

NS2024

APRIL 15 - 17 | ANAHEIM, CA

Advanced Visualization

Tools To Elevate Niagara User Experience

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NS2024

ANAHEIM, CA | APRIL 15-17

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Evolving Expectations

Building owners have key expectations for their systems

- State of the art controls engineering and system integration
- Secure integration with IT infrastructure
- White-glove customer care and technical support

As consumer technology pushes forward, these expectations are evolving.

- Cross-device compatibility
- Modern, consistent user experience and interface



Evolving Expectations

System integrators are left to wear many hats on projects

- Equipment and mechanical expert
- Controls engineer
- Energy manager
- IT professional
- Network admin
- Customer service representative
- Salesperson
- Web developer
- Graphic designer
- User experience architect



Current Scenario

Niagara4



N4 IS AWESOME

The leading open platform and talks to everything. Comprehensive, fully featured engineering tool



ENGINEERING PLATFORM

N4 is an engineering platform first and foremost it's not a design tool



PXEDITOR

A blank canvas approach doesn't cut it when creating modern experiences. You need HTML, JavaScript, and CSS



CONTROLS TEAM

Web developers, graphic designers, and UX architects are not on staff. SIs can't be expected to become experts

Current Scenario

Niagara4

The system may be a modern marvel of engineering, but a user's first impression often looks like this



DOESN'T
WORK ON
MOBILE

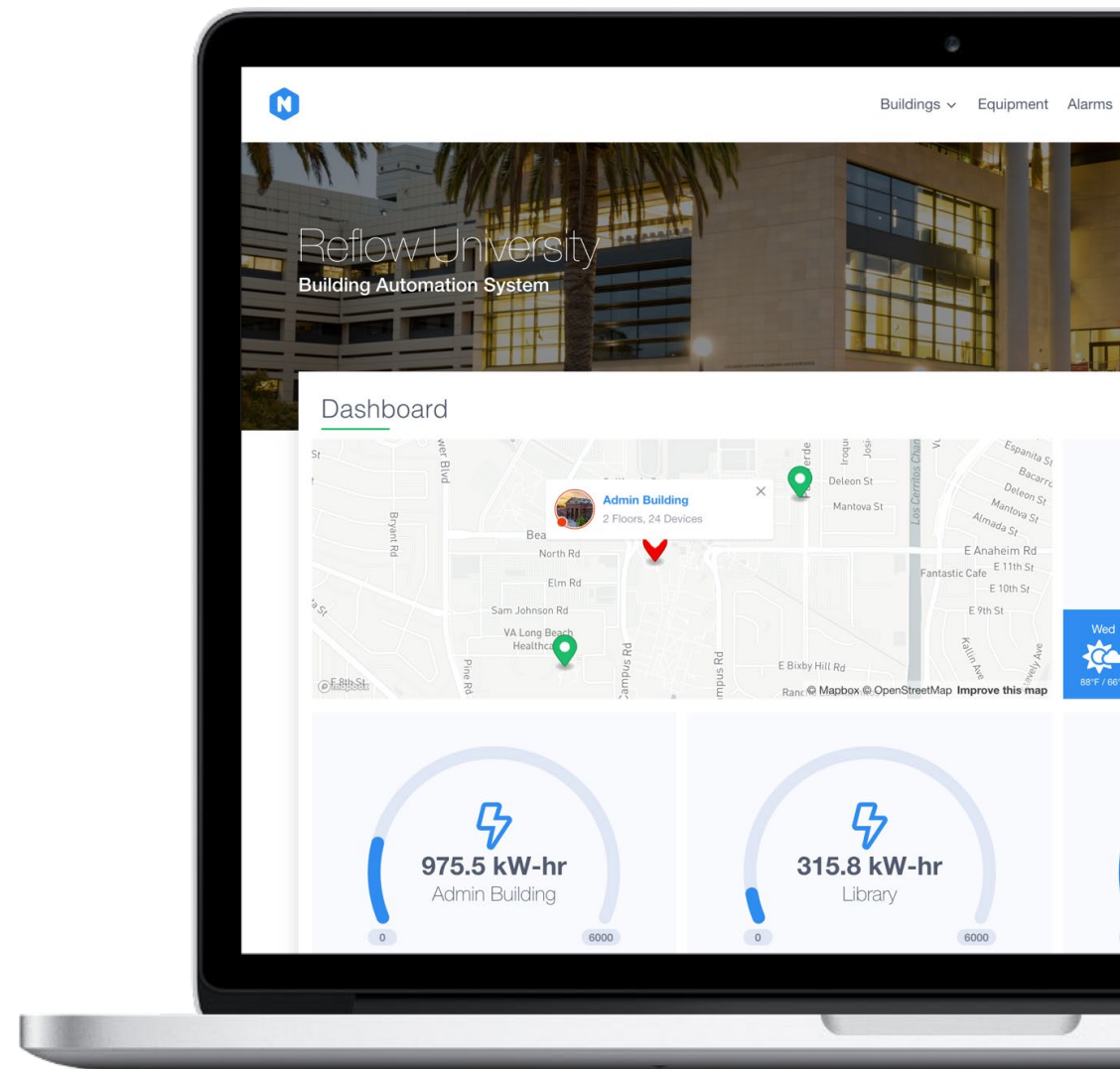
OUTDATED
DESIGN

COMPLEX TO
SETUP

Product Design & Philosophy

The modern web is built on standards and common user interface conventions – not blank canvases.

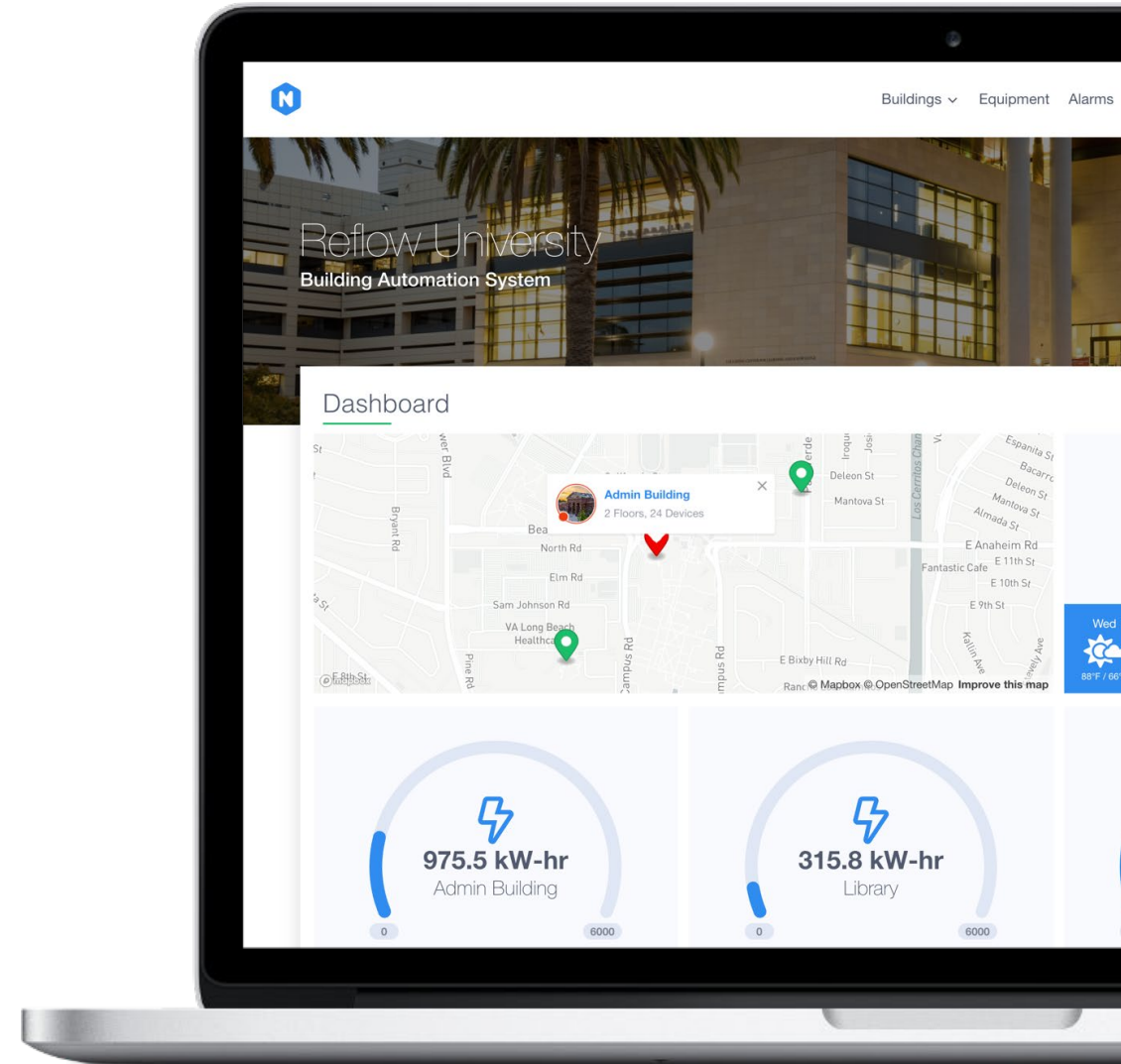
Reflow provides a set of design frameworks, page layouts, and components that bring Niagara 4 data into a modern web application structure that adhere to standards and common conventions.



Product Design & Philosophy

The modern web is built on standards and common user interface conventions – not blank canvases.

Reflow provides **well designed UX**



What is UX?

Definition

'UX' stands for User Experience, which focuses on the user's interaction with a product, system,

Objective

Ensure a system is easy, efficient, and enjoyable to use

Core Elements

Usability, functionality, consistency, simplicity, and user satisfaction

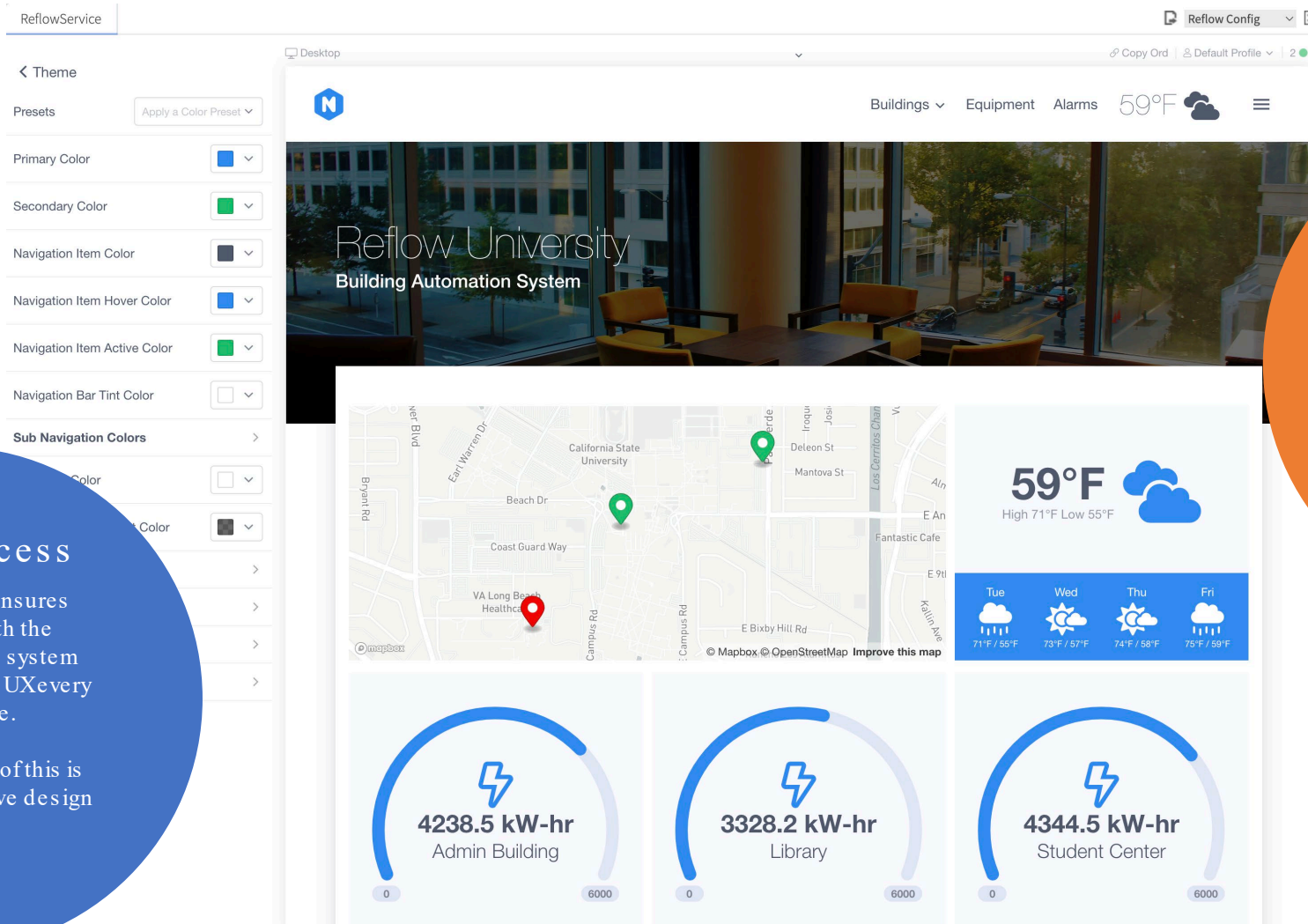
Strong ROI

Satisfied customers, faster project completion, less training, and less technical support

Design Process

Strict process that ensures users interacting with the building automation system enjoy well-designed UX every time, on every device.

The key component of this is the use of responsive design

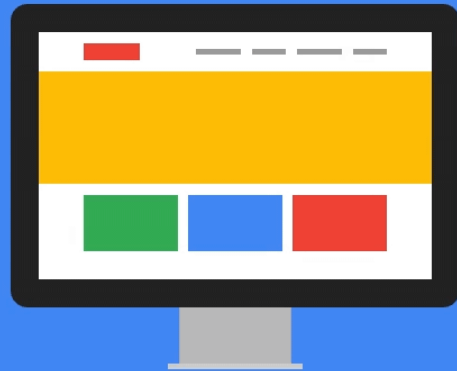


UX for SIs

The same process is applied to Reflow's configuration system, ensuring good UX for SIs while they're building projects.

Responsive Design

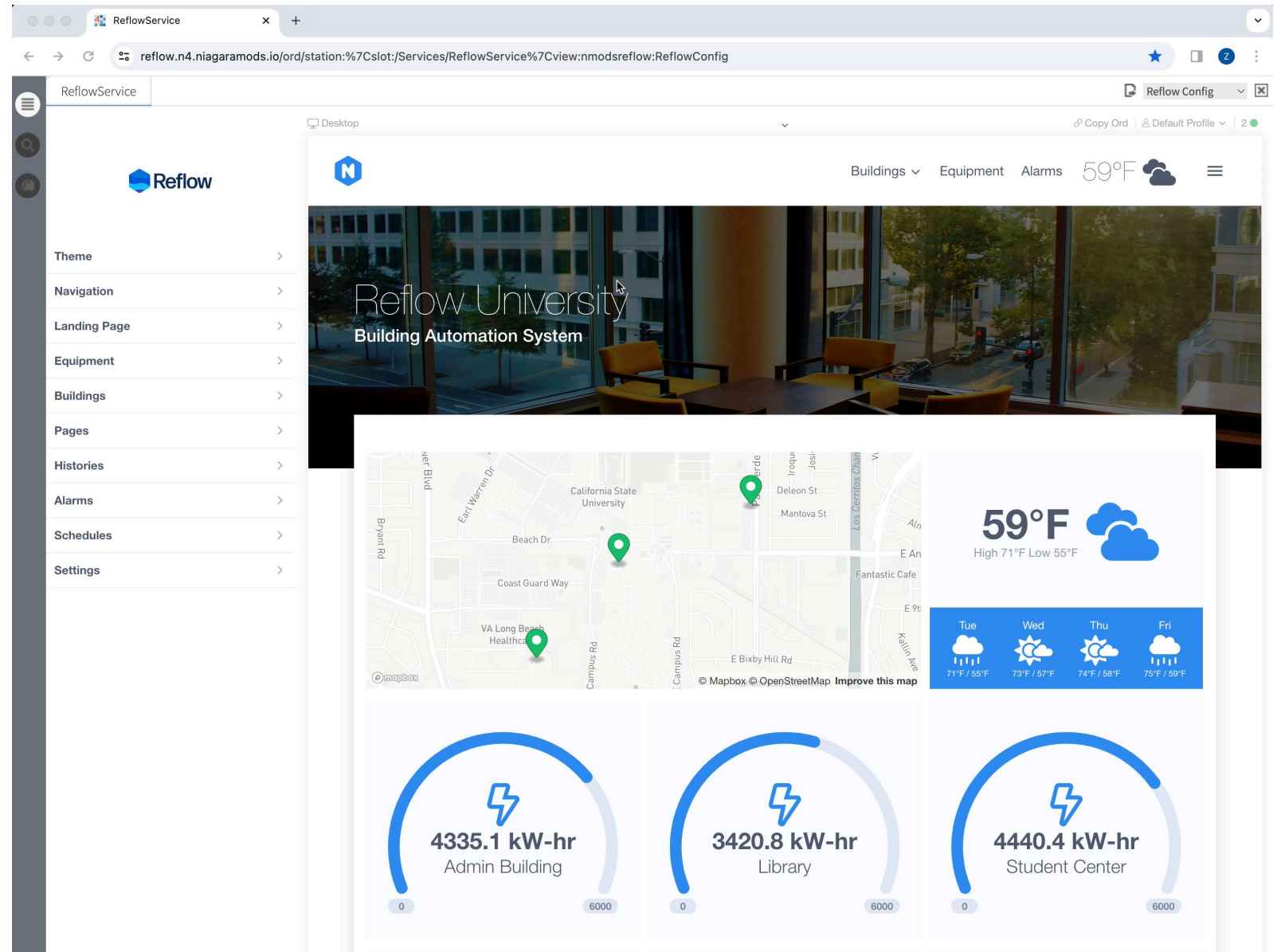
An approach to web design where interfaces dynamically adapt to provide the optimal viewing experience across various devices & screen sizes



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Capability

- Mobile/Tablet friendly (Responsive)
- System Health Report



How can we quickly assess and track the health of our overall Niagara Network?



Online?
Reboots?
Devices down?



Points in Fault?
Orphaned Histories?



CPU Performance?
Watch Dog Issues?



Station Health®

Drag and drop service to track the core health of your network



Station Health Performance Report

Performance report based on the last seven days of data.

General Information

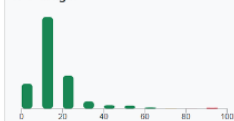
Station name: Student_Center_East
Station reboots: 0
Niagara version: 4.8.0.110
Last station save: 2023-04-13
Station uptime: 9 days
Last backup: 2021-09-22

License Information

Host ID: Qme-TITAN-XXXX-XXXX-XXXX
Device capacity: 64 of 101 63.4%
SMA expires: 2022-08-27
Point capacity: 2,652 of 5,000 53.0%

Hardware Performance

CPU usage:

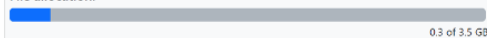


The cpu was above 80.0% for 2.1 hours.

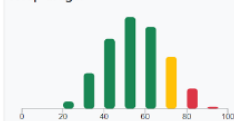
CPU spike index: 1.2%

Heap spike index: 12.3%

File allocation:



Heap usage:



The heap was above 75.0% for 20.7 hours.

EWT index: 19.2%

Peak engine scan: 57.5s

Overall Health KPI



User Interface Performance

Actions invoked:	31	↑ 27
Login count:	0	↓ 6
Login failure count:	0	—
Override count (average):	22	↑ 4
Override count (current):	24	—
Open alarm count (average):	154	—
Open alarm count (current):	182	—

History Performance

History extension count:	2,617	—
Trend record count:	2,623	—
Fault history count:	0	—
Record capacity (maximum):	672	—

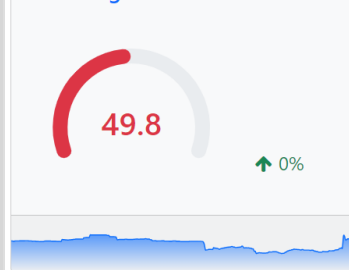
Application Performance

Severe error count:	456	↑ 354
Warning error count:	8	↓ 16



University Campus - Station Health Dashboard

Average Station Health KPI



Niagara Connections

10 of 13 total stations being monitored.

Device Connections

491 of 501 total field devices communicating.

Niagara Versions

0 stations at AX 3.8 or lower.

13 stations at N4.1 or higher.

Top Five - Stations w/ High CPU Usage

Station	CPU
Hospital_OP_CenterA	32.0%
Bldg_Lights	31.8%
Bldg_98_Cafe	28.2%
Hospital_OP_CenterB	27.5%
Office_Bldg42	23.0%

Station Summary

Export

Station Name	Niagara Version	Uptime	CPU Usage	Heap Usage	Down Device Count	Overrides	KPI
Hospital_OP_CenterA	4.10.0.154	9 days	32.0%	29.7%	7	45	56.6
Bldg_98_Cafe	4.8.0.110	57 days	28.2%	56.3%	0	46	41.1
Maintenance_BldgC	4.10.0.154	9 days	14.1%	29.6%	0	20	51.0
Office_Bldg56	4.10.0.154	265 days	19.4%	40.8%	0	25	50.7
Main_HQ	4.10.0.154	125 days	20.0%	54.1%	0	23	45.6
Bldg_Lights	4.10.1.36	90 days	31.8%	55.3%	0	27	47.0
Student Center East	4.8.0.110	9 days	18.5%	57.6%	0	24	43.4

Report View

User Interface Performance

Actions invoked:	98	↑ 52
Login count:	3	—
Login failure count:	0	—
Override count (average):	32	↓ 2
Override count (current):	25	—
Open alarm count (average):	370	↑ 203
Open alarm count (current):	500	—

History Performance

History extension count:	578	—
Trend record count:	578	—
Fault history count:	0	—
Record capacity (maximum):	43,000	—



Station Health Performance Report

Performance report based on the last seven days of data.

General Information

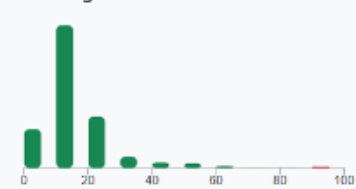
Station name:	Student_Center_East	Station reboots:	0
Niagara version:	4.8.0.110	Last station save:	2023-04-13
Station uptime:	9 days	Last backup:	2021-09-22

License Information

Host ID:	Qnx-TITAN-XXXX-XXXX-XXXX-XXXX	Device capacity:	64 of 101	63.4%
SMA expires:	2022-08-27	Point capacity:	2,652 of 5,000	53.0%

Hardware Performance

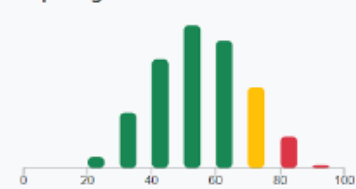
CPU usage:



The cpu was above 80.0% for 2.1 hours.

CPU spike index:	1.2%	—
Heap spike index:	12.3%	—

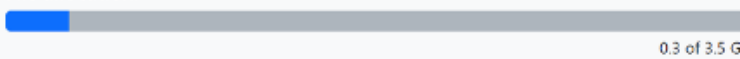
Heap usage:



The heap was above 75.0% for 20.7 hours.

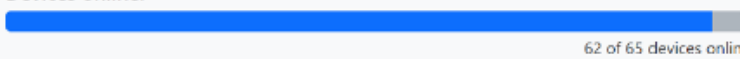
EWT index:	19.2%	—
Peak engine scan:	57.5s	↑ 1.9s

File allocation:



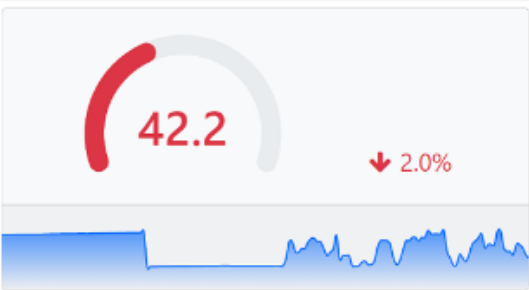
Communication Performance

Devices online:



Device uptime index:	100.0%	—
Fault points count:	41	—

Overall Health KPI



User Interface Performance

Actions invoked:	31	↑ 27
Login count:	0	↓ 6
Login failure count:	0	—
Override count (average):	22	↑ 4
Override count (current):	24	—
Open alarm count (average):	154	—
Open alarm count (current):	182	—

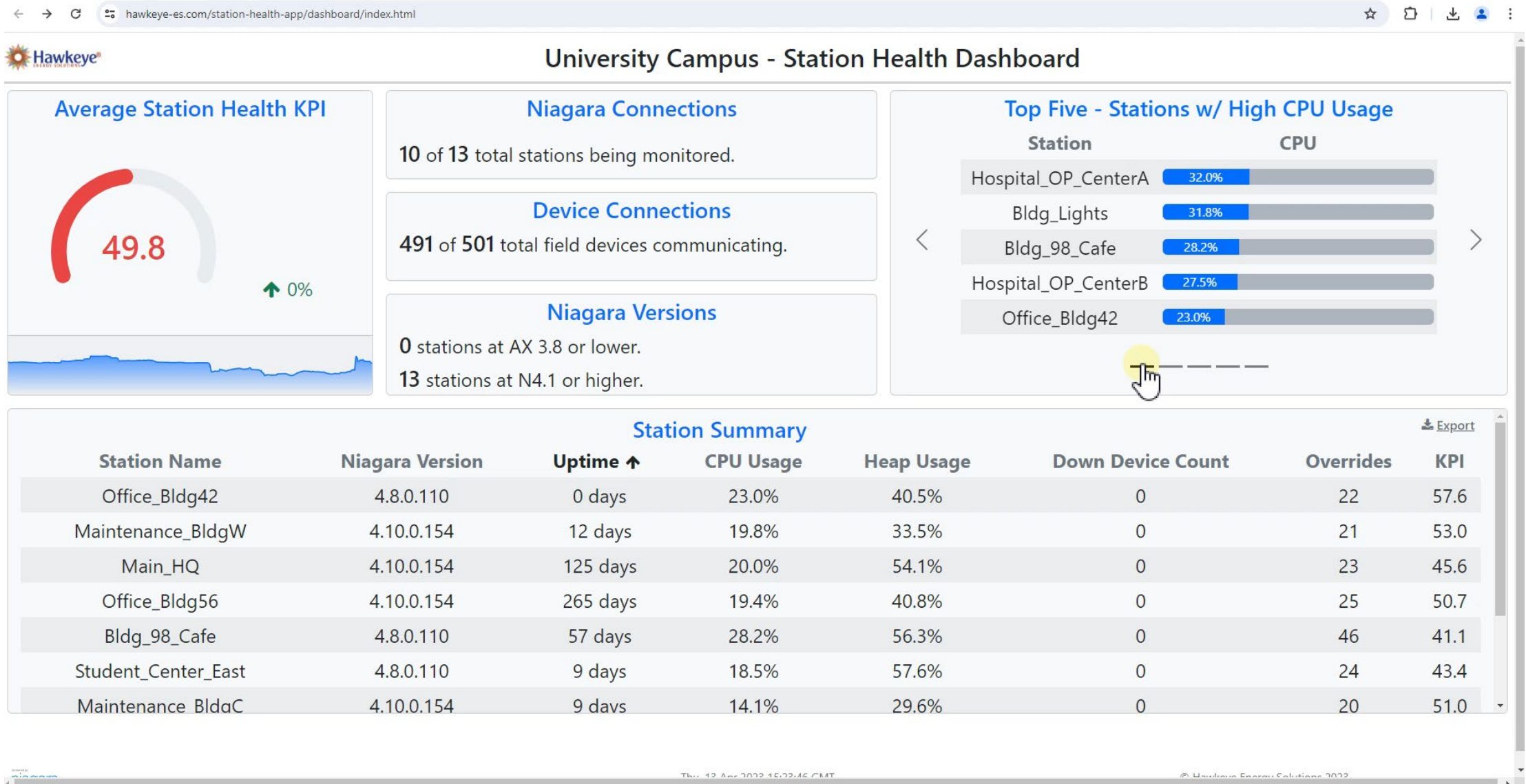
History Performance

History extension count:	2,617	—
Trend record count:	2,623	—
Fault history count:	0	—
Record capacity (maximum):	672	—

Application Performance

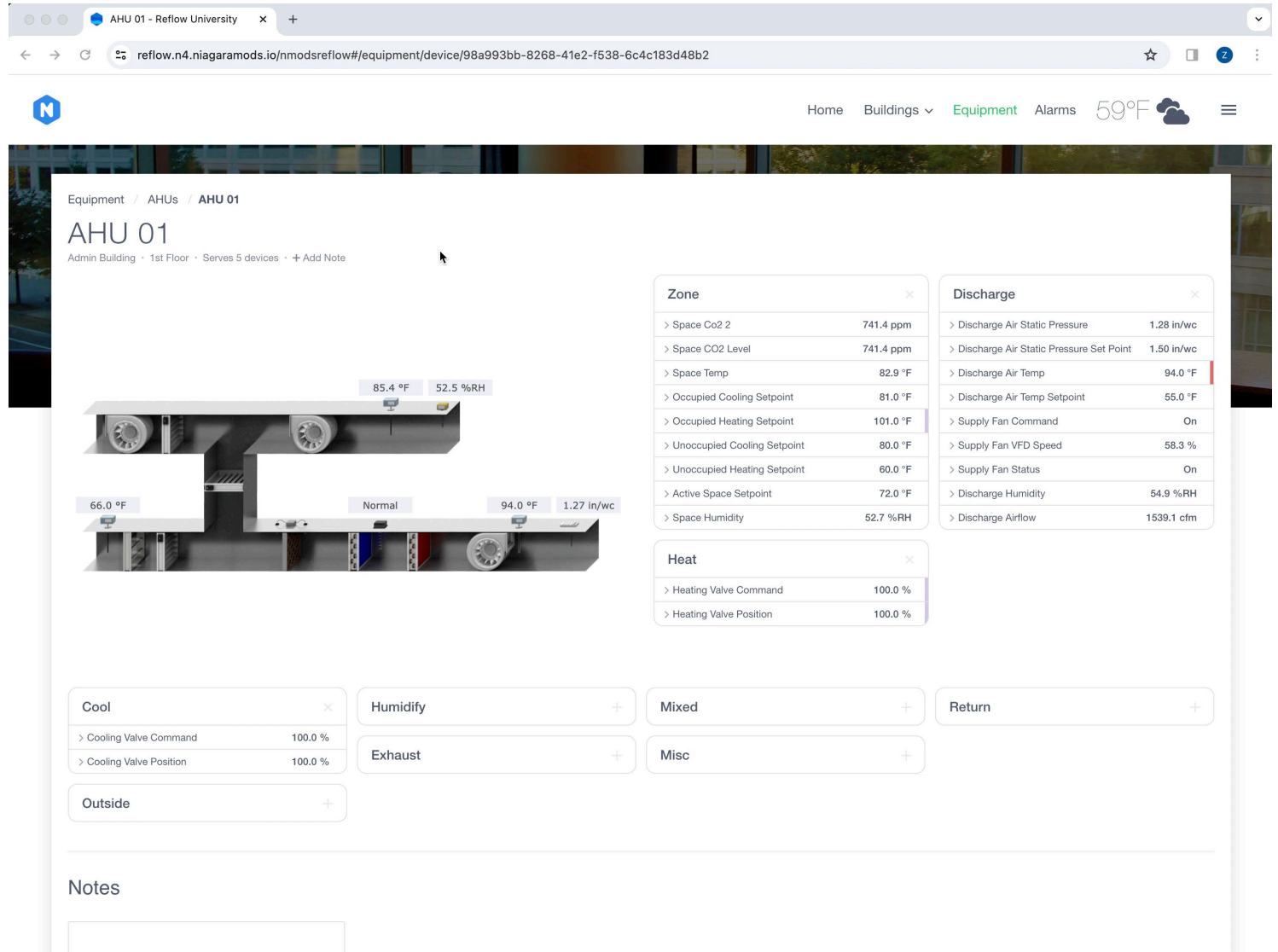
Severe error count:	456	↑ 354
Warning error count:	8	↓ 16

Supervisor Dashboard



Communication

- Niagara Notes
- Point Status Badges



Equipment / AHUs / AHU 01

AHU 01

Admin Building • 1st Floor • Serves 5 devices • + Add Note

85.4 °F 52.5 %RH

66.0 °F Normal 94.0 °F 1.27 in/wc

Zone	
> Space Co2 2	741.4 ppm
> Space CO2 Level	741.4 ppm
> Space Temp	82.9 °F
> Occupied Cooling Setpoint	81.0 °F
> Occupied Heating Setpoint	101.0 °F
> Unoccupied Cooling Setpoint	80.0 °F
> Unoccupied Heating Setpoint	60.0 °F
> Active Space Setpoint	72.0 °F
> Space Humidity	52.7 %RH

Discharge	
> Discharge Air Static Pressure	1.28 in/wc
> Discharge Air Static Pressure Set Point	1.50 in/wc
> Discharge Air Temp	94.0 °F
> Discharge Air Temp Setpoint	55.0 °F
> Supply Fan Command	On
> Supply Fan VFD Speed	58.3 %
> Supply Fan Status	On
> Discharge Humidity	54.9 %RH
> Discharge Airflow	1539.1 cfm

Heat	
> Heating Valve Command	100.0 %
> Heating Valve Position	100.0 %

Cool	
> Cooling Valve Command	100.0 %
> Cooling Valve Position	100.0 %

Humidify	
> Humidify Command	100.0 %
> Humidify Position	100.0 %

Mixed	
> Mixed Command	100.0 %
> Mixed Position	100.0 %

Return	
> Return Command	100.0 %
> Return Position	100.0 %

Exhaust	
> Exhaust Command	100.0 %
> Exhaust Position	100.0 %

Outside	
> Outside Command	100.0 %
> Outside Position	100.0 %

Notes

How can Niagara help us track and stay on top of operational issues?

✓ Why is that valve overridden?
Why is that disconnect off?
Did the sensor get ordered?

✓ When did this programming change?

✓ What happened over the weekend?
Did the midnight shift have any problems?



Niagara Notes[®]

Responsive messaging and notes application built right into the Niagara Framework.

Add a New Note

Campus

North Campus

Site

Building 400

Equipment

AIR COMPRESSOR 3

Subject

Down

Details

Enter Details

Close

Add Note

Niagara Notes[®]

Sort By: Recent ↓

Boiler 1 Controller Reboot

South Campus / Phar...

2

4/9/2024 12:56 PM

admin

4/9/2024 12:56 PM

Down went down on main page. Power cycle brought it back online.

BRIAN_BELL

4/11/2024 6:11 PM

Down went down again last night

Jdavis

4/11/2024 6:13 PM

The controls team looked at this and determined the control board is failing. New one on order. 2 weeks out.

Reply...

↩

Boiler 1 OAT Sensor Repair

South Campus / Phar...

0

4/9/2024 12:56 PM

PUMP-CHW1 Pump is leaking

South Campus / Phar...

0

4/9/2024 11:31 AM

AHU-5 Leaking CHW Coil

South Campus / Colle...

0

4/9/2024 11:29 AM

AHU-5 Return Damper Not Modulating

South Campus / Colle...

2

3/31/2024 7:00 AM

PUMP-CHW1 Leaking

South Campus / Phar...

0

4/9/2024 11:31 AM

powered by

niagara

11-Apr-24 6:22 PM CDT

v4.10.1.0

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Niagara Notes®

Responsive messaging and notes application built right into the Niagara Framework.

The screenshot displays the Niagara Notes application interface. At the top, the 'Niagara Notes' logo is visible. Below it, a search bar and filter settings are present. The main area shows a list of notes, with the first note selected and its details expanded. A blue arrow points from the 'Boiler 1' note in the list to the expanded view. The expanded view shows the note title 'Boiler 1', location 'South Campus / Phar...', and a list of messages. The first message is from 'admin' dated 4/9/2024 12:56 PM, stating 'Data went down on main page. Power cycle brought it back online.' Below this, a message from 'BRIAN_BELL' dated 4/11/2024 6:11 PM is visible, mentioning 'It went down again last night'. The interface also includes a 'Sort By: Recent' dropdown and a 'Card' toggle. The bottom of the screen shows the 'powered by niagara' logo, the date and time '11-Apr-24 6:22 PM CDT', and the version 'v4.10.1.0'. The copyright notice '© Hawkeye Energy Solutions 2024' is also present.

Niagara Notes®

Sort By: **Recent** ↓

Boiler 1 Controller Reboot 2 4/9/2024 12:56 PM
South Campus / Phar...

admin 4/9/2024 12:56 PM
Data went down on main page. Power cycle brought it back online.

BRIAN_BELL 4/11/2024 6:11 PM
It went down again last night

4/11/2024 6:13 PM
at this and determined the control board is failing. New one on order. 2

AT Sensor Repair 0 4/9/2024 12:56 PM

ump is leaking 0 4/9/2024 11:31 AM

leaking CHW Coil 0 4/9/2024 11:29 AM

eturn Damper Not Modulating 2 3/31/2024 7:00 AM
South Campus / Colle...

PUMP CHW1 Leaking 0

powered by **niagara**

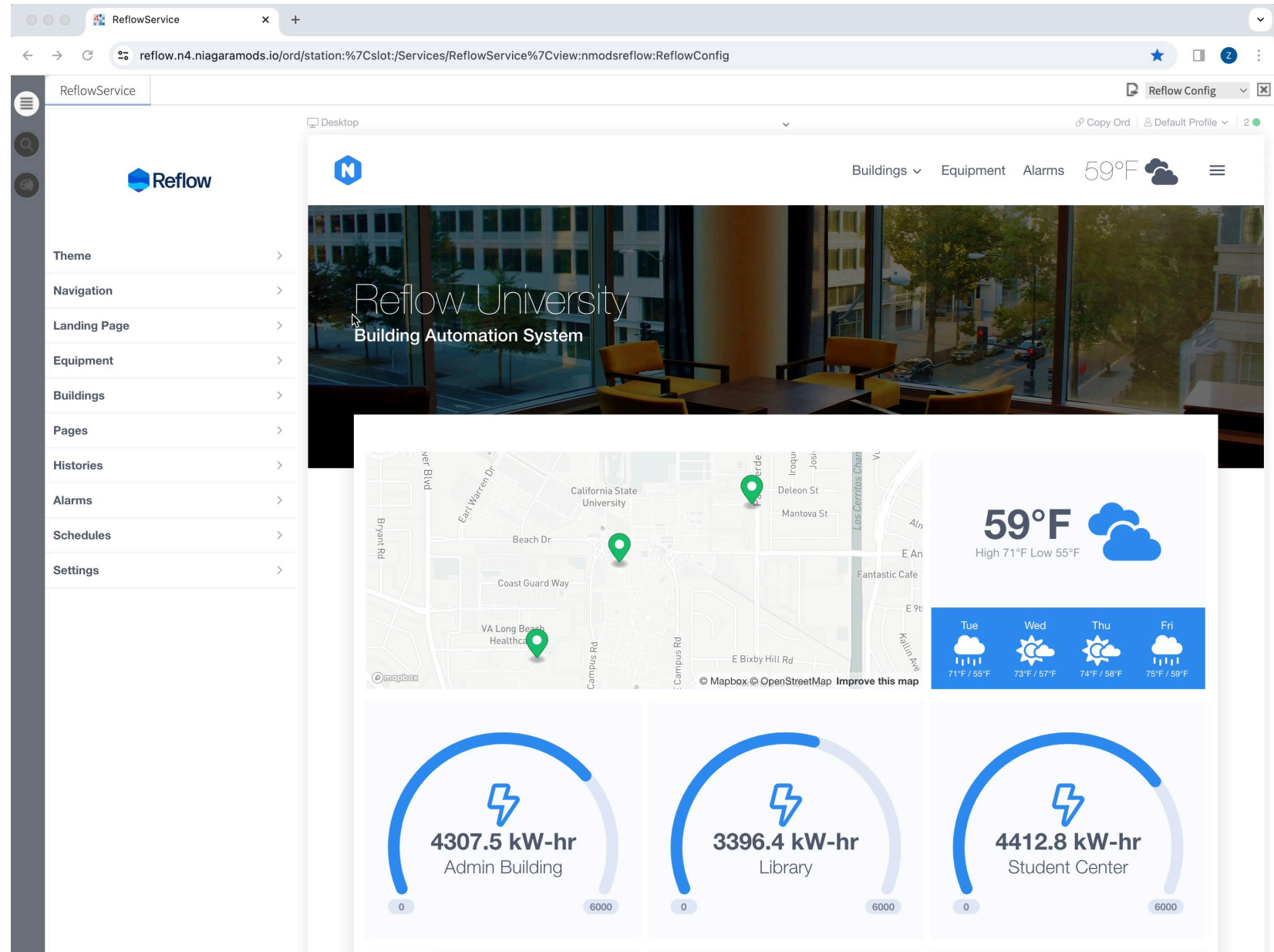
11-Apr-24 6:22 PM CDT
v4.10.1.0

© Hawkeye Energy Solutions 2024

			Sort By: Recent ↓
VAV-104 South Campus / Building 856	Room Heat	0	4/11/2024 9:09 PM
Boiler 1 South Campus / Pharmacy Building	Controller Reboot	3	4/9/2024 12:56 PM
Boiler 1 South Campus / Pharmacy Building	OAT Sensor Repair	1	4/9/2024 12:56 PM
PUMP-CHW1 South Campus / Pharmacy Building	Pump is leaking	0	4/9/2024 11:31 AM
AHU-5 South Campus / College of Business	Leaking CHW Coil	0	4/9/2024 11:29 AM
AHU-5 South Campus / College of Business	Return Damper Not Modulating	2	3/31/2024 7:00 AM
PUMP-CHW1 South Campus / Pharmacy Building	Leaking	0	3/31/2024 6:59 AM
PUMP-HX-1 South Campus / Building 856	VFD Fault	2	3/31/2024 6:58 AM
AHU-4B North Campus / Building 400	Filters Again	0	3/31/2024 6:56 AM
AIR COMPRESSOR 3	oil filter	0	

Context

- Visual HVAC
- Point Info Markers



How can we leverage Niagara to add more context to save time and inform decision making?

- ✓ What does AHU-1 really look like?
Where is the IOM located?

- ✓ Where is the return valve for the heat exchanger located?

- ✓ Where is the VAV box located in conference room 105?

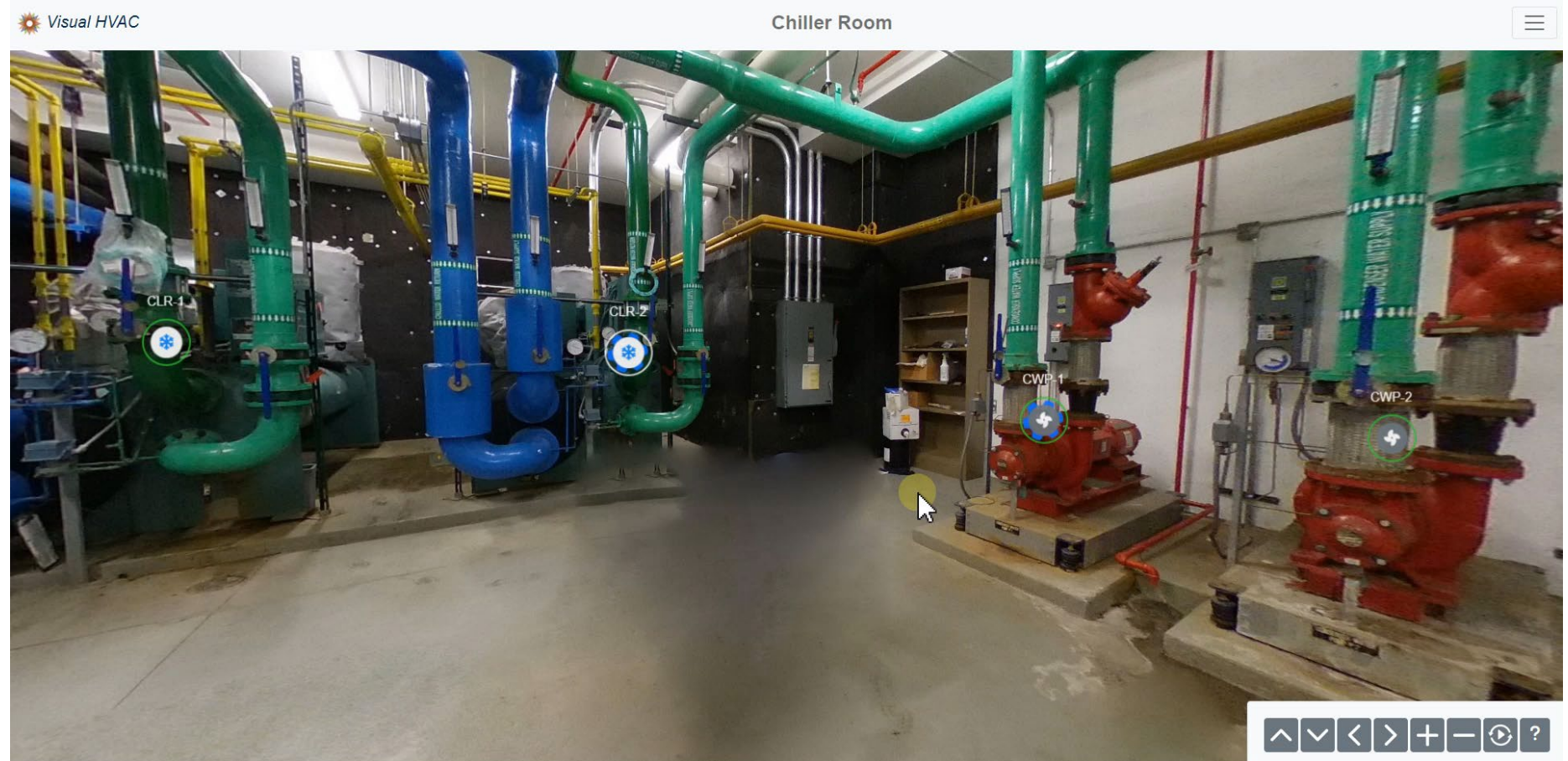
Visual HVAC For Niagara

- **Pan 360 Deg**
- Info Hot Spots
- Card Hot Spots
- Downloads
- Hyperlinks
- Navigation



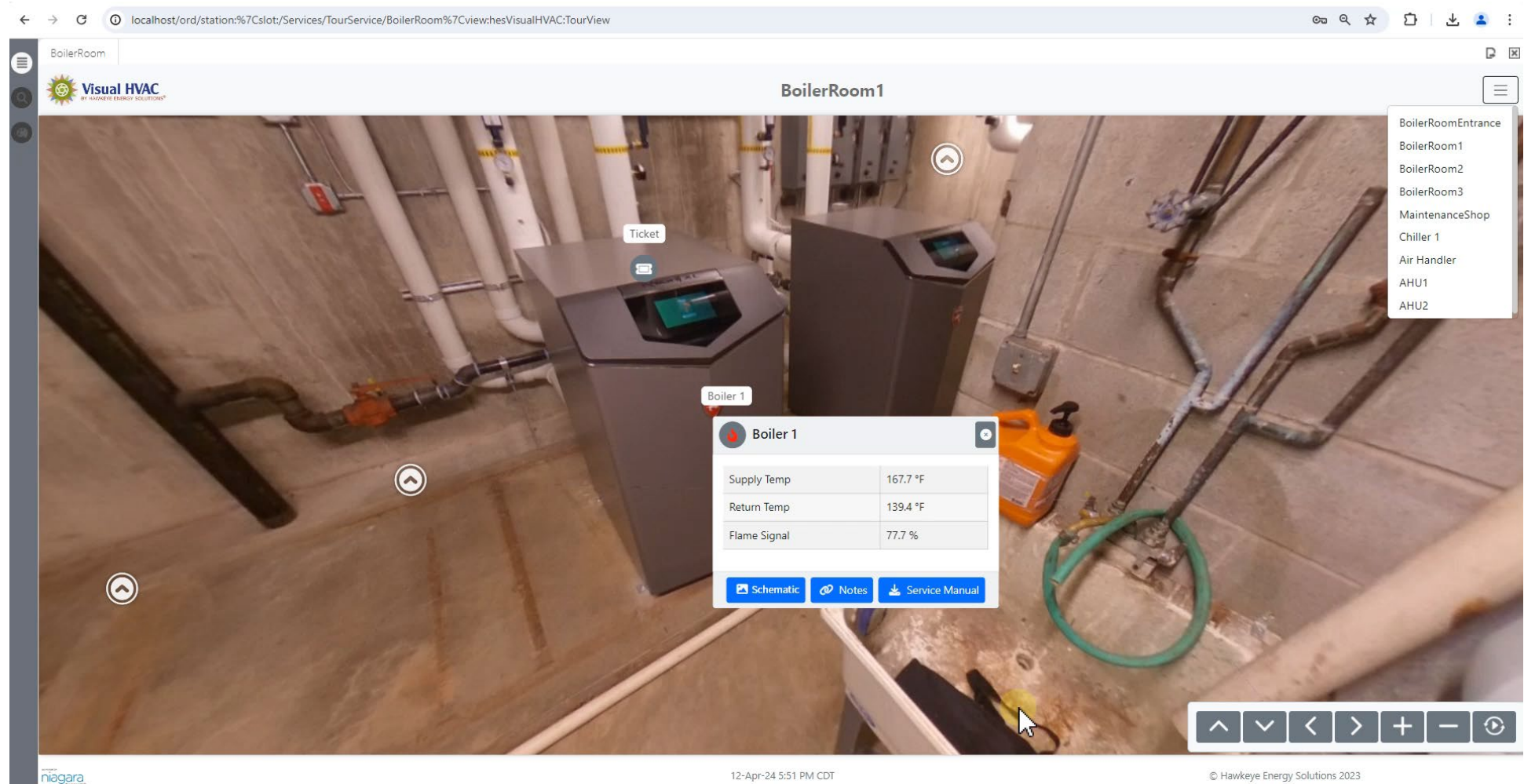
Visual HVAC For Niagara

- Pan 360 Deg
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- Downloads
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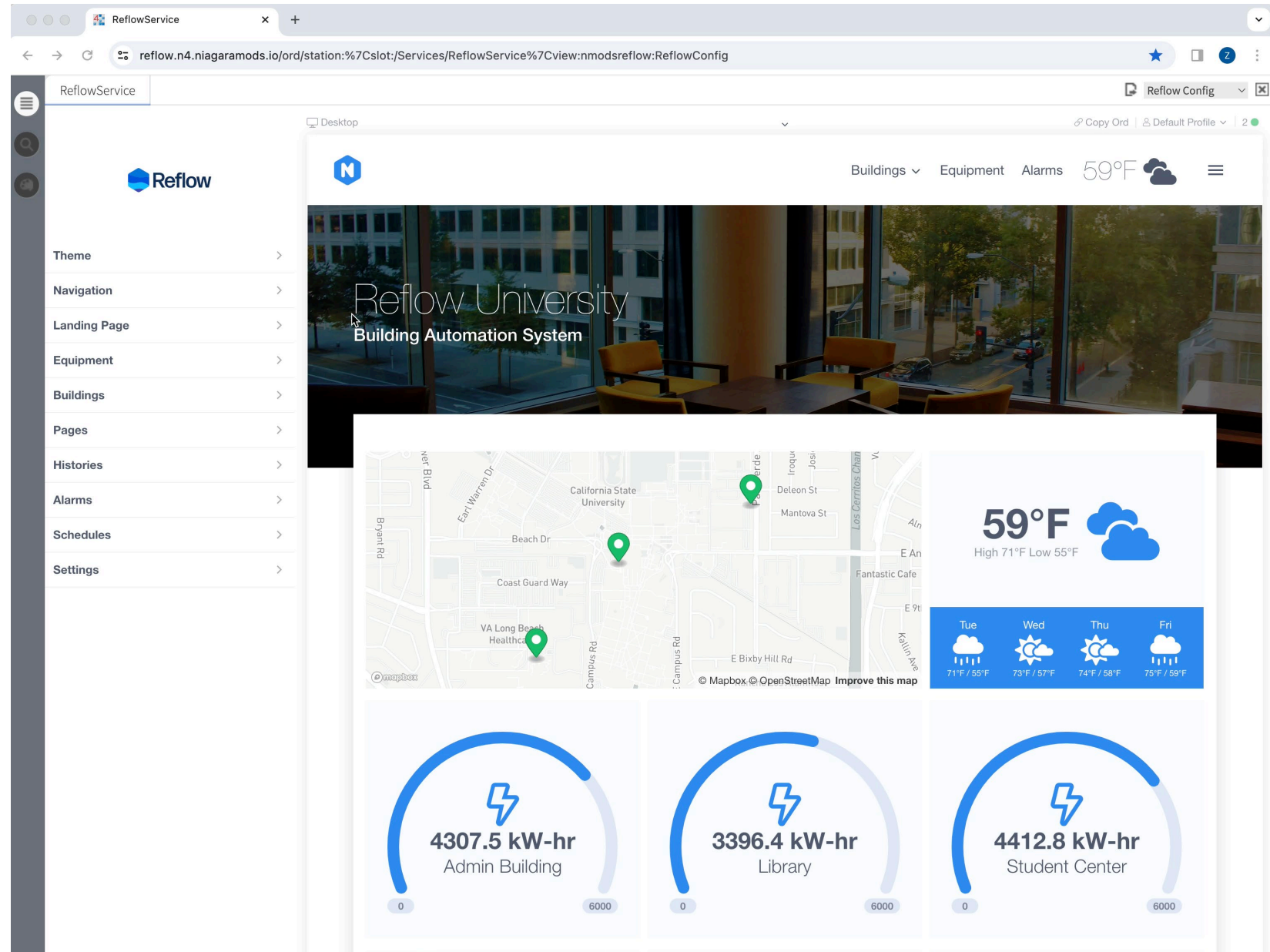
Visual HVAC For Niagara

- Pan 360 Deg
- Info Hot Spots
- Card Hot Spots
- **Downloads**
- **Hyperlinks**
- **Navigation**



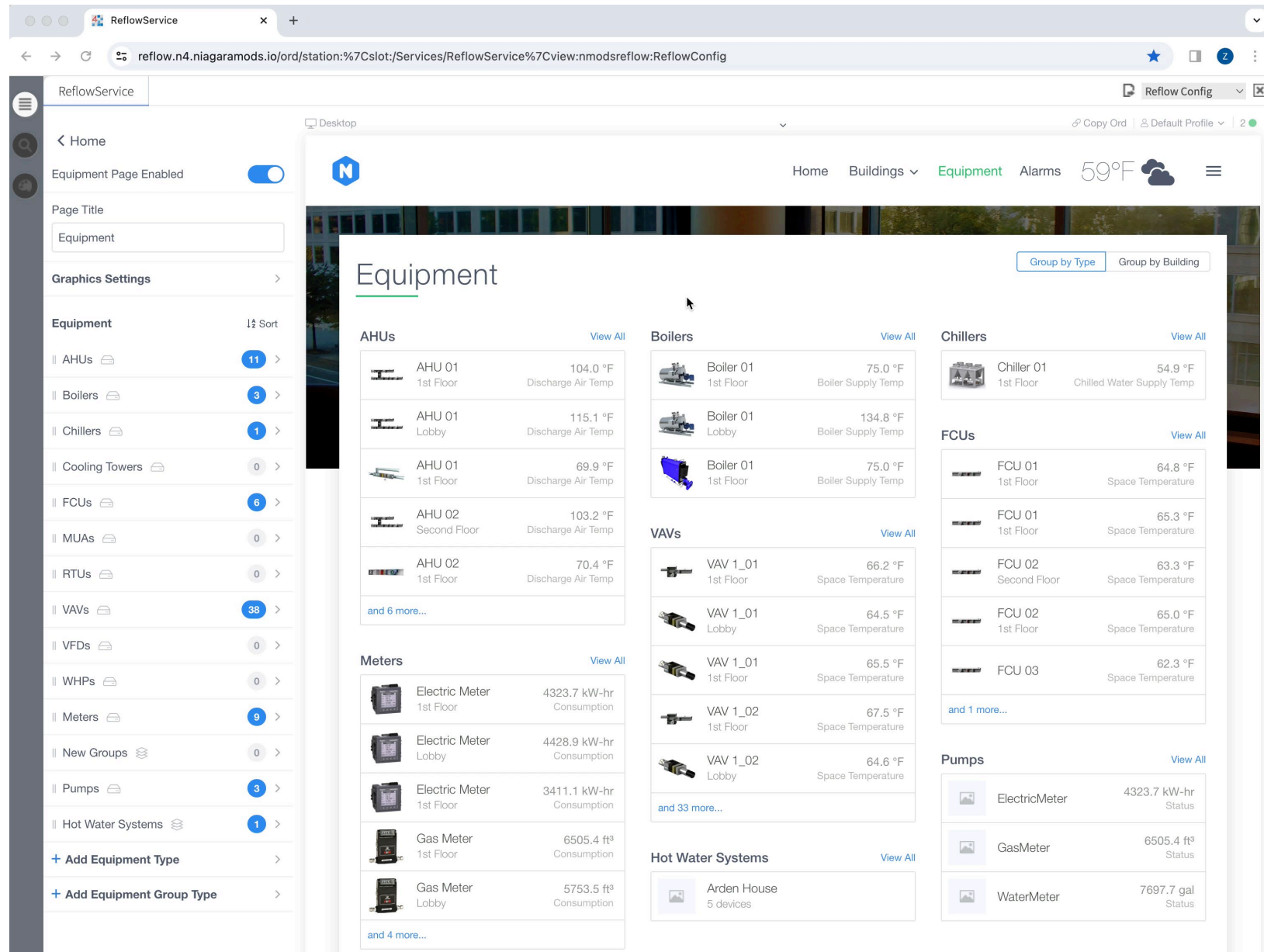
Consistency

- Equipment Templates
- Dashboard Elements
- Navigation



Collaboration

- Reporting
- Reflow Ord Scheme
- External Hyperlinks
- Embedding 3rd Party Web Content



The screenshot displays the ReflowService web application interface. The browser address bar shows the URL: `reflow.n4.niagaramods.io/ord/station:%7Cslot:/Services/ReflowService%7Cview:nmodsreflow:ReflowConfig`. The interface includes a sidebar with navigation options like Home, Equipment Page Enabled, Page Title (Equipment), Graphics Settings, and a list of equipment types (AHUs, Boilers, Chillers, FCUs, Meters, etc.) with counts and sort options. The main content area is titled "Equipment" and shows a grid of equipment cards categorized by type (AHUs, Boilers, Chillers, FCUs, Meters, VAVs, Hot Water Systems). Each card displays a name, location, and a temperature or consumption value. For example, under AHUs, there are cards for AHU 01 (1st Floor, 104.0 °F Discharge Air Temp) and AHU 02 (Second Floor, 103.2 °F Discharge Air Temp). Under Boilers, there are cards for Boiler 01 (1st Floor, 75.0 °F Boiler Supply Temp) and Boiler 01 (Lobby, 134.8 °F Boiler Supply Temp). Under Chillers, there is a card for Chiller 01 (1st Floor, 54.9 °F Chilled Water Supply Temp). Under FCUs, there are cards for FCU 01 (1st Floor, 64.8 °F Space Temperature) and FCU 02 (Second Floor, 63.3 °F Space Temperature). Under Meters, there are cards for Electric Meter (1st Floor, 4323.7 kW-hr Consumption) and Gas Meter (1st Floor, 6505.4 ft³ Consumption). Under VAVs, there are cards for VAV 1_01 (1st Floor, 66.2 °F Space Temperature) and VAV 1_02 (Lobby, 64.6 °F Space Temperature). Under Hot Water Systems, there is a card for Arden House (5 devices). The interface also includes a top navigation bar with Home, Buildings, Equipment, Alarms, and a temperature display (59°F). A sidebar on the left contains a menu icon, a search icon, and a list of equipment types with counts and sort options. The bottom of the interface features a footer with the NS2024 logo and the TRIDIUM logo.