
NIAGARA
SUMMIT
2026
SEAMLESS CONNECTIVITY,
POWERFUL INTELLIGENCE
NS26
TECH TRENDS
TRIDIUM

NIAGARA + PLC IN DATA CENTERS:

DESIGNING HYBRID CONTROL ARCHITECTURES THAT SCALE

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SPEAKERS

KEVIN MAMAJEK
Moderator: Tridium

ANTON SAVENKO
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TRIDIUM

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Downtime = Business Risk

Data Center Tier Standards & Reality

Tier	Availability	Downtime / Year	Design Concept
Tier I	99.671%	28.8 hours	Basic
Tier II	99.741%	22 hours	N+1
Tier III	99.982%	1.6 hours	Maintainable
Tier IV	99.995%	**26 minutes**	Fault Tolerant

Higher tier = lower risk, but never zero downtime

What Does Downtime Really Cost?

$5K – $15K /min
(Typical enterprise)

$100K+ */min*
(Financial / hyperscale)

Downtime ≠ only power loss

- Loss of cooling
- Loss of redundancy
- Control system failure
- Loss of visibility

⚠ *System still running — but already at risk*

Illustrative industry estimates based on publicly available data (Uptime Institute, Gartner, industry reports)

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Estimated Cost of Downtime by Industry

Industry	Cost per Hour	Cost per Minute
Trading	$100M – $300M	$1.5M – $5M
Cloud	$300K – $1M+	$5K – $16K
Banking	$1M – $5M	$16K – $80K
Casino	$100K – $1M	$1.6K – $16K
Airlines	$100K – $500K	$1.6K – $8K
Power Grid	$1M – $10M+	$16K – $160K
Hospitals	Not measurable	Life safety impact

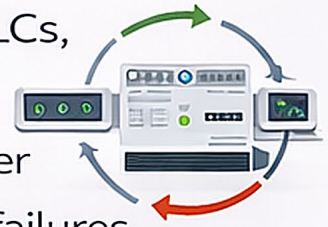
Resilience & Redundancy in Mission-Critical Environments

1 Mechanical & Electrical Redundancy

- N+1, N+2, 2N architectures
- Backup capacity to support full load
- Eliminates equipment-level failures (chillers, UPS, power)

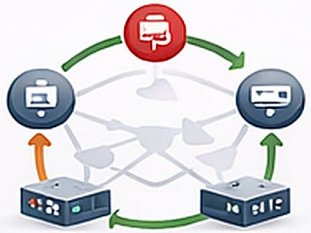
2 Controllers & Control Logic Redundancy

- Master / standby controllers, dual PLCs, redundant JACE
- Automatic failover to backup controller
- Maintains full system visibility during failures



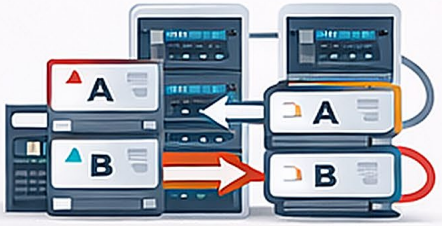
3 IT Network Redundancy (TurboChain)

- Ring topology communication
- Automatic rerouting if connection is lost
- No single point of failure in network communication



4 Server Redundancy (Active-Active)

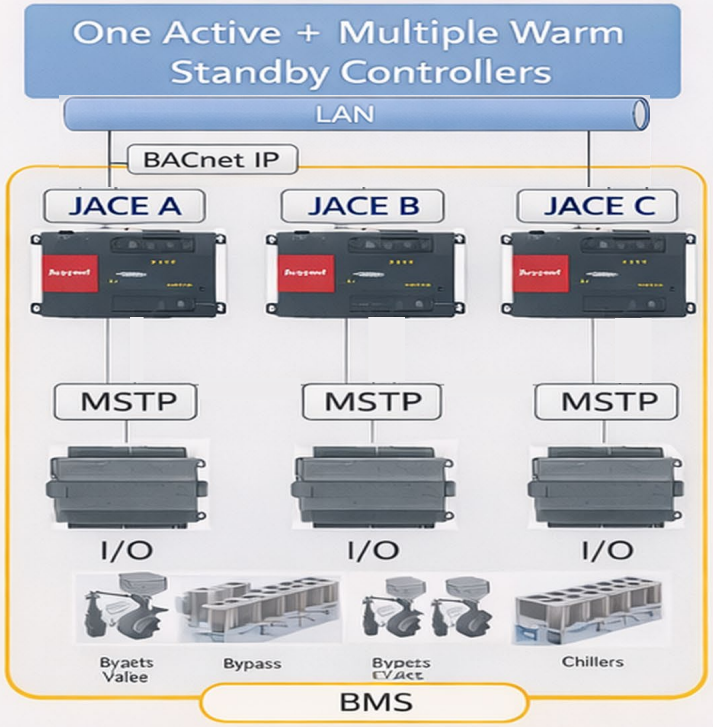
- Server A + Server B running simultaneously
- Load sharing and seamless failover
- Continuous operation without interruption



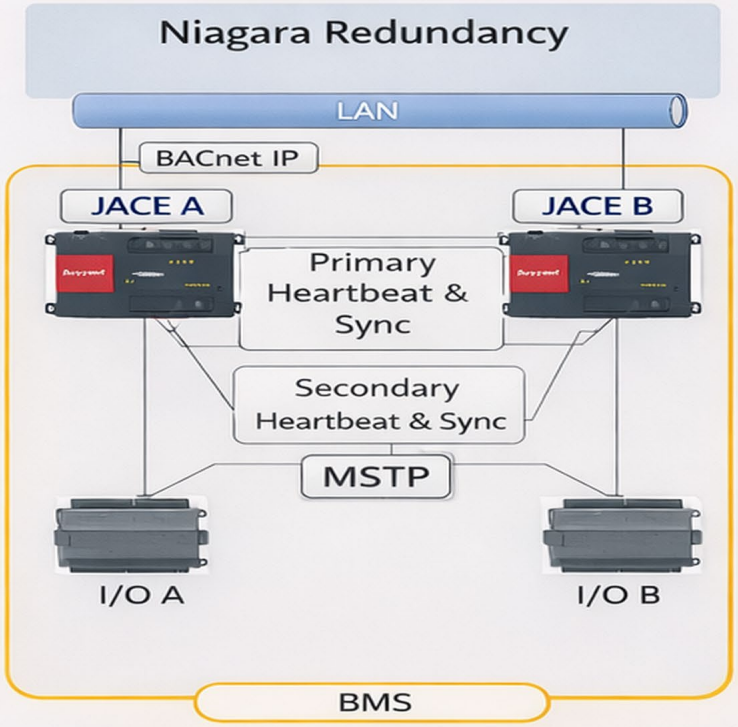
Key Principle → *Assume failure* → *Design for continuity* → *Validate through testing*

Redundancy Architecture Options

OPTION 1



OPTION 2



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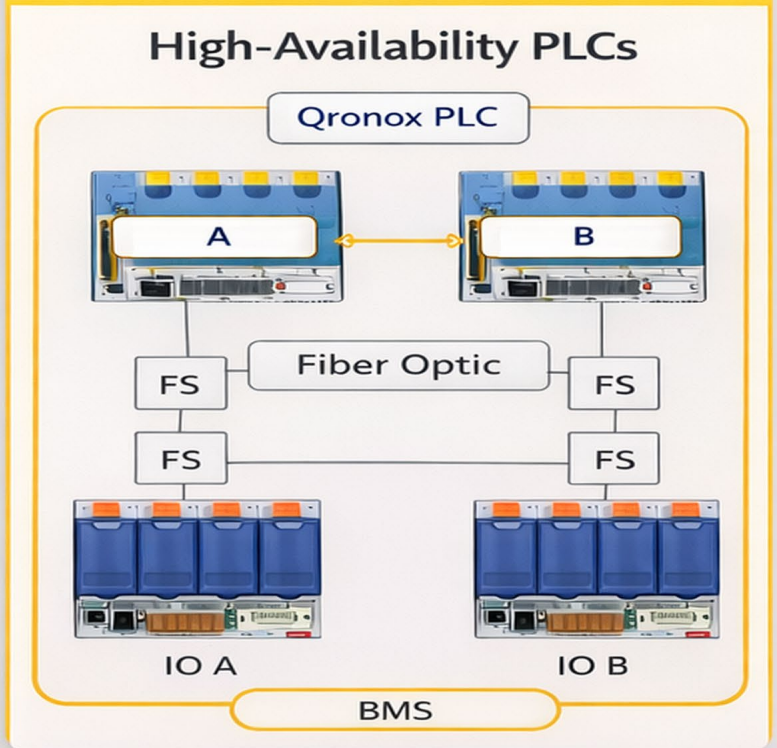


PLC + Niagara Based Resilience for Data Centers

PROSS

Industrial-Grade Reliability
Designed for mission-critical infrastructure
20+ year lifecycle stability

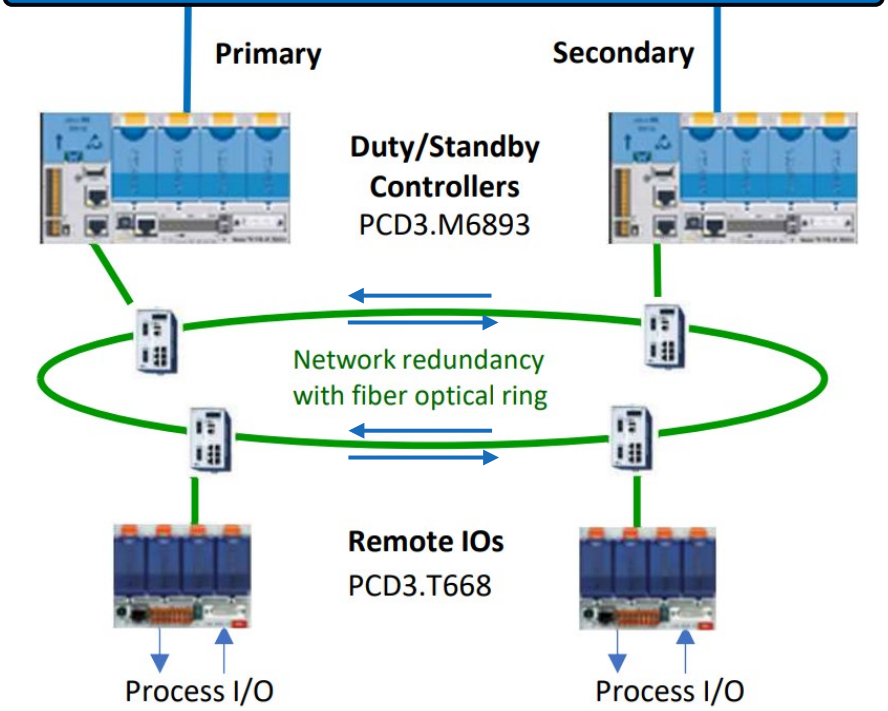
Built-in Redundancy & High Availability
Hot-standby PLC architecture
Primary and secondary controllers, failover

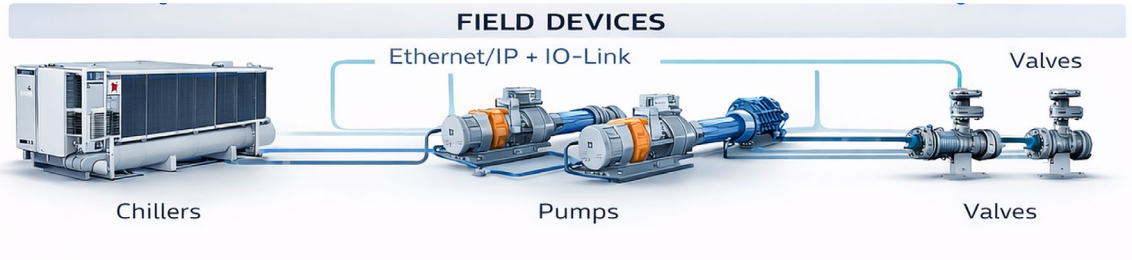
Distributed Remote I/O
I/O installed near equipment — less wiring
Faster, more scalable installation

Network Redundancy (Fiber Ring)
Fiber optic ring eliminates single points of failure
Automatic rerouting for high availability

Flexible Multi-Protocol Integration
OPC UA / PROFINET / Modbus / CAN + more
Works with multi-vendor environments

Standardized Engineering (IEC 61131-3)
International PLC programming standard
Modular, reusable logic with pre-built libraries





CONS

Higher Infrastructure Cost
Fiber ring redundancy requires: fiber cabling & industrial switches

Limited Specialized Talent
PLC engineers exist, but requires knowledge of redundancy (2N, N+1).

Steep Learning Curve
Requires PLC programming knowledge (IEC 61131-3, Structured Text, etc.)
Training needed for: customers and operators

Smaller Ecosystem vs Niagara
Fewer available engineers compared to Niagara/BAS
Less standardized across projects

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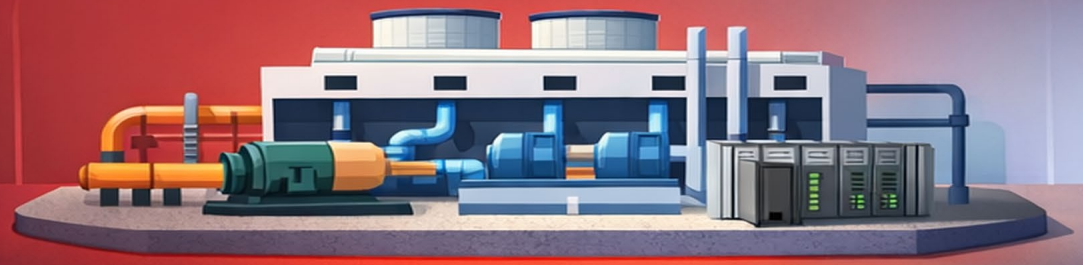
Optimized Hybrid Architecture for Data Centers

PLC

What Must Never Fail

CONTROL & INTERLOCKS

Chiller Plant Control



- Chillers, Pumps, Valves
- *Critical Sequences*

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What Must Scale

INTEGRATION & VISIBILITY

Electrical & HVAC Systems

- Generators, UPS, PDUs
- AHUs, VAVs, Monitoring

PLC for **Critical Control** • **Niagara** for **Integration & Visibility**

Thank You.

TRIDIUM

Speaker Intro: Deepan Patel

- Industry Manager Infrastructure at Phoenix Contact for 7 Years.
- Over a decade of experience in Controls Industry, both BMS & PLC Controls!
- Strives to develop the exposure of Phoenix Contact Smart Building solutions
- Graduated from QMUL BEng Computer Systems Engineering & Postgraduate in Project Management
- TCP Niagara Certified

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PLC or Niagara?

- **PLCs**: Manage essential Infrastructure systems like Water Treatments, Oil & Gas, Power Plants & Infrastructure ensuring reliability and safety.
  - Control individual processes reliably but lack built-in cross-system integration, often tied to one vendor's ecosystem.
- Excellent for local real-time control, but scaling requires multiple PLCs and an external BMS/SCADA to supervise them.
- Challenges in scaling which involved higher initial costs.

- **Niagara**: Scales from a single facility to enterprise portfolios with centralized monitoring, open platform data sharing, and easy expansion.
- Integrates HVAC, lighting, security, and other systems on one platform with multi-protocol support.
- Better at bridging IT/OT environments with multi-protocol support.

But is PLCs Necessary in Data Centers?

- Buildings contain many subsystems – HVAC, lighting, elevators, security access, fire alarms, metering, etc… Just like Data Centers!

- PLCs often originate from different manufacturers and historically uses separate, closed controllers.

- Niagara's core mission is to *"bring together different systems and protocols in building automation" into one unified environment*.

- Using Niagara in Data Centers can drastically **reduce custom interface work** compared to integrating PLCs.
  - For example, writing a custom interface between a Siemens PLC (HVAC) and a Crestron lighting controller and a Schneider electric meter system.

  - Niagara can integrate all three by presenting all data points side-by-side.

  - Phoenix Contact hardware can compliment hardware solutions to design both solutions PLC or Niagara.

So What about Phoenix Contact solutions – Case Study

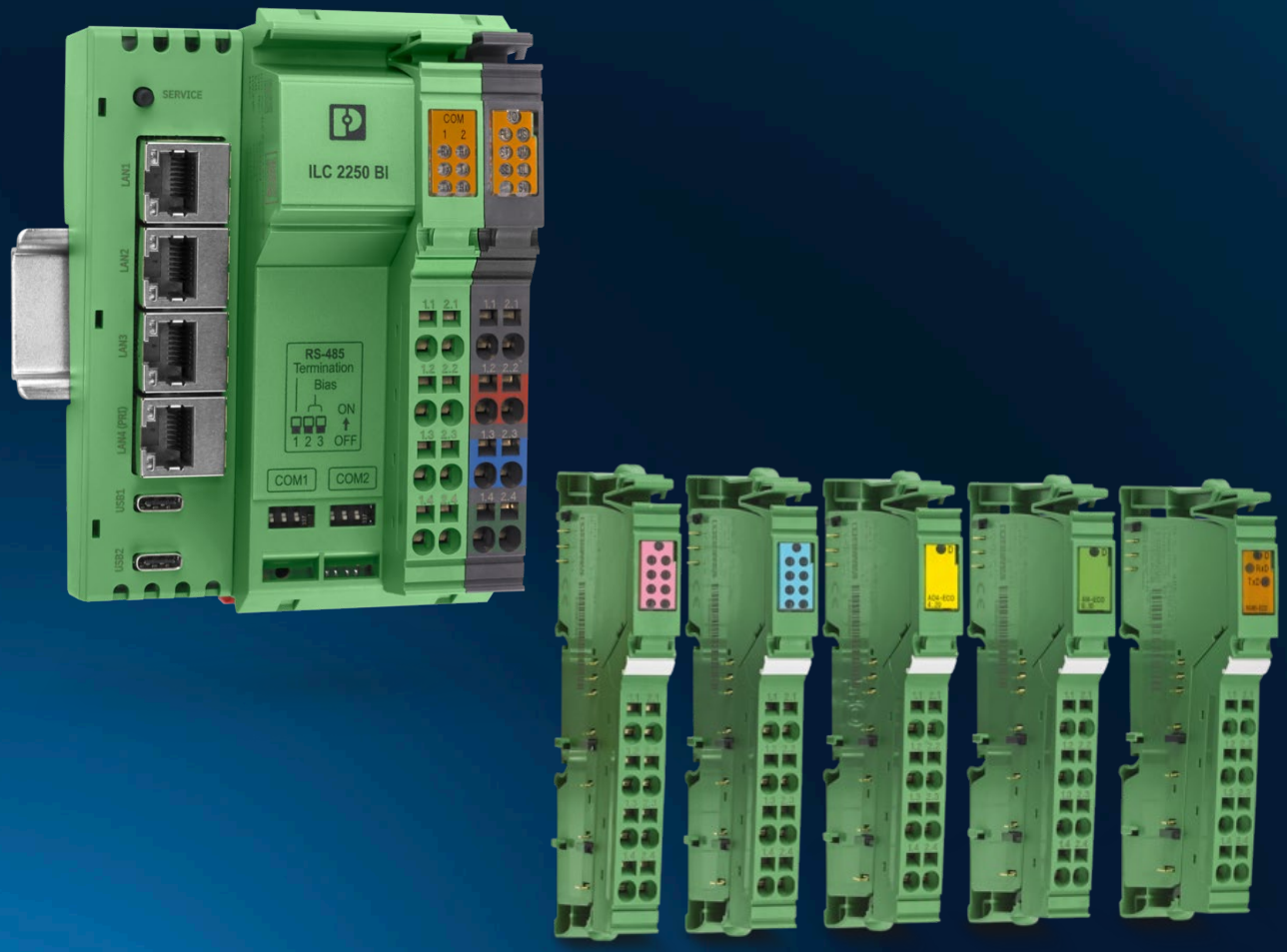
- Data Center – North London
  - Pains
    - Downtime on availability in Data Centers imperative
    - Panel sizes ever increasing in BMS
    - Integration of multiple gateways costly, i.e. Ethernet switches for IP Routes, etc…

Data Center North London – Benefits

Solutions

- ✓ Improvement in uptime
- ✓ Niagara has assisted in providing Data Centers with over 200MW with 300+ days uptime
- ✓ Resilient network design: Tier 3 N+1 Network between outstations/MCCs and Building BMS network server
- ✓ The Niagara Platform is a more versitile platform for use in Data Centers

Data Center North London – Benefits II



- Niagara played a vital role in its capability to reduce energy usage by 20%.
- Phoenix Contact's ILC2250 Niagara controllers compliments this design further with the benefit of its high scalable IO modules - direct connectivity up to 63 modules.

Data Center North London – Benefits III

- ✓ Niagara monitor & controls several cooling schemes focused on the DC becoming self sustainable, such as harvesting rainwater, etc…
- ✓ Due to designs the customer managed to improve their PUE from 1.67 to 1.05
- ✓ Phoenix Contact offers wider solutions in the Industry – such as Power Redundancy

- Thank You!

Deepan Patel
Industry Manager - Infrastructure

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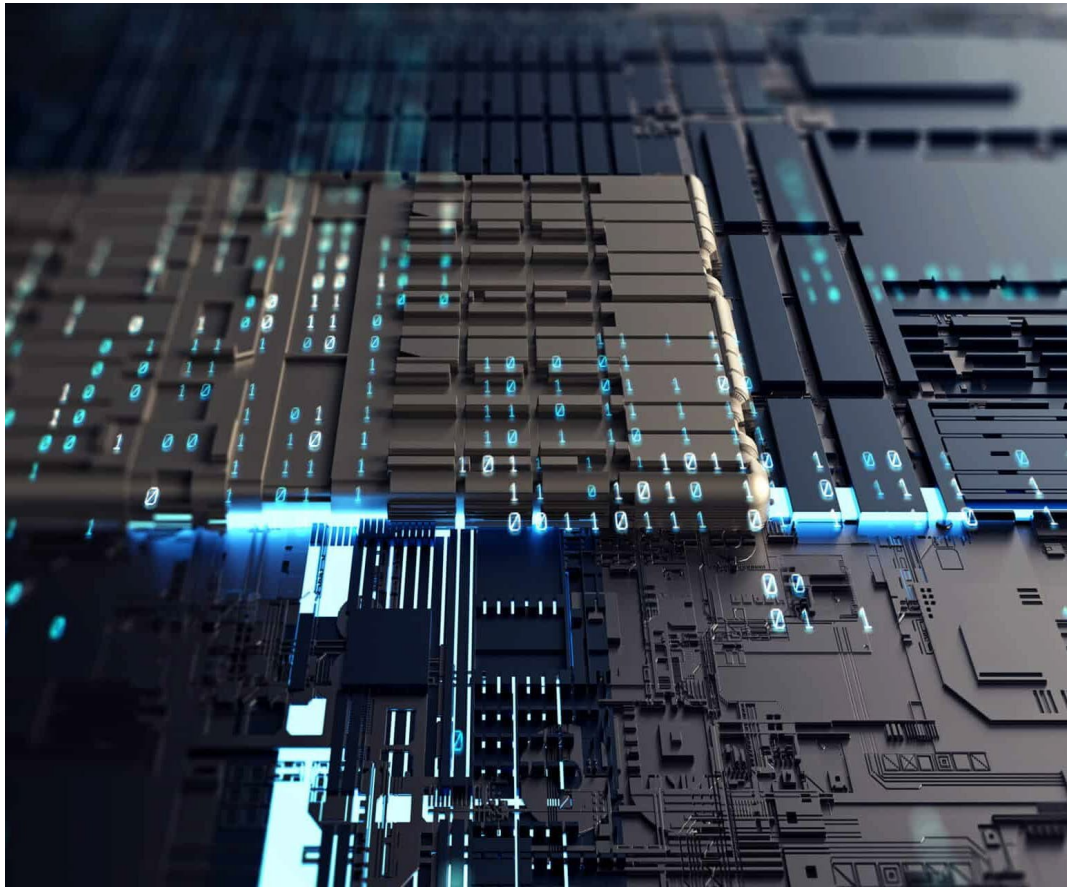
Diego Palacios

Diego Palacios, Vice President of Building Automation National Sales with Harris, has been leading high-performing teams to sales and business development success for almost two decades. His personable, consultative approach has helped clients and team members understand how technology can address their needs. He does this by reframing the way we view technology: not as a feature to add, but as an asset to leverage so buildings can be safer, smarter and a lot cooler to work on.

WHAT THE MARKET SAYS

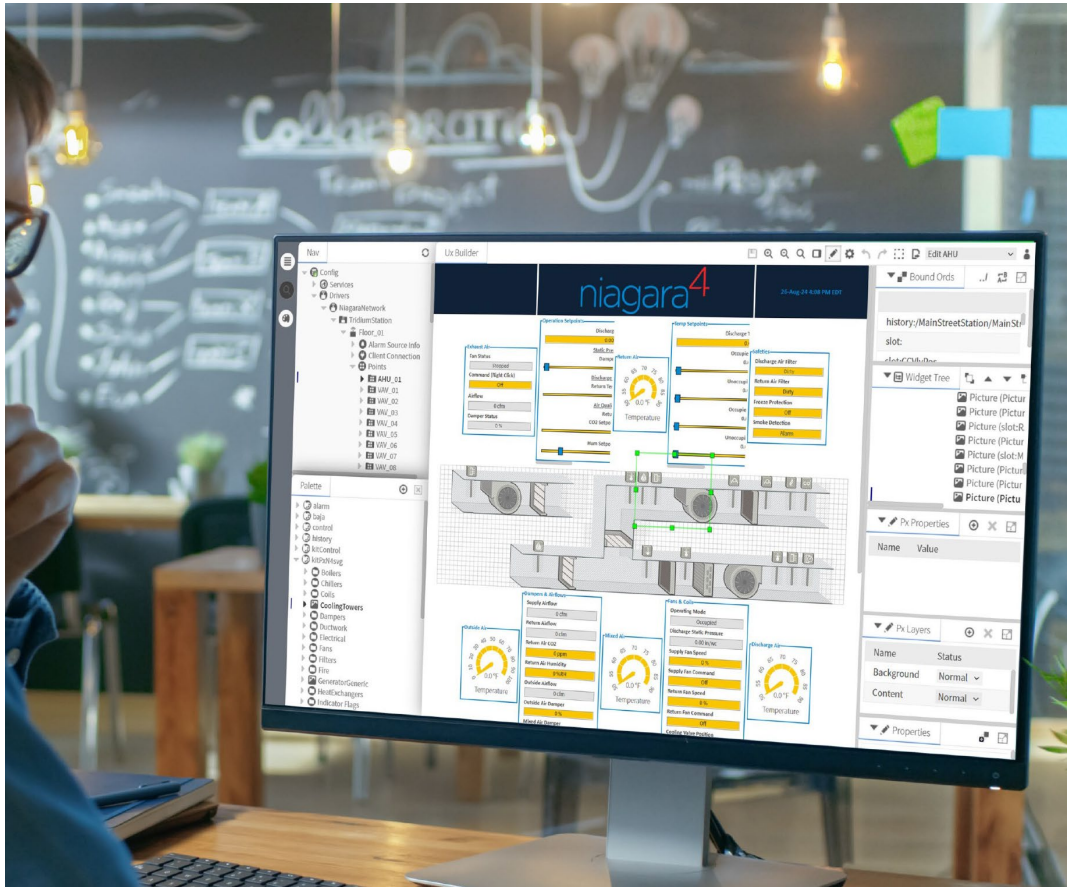


- Niagara cannot handle point count
- DDC is too slow
- Product isn’t as easily accessible compared to PLC
- Not enough DDC talent is out there comparatively
- Critical vs. Non-Critical: Redundancy & Robustness

THE HYBRID HURDLES

- Another list of spare parts to have and manage
- Ability to scale with speed
- Not many vendors that can do both (DDC & PLC)
- Layers of complexity

THE REALITY



- Limitations are at EQ level
- DDC is much simpler to implement vs. PLC
- Niagara Point Load is virtually unlimited

Ask the Pannel Q&A

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