case study

Michigan School Reaches for Ambitious Goals Starting with its own Energy-Efficient Campus

Since 1878, University Liggett School (ULS) has been abiding by its founding mission "to help young people more completely realize that which is within them and in doing so make positive contributions to society." This includes teaching students about global sustainability goals. As Michigan's oldest, co-educational, pre-kindergarten through 12th-grade independent day school, ULS recognizes that its facilities need to demonstrate exemplary stewardship of the environment and of its funding. It is making strides toward both of these objectives with help from Niagara Partner, Conti.

A member company of Equans, Conti offers facility management and energy performance contract solutions tailored to the needs of institutions like ULS. Conti recently upgraded the school to a modern Niagara Framework®-based building management system. Now from a unified central console, the ULS Maintenance team can take a whole-campus approach to comfort-control, scheduling equipment operating hours, setting up alarm notifications, and doing data trending and analysis. With this upgrade to Niagara 4, Conti has provided a powerful, non-proprietary, and cost-effective foundation to ULS for not only the current challenges presented, but for potential future equipment upgrades and expansion.

CHALLENGE

The University Liggett School project included multiple buildings across its campus in Grosse Pointe Woods, Michigan, spanning over +60,000 square feet of climate-controlled space. Zones within the campus were served by a diverse mix of digitally-controlled pieces of equipment, each with its own operating system and user interface. These control systems ranged in age from brand new to legacy controls dating back 30 years. They communicated in different non-interoperable formats and via different communications channels, which inhibited the sharing of data. The scope of the BMS upgrade project included not only systems integration and data normalization to enable better orchestration of heating, ventilation and other building services, but also the school asked Conti to consider local energy saving initiatives in the controls design. This meant programming in the ability to coordinate with the local utility to reduce energy consumption when called upon, as well as to meet certain energy reporting guidelines.

University Liggett School

Due to the versatility of Niagara 4, Conti was able to integrate, control, and display equipment data that had not been viewed in years. The ULS Maintenance staff commented, "Finally, a system that works!"

FAST FACTS

Niagara Partner:

CONTI
AN EQUANS COMPANY

Project Type: Controls Retrofit of School Campus

Project area: 62283 square feet of climate-controlled area

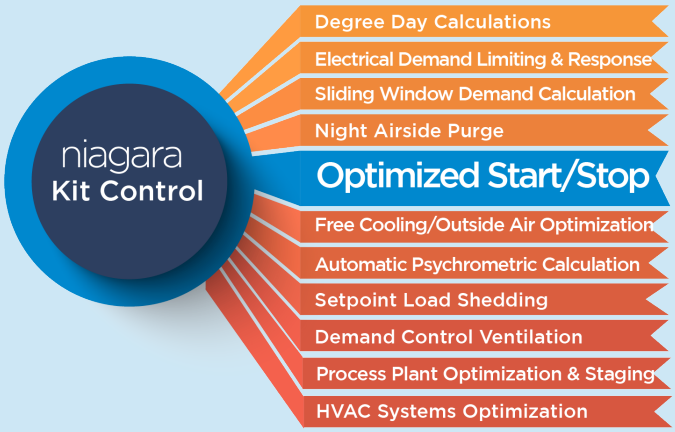
Project Scope: Services under Niagara management include HVAC, Power, Lighting, Occupancy and more to come

Key Technologies: Niagara Framework for data integration and normalization. Two JACE 8000s. One site supervisor running on a virtual machine hosted locally

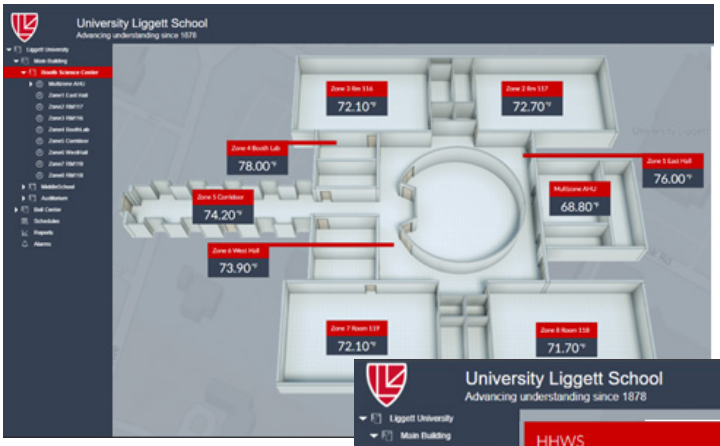
SOLUTION

The foundational step of the Conti solution was to decommission the existing multiple front-end systems and to centralize University Liggett School's equipment data into a single, easily accessible Niagara database with a unified user interface (UI). This UI provides a *single-pane-of-glass* (SPoG) from which campus facilities personnel can view operational data for major building services across campus. This has improved operational efficiency by providing easier visibility into analytical data for important building equipment, including the reporting of equipment alarms in a timely manner.

Once this central console for all the core building management activities was in place, Conti was able to deploy advanced energy saving tactics like Optimized Start-Stop. Also known as a *soft* warm-up and *soft* shut-down, this involves maintaining comfort conditions inside an occupied space, while programmatically delaying the start-up of heating/cooling equipment as long as possible and initiating shut-down as early as possible. Effectively deploying this tactic requires a feedback loop including analysis of area temperature changes and adjustment of the optimization parameters based on the actual temperature change rates after an optimized start or stop. The Niagara kitControl module enabled all this.

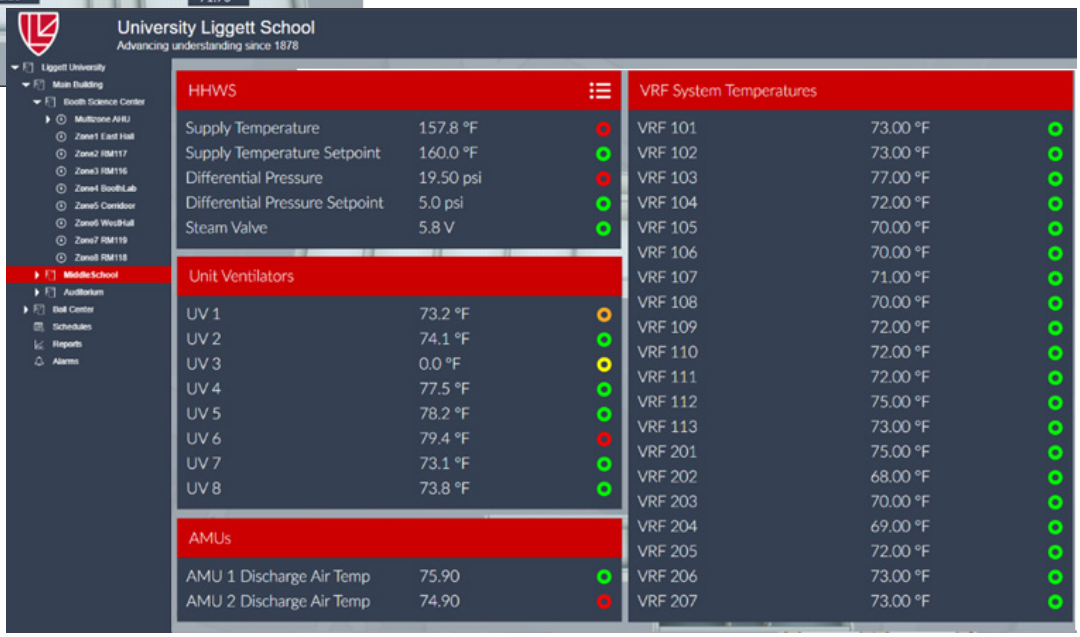


The Niagara kitControl module contains multiple easy-to-use logic blocks for proven energy saving and optimization strategies. The Conti team used the Optimized Start-Stop block to set parameters informed by desired space conditions and area characteristics. The algorithm then calculates an optimal amount of lead-time before a scheduled event.



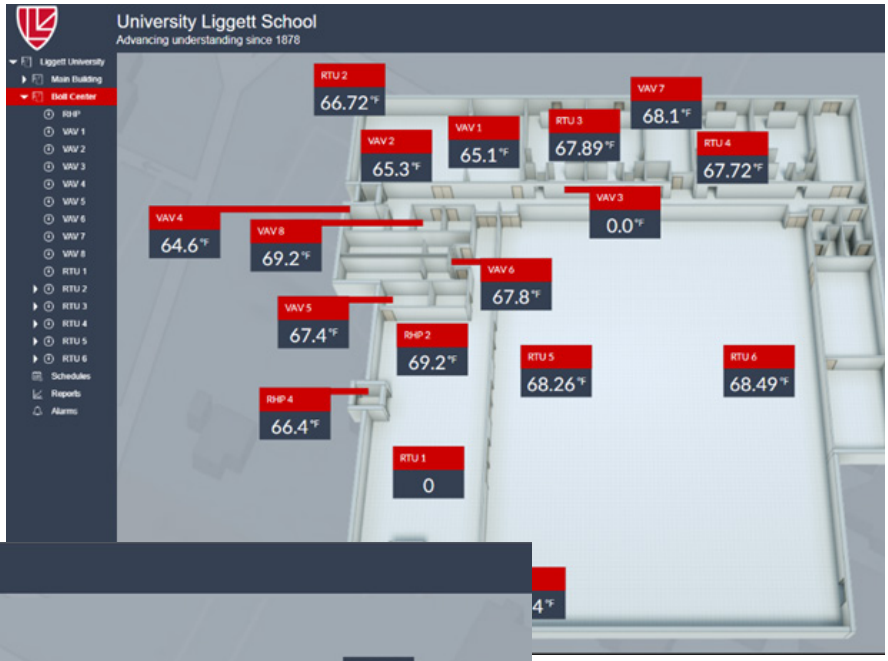
The UI developed by Conti with Niagara Workbench offers easily interpretable information starting with this heat-map view of a whole building. The visual temperature indication allows the ULS team to quickly determine any problem units and take fast action.

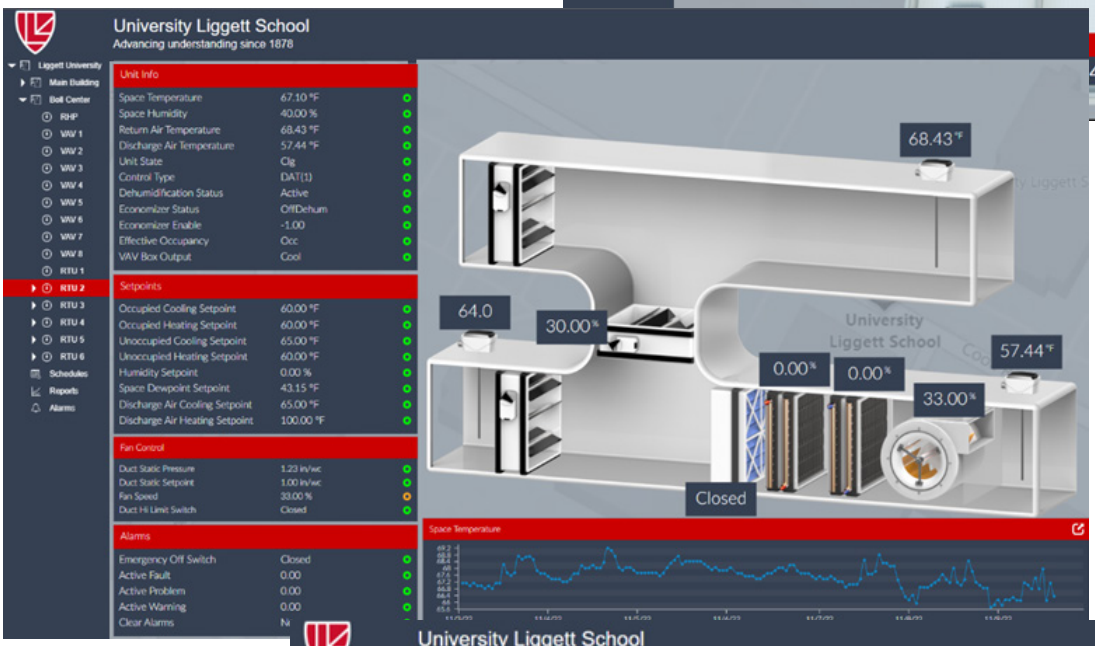
From the heat-map whole-building view, the user can navigate down to view equipment and see any alarm conditions.



Opened in September 2018, the 30,200 square-foot John and Marlene Boll Campus Center at ULS hosts atheletic events and provides community gathering space for students, alumni and the community in the surrounding Southest Michigan region.

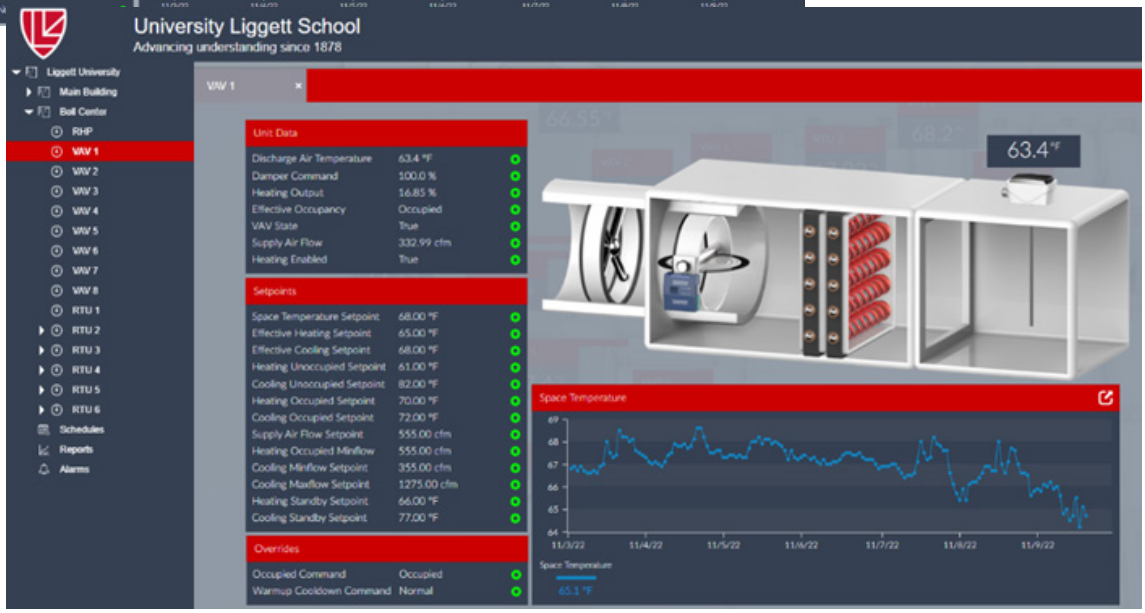
This heat-map view from the ULS BMS central console provides temperatures across the building with the ability to navigate down into the equipment serving its 14,500 square foot gymnasium, 300-person-capacity theatre, dance studio, arts gallery, commercial-grade kitchen and 100-person-capacity meeting space.

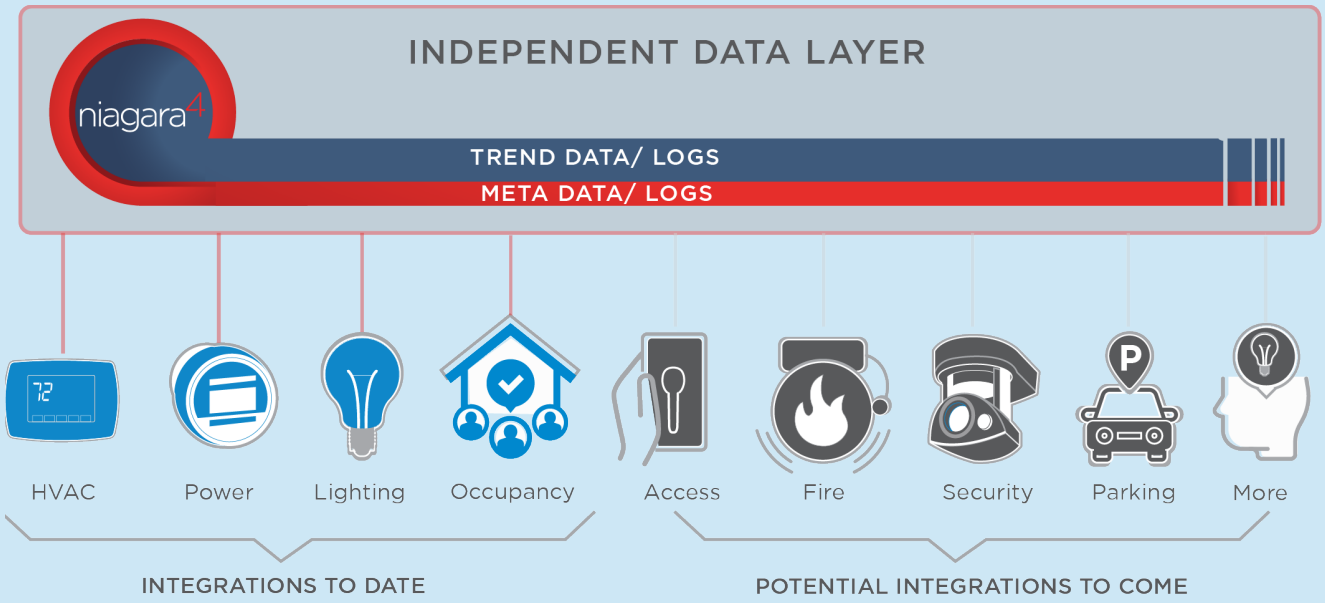




Equipment-level view with easily understood graphics that aid in pinpointing the source of issues.

VAV-level view. Visualizations are designed for easy, unambiguous interpretation to facilitate quick reaction and resolution of alarms.





To date, the Conti team has integrated HVAC, Power, Lighting and Occupancy building services under Niagara management with more to come. The State of Michigan has made available grants for the purchase of equipment and/or technology to improve the safety and security of schools. With its upgraded BMS, ULS has the infrastructure in place to use this funding for Access Control and Fire Safety integration.

RESULTS

Conti provided a cohesive, intelligent, and intuitive system to University Liggett School. As a result, the operational efficiency of the facilities planning and maintenance group has improved. To cite one example, the facilities group had lost access to a controls package dedicated to one important piece of legacy equipment. Due to the versatility of Niagara 4, Conti was able to integrate that subsystem into the upgraded BMS such that the ULS staff can once again control and display equipment data not viewed in years.

Another example concerns roof-top units serving the brand-new Boll Campus Center building. These had once been controlled manually from their local User Interfaces (UIs). Now they are under full remote control, and they can be scheduled to automatically power down when nobody is occupying the space.

Moreover, the integration of all the disparate control systems into a single platform hosted locally on campus has given the school a BMS platform for growth. Quick and easy-to-interpret alarms are now notifying the facilities staff of potential equipment failures, so they can act before comfort is impacted. And, software analytics modules are capturing and displaying performance trends, giving the school a deeper look into space comfort and unit operation.

By implementing the proposed energy saving programs, Conti has created a more energy efficient system and secured thousands of dollars in rebates for the school. Conti is proud of all these results which have been made possible by Tridium's Niagara Framework software.

ABOUT CONTI CORPORATION

Conti, an Authorized Niagara Reseller, is a nationally respected multi-trade contractor with an impressive history of quality and service. Since 1969, Conti has led the industry in the development of design and construction solutions that address job requirements while surpassing performance expectations. Today, Conti performs the complete lifecycle of construction services from design/build to field installation, training and maintenance for an array of services. To learn more, visit: www.conticorporation.com.

ABOUT TRIDIUM

Tridium is a world leader in open protocol business application frameworks — advancing truly open environments that harness the power of the Internet of Things. Tridium's Niagara products enable diverse monitoring, control and automation systems to communicate and collaborate in buildings, data centers, manufacturing systems, smart cities and more. Tridium's Niagara products are at the core of smarter, safer and more efficient enterprises and communities — bringing intelligence and connectivity to the network edge and back. Additional information about Tridium is available at www.tridium.com

TRIDIUM
tridium.com

Americas: support@tridium.com
EMEA: ordersEMEA@tridium.com
Asia-Pacific: tsupportAP@tridium.com