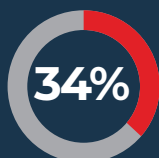# Energy management

A major metropolitan school district in the US with 269 schools chooses IoT.nxt to manage energy vs. occupancy as a service.

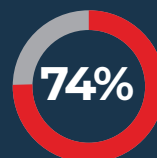| There are more adopters	They're seeing tangible benefits	That's encouraging them to do more	And that's why it's time to act
34%	**95%**	**58%**	**74%**
of companies are using IoT, with over three-quarters (76%) of those saying that it's mission-critical to them.	of adopters have already seen measurable benefits from IoT. And over half say those benefits are significant.	of adopters are using analytics platforms to get more from their IoT data to improve business decision-making.	of adopters say that within five years companies that haven't adopted IoT will have fallen behind their competition.

A 2003 study shows that students with the best daylighting in their classrooms progressed **20%** faster on math tests and **26%** faster on reading tests in one year than those with minimal daylighting.

Rebuilding or renovating schools to high performance standards can have multiple positive impacts, including:
- A healthier, more productive learning environment, which has been shown to improve test scores and student attendance.
- Energy efficiency and renewable energy lessons can be incorporated into curriculum.
- Energy efficiency is cost effective, reducing the life-cycle cost of new and renovated schools.

In many instances, educational institutions with legacy systems run at higher than normal energy load factors, which means equipment is run sub-optimally. This translates into educational institutions that are already financially stressed due to excessive spending on wasted energy. The primary objective of the IoT.nxt energy management solution is to reduce load factors by controlling and switching off any equipment when not required, thereby optimising the use of energy systems in real-time.

IoT.nxt integrates into BMS, HVAC, motion detection, energy monitoring, flow metering, security alarms and other systems within educational institutions. The data from these systems informs rules that are used by the IoT.nxt platform to control systems across schools intelligently in line with the ultimate goal - improving energy consumption.

Legacy systems in schools and higher education facilities fail to realise anywhere near full operational and cost efficiencies because it can seem too hard to make these older systems smart. Advancements in the form of IoT and a multitude of sensor technologies available has resulted in a fundamental shift closing the gap between the edge and the core of facilities, adding intelligence in the process to further streamline the relevance of interpreted data.

Correctly implemented, our solutions can increase a schools efficiency and play a significant role in reducing energy costs. IoT.nxt offers companies the ability to create interconnected and interoperable business operations and improve overall performance.

When combined with a well-designed and executed solution, these technologies can address the following industry challenges:

- Lack of visibility into energy usage across the ecosystem- Poor visibility into the balance of mass-energy usage.

- Legacy systems are dated, and proprietary- Modern methods seem out of reach because legacy systems are entrenched and often proprietary.

- System downtime is crippling– Downtime caused by equipment failure is causing excessively high overtime and maintenance costs.

IoT.nxt, Dell, Best, Minimise USA, Ensights on Microsoft Azure have combined to create an IoT solution that transforms the ecosystem, creating a horizontal interconnectedness with IoT.nxt Raptor intelligent edge gateway and Commander platform visualisation, Dell gateway hardware and the ability to integrate into BMS, HVAC, motion detection, energy monitoring, flow metering, security alarm and other systems at educational institutions. This enables us to use the data obtained from the aforementioned systems to inform rules that will be used by the IoT.nxt platform to control systems across schools intelligently; with the ultimate goal of improving energy consumption.

The solution enables businesses to fully leverage off all critical data points with the purpose of improving the ecosystem in which it operates, gaining insight into what energy is being used, where it is used and how this energy usage relates to students usage of these areas. Data also brings about an understanding of processes and efficiencies.
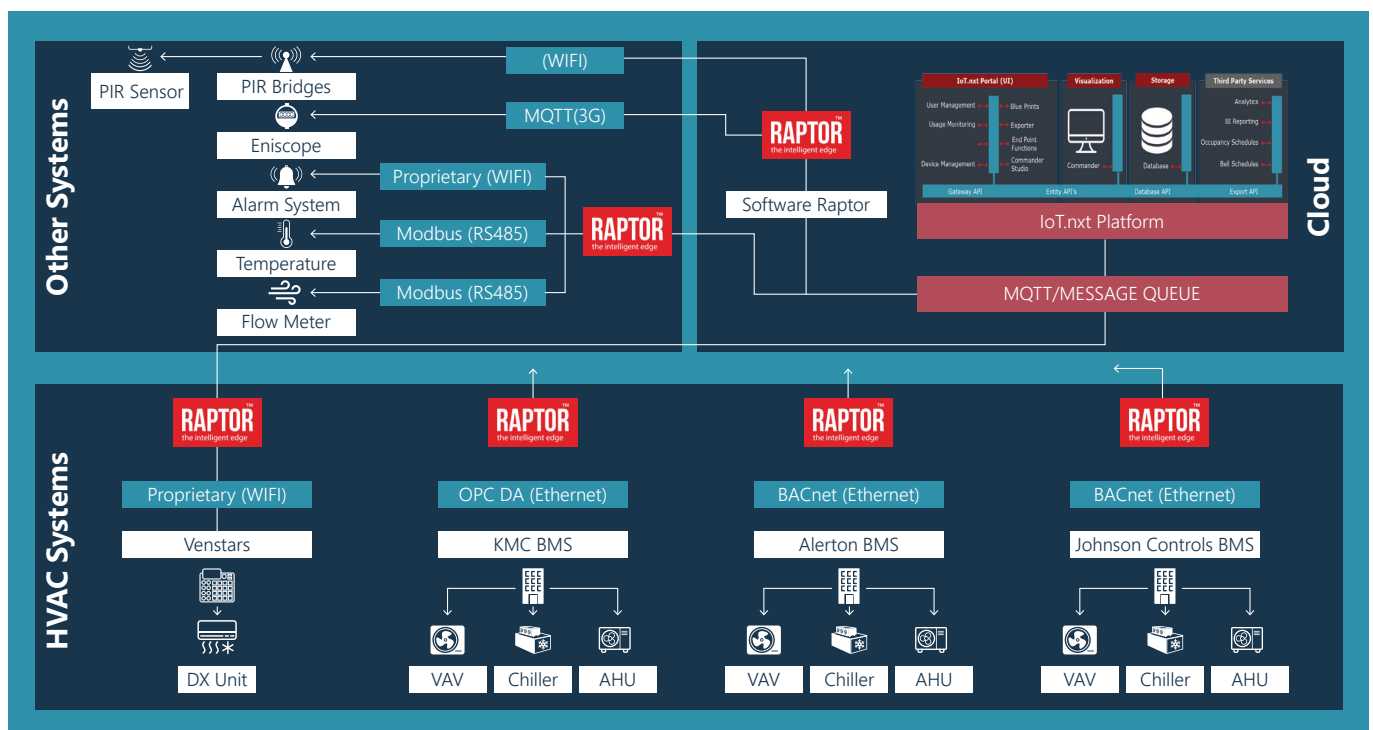
The IoT.nxt solution enhances existing ecosystems and enables companies to experience a powerful resurgence with compelling benefits:

● By connecting to existing HVAC systems and BMS applications, we can read energy usage and transfer these findings into usable and invaluable insights.

● By supplementing existing legacy systems with sensors we can, for example, measure classroom occupancy against energy and actuate HVAC and BMS accordingly to use the minimum viable amount of energy possible with considerable savings in mind but also with student comfort in mind creating a happy medium.

● Knowing the status of all things (equipment, suppliers, people) in the eco-system in real time, and building non-discretionary logic into this eco-system, fundamentally reduces waste at the source. Integrate, measure, analyse and actuate - the impact of this across the expansive value chain can be profound when iterated.

Solution Diagram

Offering a solution that has the flexibility to work with existing devices and services, means the customer will derive immediate value. The following diagram illustrates how, correctly implemented, components of this solution can be used to unify an entire business ecosystem to achieve optimal results organisation-wide. Our core digitisation technologies lay the foundation required for true transformation, obviating risks and potential data overload on networks.

Open IoT and Digital Experience Platform Components

Current Landscape

Scheduling/Reporting/Monitoring

Platforms
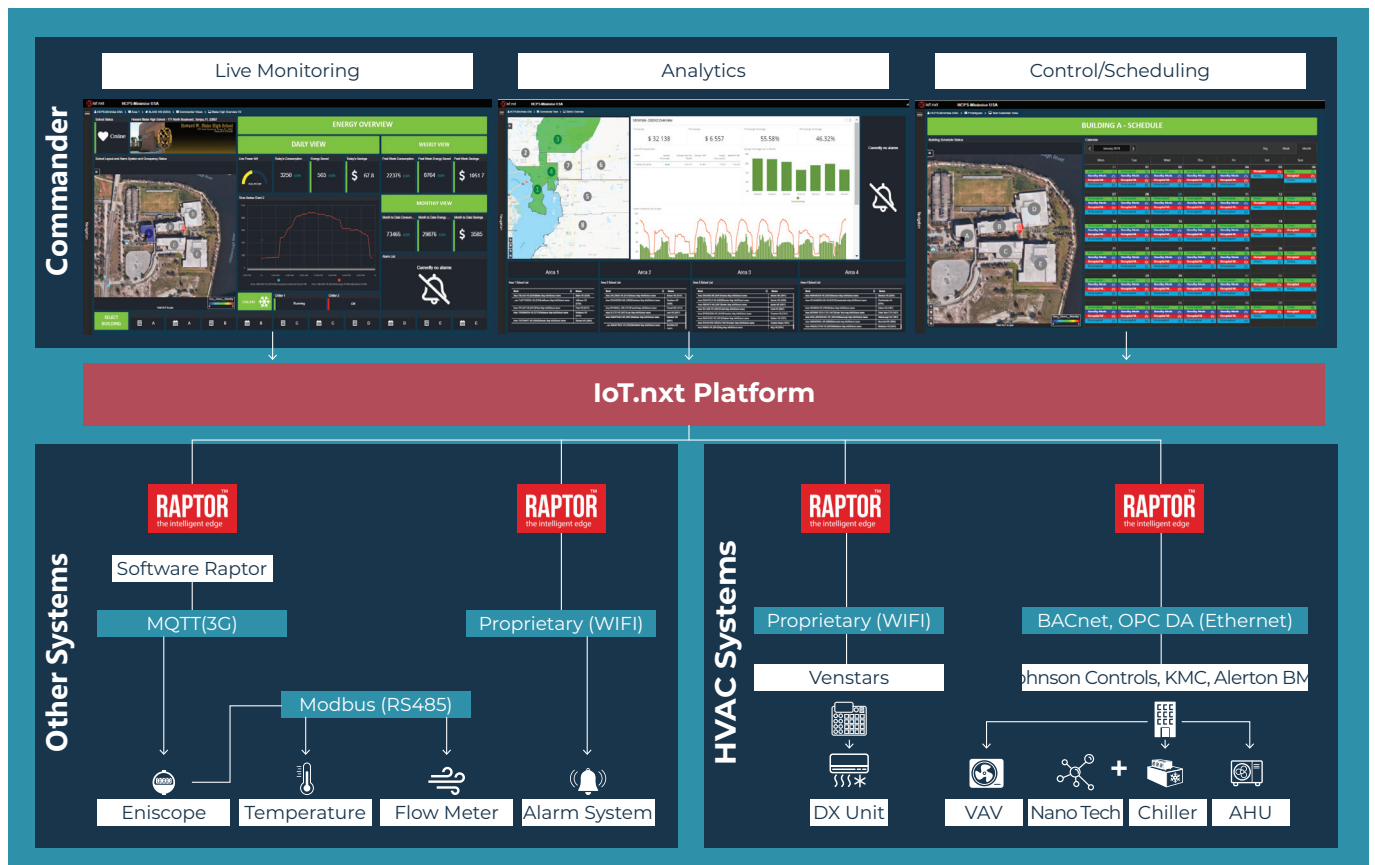
BEST Platform	Honeywell Platform	Venstar App	Metasys	KMC Platform

Other Systems

MQTT(3G) — Proprietary (WIFI)

Modbus (RS485)

Eniscope	Temperature	Flow Meter	Alarm System

HVAC Systems

Proprietary (WIFI)

Venstars

DX Unit

BACnet, OPC DA (Ethernet)

Johnson Controls, KMC, Alerton BMS

VAV	Chiller	AHU

New Raptor Landscape

Commander

Live Monitoring	Analytics	Control/Scheduling

IoT.nxt Platform

Other Systems

RAPTOR — the intelligent edge

Software Raptor

MQTT(3G)

RAPTOR — the intelligent edge

Proprietary (WIFI)

Modbus (RS485)

Eniscope	Temperature	Flow Meter	Alarm System

HVAC Systems

RAPTOR — the intelligent edge

Proprietary (WIFI)

Venstars

DX Unit

RAPTOR — the intelligent edge

BACnet, OPC DA (Ethernet)

Johnson Controls, KMC, Alerton BM

VAV	Nano Tech +	Chiller	AHU

IoT.nxt®
bridging the edge

6 Steps: The path to success

1| Reimagining business processes

Applying business analytical best practice, consider current SOPs, process and workflows that are performed across your business ecosystem to identify areas where standards and processes have not been optimised.

- Provide relevant insights and operational functionality to users.
- Leverage automation and integration to create a complete company overview and reliable, precise data collection.
- Enable primary business functions while accommodating anomalies that can cause downtime.

2| Avoiding an information overload

As businesses digitalise, caution should be paid to not overloading operators with information and to automate specific processes like maintenance scheduling where possible. Having insight into knock-on effects of activity may boost efficiency and the business bottom line. To ensure effectiveness, work to provide the right information to the right people to drive better decision making and improve employee accountability.

	IoT	Operational	Transactional
Example	Energy usage vs. Occupancy optimization and maintenance scheduling	Integrating into HVAC and BMS and measuring occupancy in classrooms and actuating cooling up or down to optimize energy and comfort levels	Real time measurement of energy and occupancy. Set points used to monitor performance of cooling systems. Event driven alerts generated. Scheduled maintenance events generated.
Sources	HVAC Integration, BMS integration, Occupancy sensors, Eniscope energy management, DELL Raptor to bring all sources together and to actuate on events	IoT.nxt Commander visualization, ERP integration, Analytics	Fully automated
Destinations	Chillers controls, HVAC controls, facility floor diagrams showing set points vs occupancy. Ensights energy management for analysis	IoT.nxt Commander, Analytics, actuation components, DELL Raptor	Billing tools and analytics

3| Ready, set, configure

Ruggedised to suit an industrial environment, designed to endure even the harshest condition and proven effective in the fields, the IoT.nxt technology stack is the answer to ensuring competitiveness, and relevance, in the years to come. Quick to install and easily customisable in any industry, an entire business ecosystem is connected into a centralised Commander dashboard and accessible remotely enabling real-time visibility and in-shift optimisation without disruption.

4| Connected your way, from edge to cloud

This flexible end-to-end solution connects non-IP based devices (2-wire and similar) through Raptor, our intelligent edge gateway, and connects IP-enabled devices directly to our IoT platform, Commander.

IoT.nxt®
bridging the edge

Once connected, data is consolidated from all devices and systems to provide a single horizontal view of your systems and devices across the entire business ecosystem.

Raptor technology creates a normalised edge layer of physical and virtual intelligence that can be retrofitted, deployed and connected seamlessly into an ecosystem of existing technologies and things, radically reducing the cost of having to develop multiple edge integrations into disparate cloud applications.

Being able to retrofit onto all deployed devices, whether analog- or IP-based reduces:

- disruption to business processes
- cost of implementation
- cost of training
- cost and impact of enterprise-wide change management
- vulnerability at the edge
- technology disparity at the edge
- data strain on, and therefore costs of, networks
- processing required at the cloud platform level
- cost of edge integrated gateway maintenance

Real-time subsystem integration allows cloud platforms to be leveraged as the up-, and down-stream effects of an event-triggered occurrence are recalibrated throughout all edge-connected devices. The pieces of any business puzzle are in the box, and ready to be pieced together to create a big picture.

5| Operationalise and reap the benefits

Surpassing industry benchmarks globally, this technology-agnostic solution can be implemented in any industry, on any system and in any process leading to the collection, normalisation and aggregation of unbiased, actionable data and real-time business intelligence. The knock-on effect of complete visibility into all operations, the knock-down of operational silos and minimisation of downtime and incidents across the business ecosystem can be felt almost immediately.

An entire ecosystem, in your hands

Implemented anywhere, this solution becomes an enabler for optimal results across the rest of your business. Operational requirements, tied in with big data and market shifts unlocks the opportunities for organisations to move into the future - and beyond - with agility, dynamically shifting with supply and demand, resource availability and, ultimately, growth. Watch it all from the palm of your hand.

Demystifying IoT

IoT.nxt is a unique rapid digitisation technology enabler that future-proofs enterprises, helping them leverage existing infrastructure investment and integrate into new technologies. The resulting interoperability and interconnectivity break down data silos and cuts out vendor lock-in.

Our IoT solution allows our clients to rapidly transform their businesses and move into the digital age quickly, and without disruption to operations.

Together with our solution partners, we work with businesses to design digitalisation strategies that are deployed in line with business goals, harnessing the magic that makes each organisation unique.

6| Repeatedly measure for constant improvement

The solution is designed to grow with your business by receiving relevant data in real time and to continuously analyse and change the rules by which you operate as it becomes necessary. Energy partners at Minimise USA can facilitate ongoing analysis and recommendations for optimisation.

It's your business. Only better.

To learn more, visit **www.iotnxt.com**

Contact IoT.nxt Sales to learn more about our ecosystem and to deploy this solution today.

IoT.nxt
bridging the edge