering Platform

Single tool to configure, program and deploy applications to multiple control and HMI devices.

Control, HMI, documentation etc. encapsulated into asset models to manage complexity and support reusability & fast refactoring

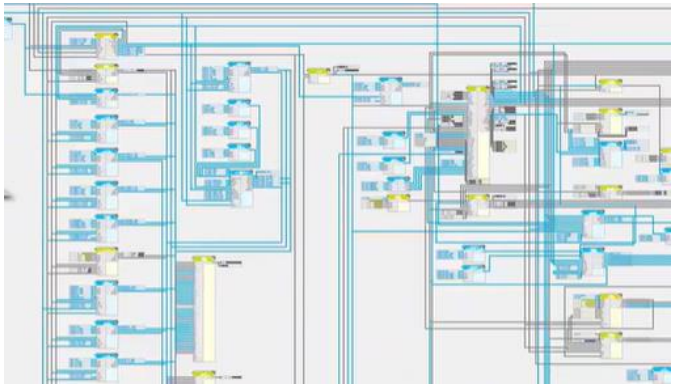


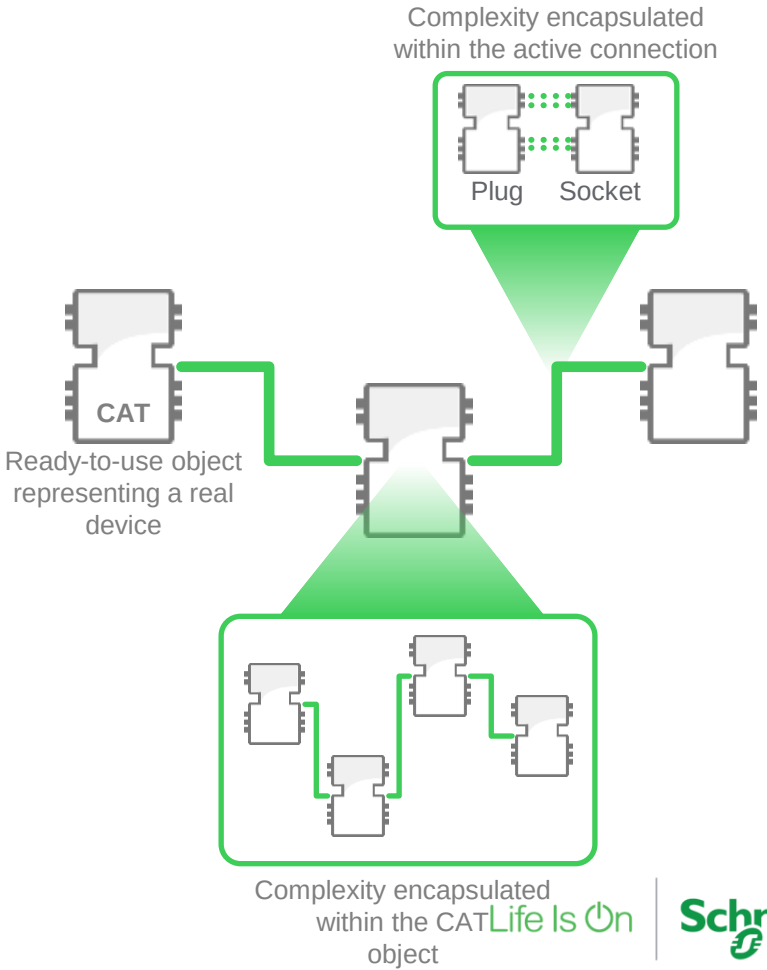
# Single Line Engineering

## Simplified Engineering Process

**Aggregations of event and data connections** between function blocks resulting in one single line connection back & forward.

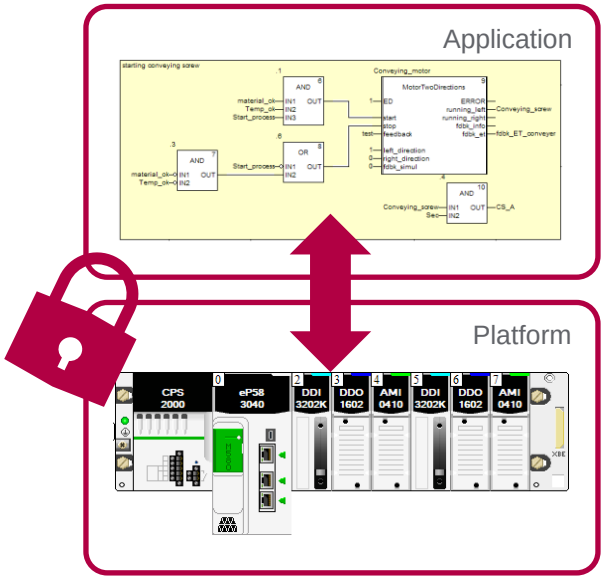
Complexity managed through smart engineering results in dramatically **reduced time and effort with fewer mistakes, higher quality.**



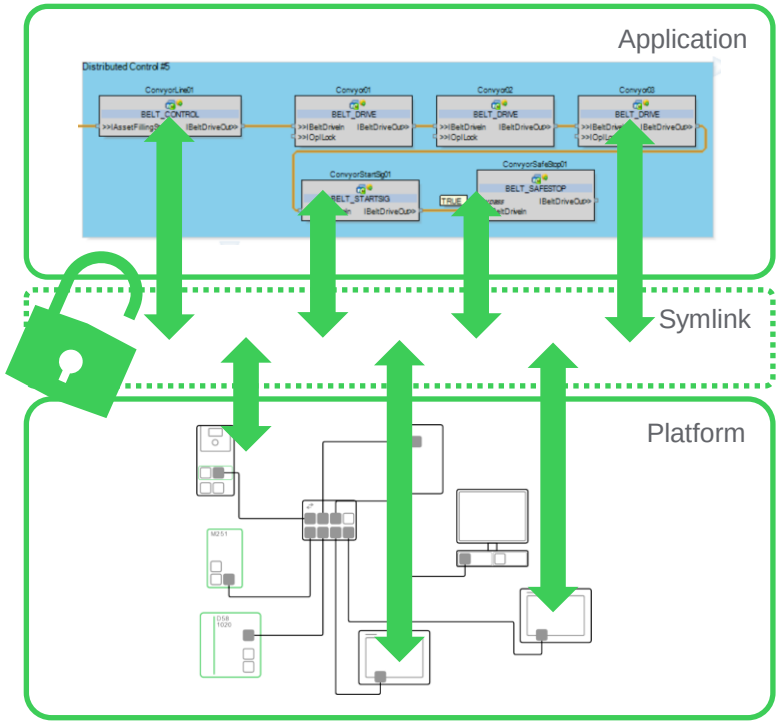


# Hardware - Software Abstraction

Difficult to re-use
Resistant to change



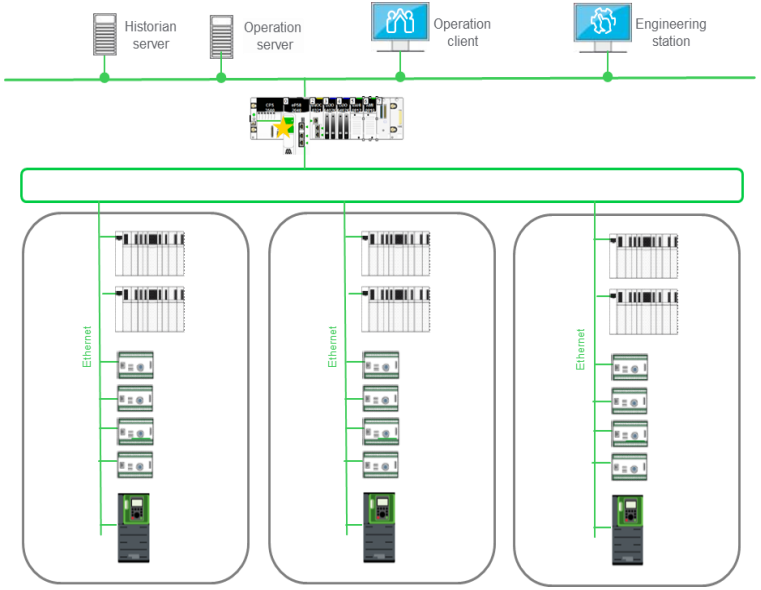

Independent HW / SW lifecycles
Just in time linking
Portable, reusable, interoperable, agile



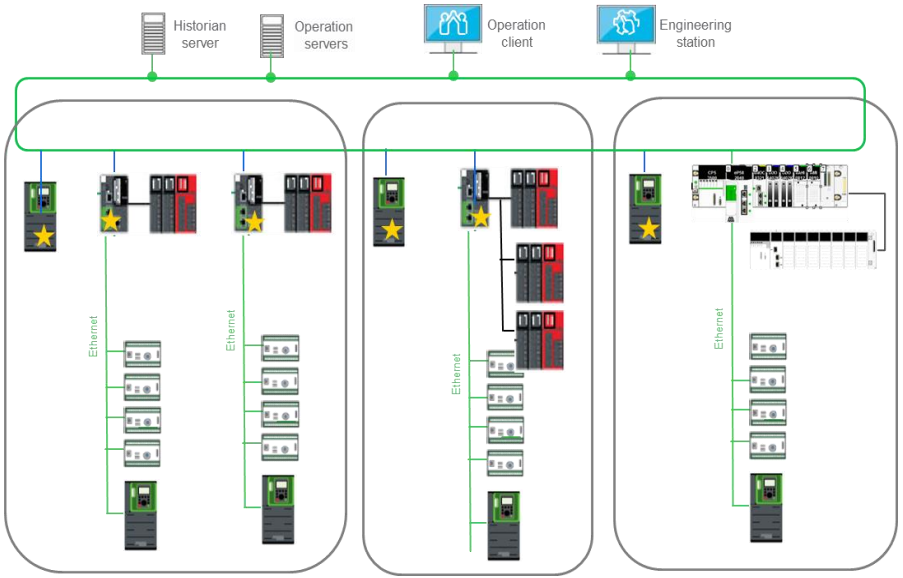
# Arquitecturas Modulares y Distribuidas

## Arquitecturas Centralizadas y Distribuídas

### Centralizada



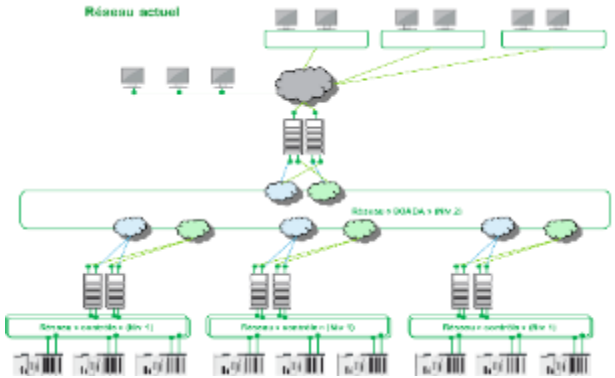

### Distribuída



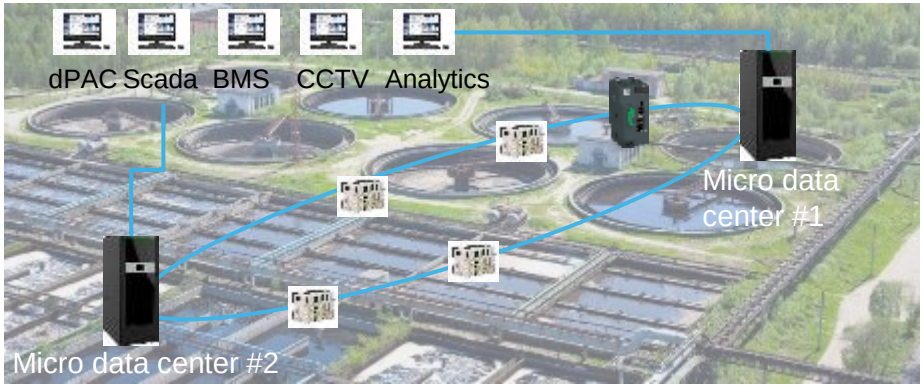
# Arquitectura “IT centric”

Pushing IT principles to its maximum - Idea opinion leaders embracing IT paradigm

## Current solution




## IT centric solution




### Physical Architecture – Technical constraints

- Space in Cabinet to install PLCs
- PLCs spare parts to maintain the system
- Material exposed to environment risks like Temperature or chemical agent.
- Material required to expand the system
- Migrate physically PLCs
- Specific PLCs HW to realize a High availability architecture
- Need additional servers to run HMI Scada or additional SW
- Cybersecurity of the control system need to be managed at every levels.

### Virtual Architecture –benefits

- System installed in Physical servers
- VM can be saved and restored easily
- Servers stored in a clean and safe environment.
- A new system can be deployed virtually. Just need IOs.
- Migrate VM on a new server
- Virtual Redundant PLCs run on different VMs on different servers.
- Mutualization of servers to run all OT and IT services.
- Cybersecurity is simplified due to the virtualization.
- Flexibility to move CAPEX to OPEX

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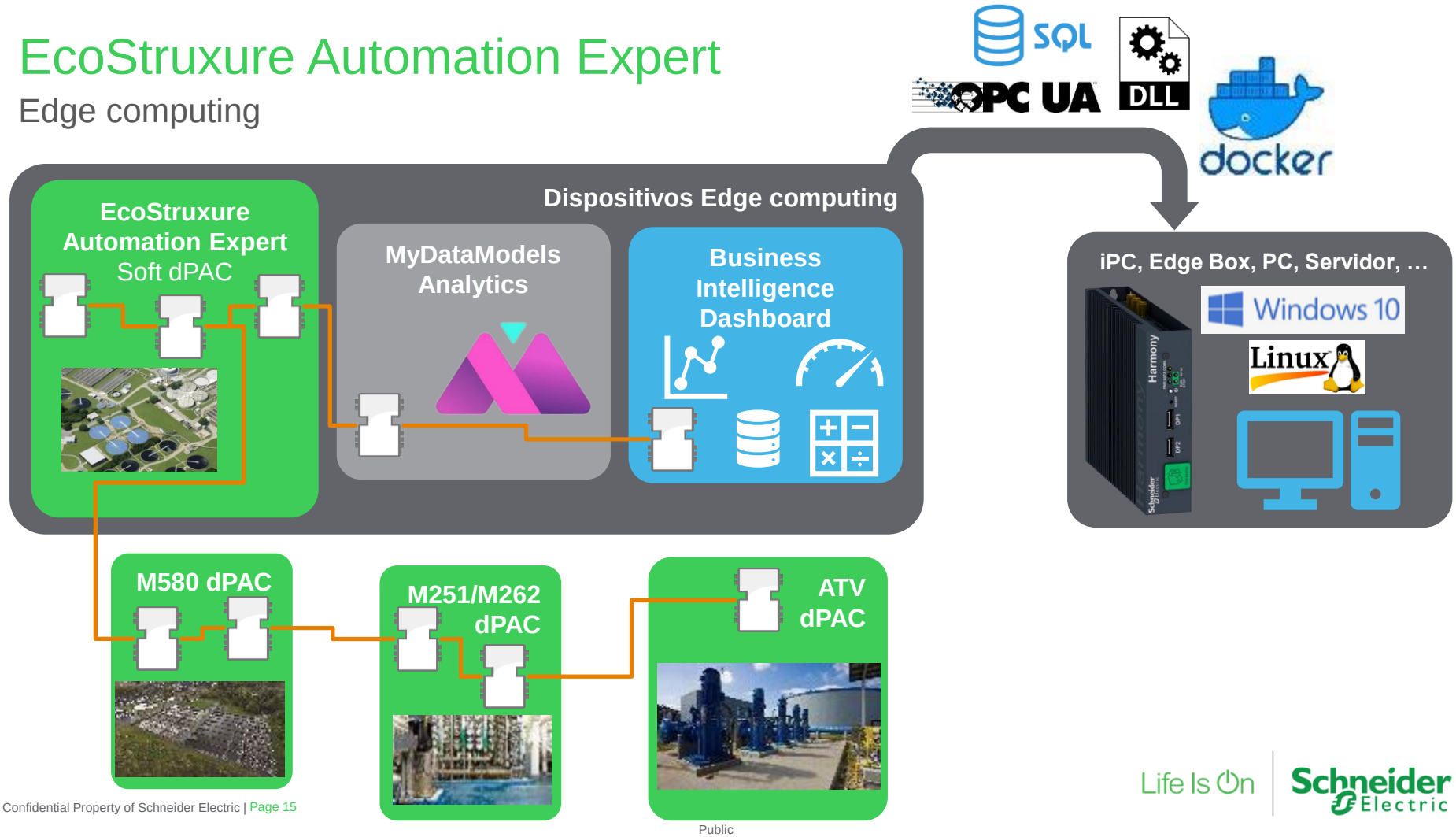
## Edge computing



# Customer NDA

random picture

Less downtime, faster operation & maintenance,

## Desafíos del Cliente

Anticiparse a los defectos en los motores de los mezcladores
La infraestructura es sencilla pero crítica (3 motores)
Un motor roto provocaría una pérdida de producto (10T) y a daños potenciales en los tanques.

## The Solution

Trabajando junto a nuestro partner Analog Device Otosense
La solución supervise 9 fallos mecánicos y eléctricos
No se requiere análisis de expertos
Rápido de implementar

## Los Resultados: Life Is On with…

Reducción de tiempos de parada de un **10%*** y pérdidas reducidas un **5%***

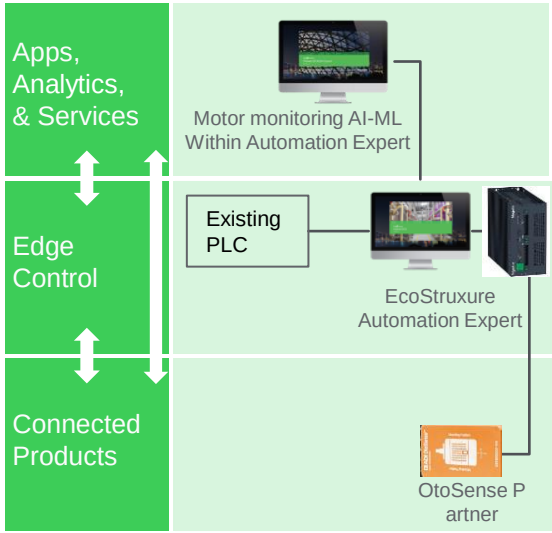
(*values tbc)

Customer's KPI:
- Maintenance
- Service contuinuity

Control & data

EcoStruxure™

Pilot stage

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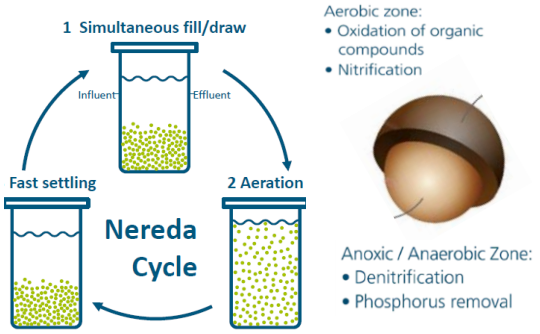
# Nereda technology for WWW End Users

Nereda®
a product of Royal HaskoningDHV




## Customer Challenges

- Cost-effective
- Small footprint
- Easy to commissioning and Operate
- Robustness and Cybersecurity
- Sustainable

## The Solution

Royal HaskoningDHV, selected Schneider Electric to develop a new automation platform for Nereda Plants based in EcoStruxure Automation Expert integrating the Nereda Process Control in one single platform, improving significantly all the project phases: Design, Construction, Operation and Maintenance.

## Customer Benefits

- 10% savings on optimized but robust architectures
- 50% improvements on engineering deployment
- 30% optimization on commissioning
- Increase operation efficiency
- Scalable and future-ready platform (AI/ML)
- Less downtime with easier and faster troubleshooting
- HW agnostic solution to optimize spares management

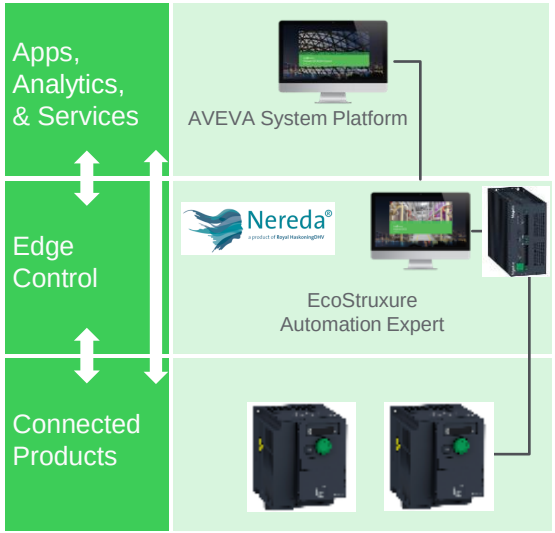
## The Results: Life Is On with…

**CAPEX** and **OPEX** Optimization

Customer's KPI:
- Footprint savings
- Sustainability
- Cost efficiency

Control & data

EcoStruxure™



# Introduction to Nereda Technology

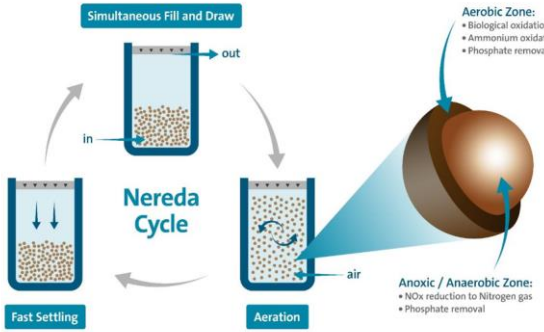
## Challenge

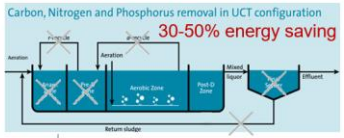
Can we create a wastewater treatment process in which normal aerobic biomass forms a stable biofilm by itself – without plastic or inorganic carrier ?

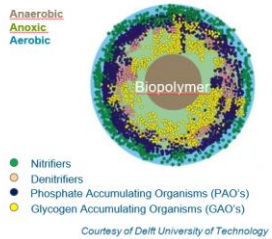
This could result in an ideal treatment process

- Meet the most stringent effluent COD, N and P requirements
- Simple construction and operation
- Compact
- Low energy requirement
- Low cost

## Nereda® process cycle




- Extensive simultaneous biological COD, N- and P-removal

*Courtesy of Delft University of Technology*

## WHY NEREDA?

**SMALL FOOTPRINT**
*Up to a factor 4 smaller*

**SUSTAINABLE**
*Significant energy savings*
*No (or minimal) chemicals*
*No plastic support media*
*Enables water reuse and recovery of bioresources*

**EXCELLENT EFFLUENT QUALITY**
*Including biological nutrient removal*
*Extensive Bio-P removal*

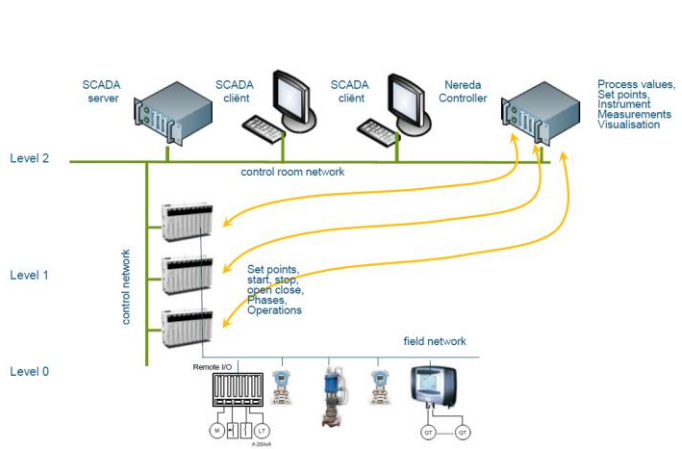
**COST EFFECTIVE**
*Low whole life cycle cost*

**EASY TO OPERATE**
*Fully automated & highly resilient AI driven Nereda Controller continuously predict & optimize*
*Modular & retrofit applications to expand or extend useful life of assets*

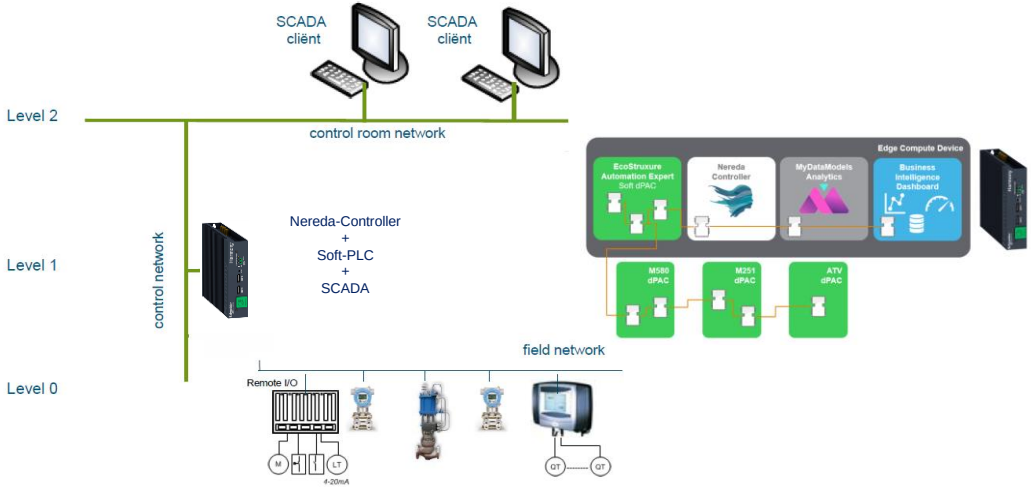
## Consolidated Technology

# Next Gen Automation Platform for Nereda® Plants based on EAE®

*Current Automation Solution*




*Next Generation Automation Platform*




| | | | |
|---|---|---|---|
| + | **Engineering Time** | − − | Up to 50% saving in labor effort |
| + | **Commissioning Effort** | − | Minimizing risks |
| − | **Flexibility & Scalabilty** | + + | Think your application and optimize your architecture |
| − | **Cybersecutiry** | + | Reduce vulnerabilities with native cybersecurity |
| − | **Open Solution** | + | Dissociated from Hardware – IEC41699 |
| − | **Faster Modification Cycles** | + + | Change and deploy! |

# Extend Nereda ® Benefits thanks to EAE®

| 100% engineering efficiency | | 100% operational effectiveness | 100% future-proof | | |
|---|---|---|---|---|---|
| Pre-design | Design | Operate and maintain | Evolve | CAPEX | OPEX |
| Asset centric<br>Interoperable data exchange (P&ID, CAD files)<br>Online ecosystem and marketplace | Object oriented<br>Single-line engineering<br>Single runtime<br>Distributed intelligence<br>Agile engineering | Simulation and virtualization<br>System management<br>Edge computing<br>- Predictive maintenance<br>- Digital twin | Process orchestration and MTP<br>System of systems<br>Orchestration services<br>Wrap and re-use<br>Resource rebalancing | Less land required due to small footprint<br>Fewer and more compact civil structure<br>Less mechanical Equipment | Less Energy<br>Minimal to no chemical<br>Less operator oversight time<br>Less Maintenance<br>No rector media to maintain |

Nereda® a product of Royal HaskoningDHV

Next Generation Nereda Process Control

Full integrated Process Control System with Automation

Improved Process Efficiency, Energy Consumption, Maintenance analytics

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