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APRIL 15 - 17 | ANAHEIM, CA

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Niagara Connected: Faster, Simpler

Niagara Integrations for Small and Mid-Sized Commercial Buildings

Roddy Hogg
Tridium, Senior OEM Sales Representative

Nick Prill
75F
Software Engineer

Tom Daenzer
Belimo,
Manager Digital Ecosystem

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POWER OF PARTNERSHIP

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ONE OEM'S JOURNEY TO SCALABLE INTEGRATED PROJECT DELIVERY

Nick Prill

75F

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Opportunities in the Small/Medium Building Space

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Owners

Good energy-management is a financial slam-dunk for __% of owners?

Owners

Good energy-management is a financial slam-dunk for __% of owners?

85% of commercial buildings <200K sq. ft. don't have a BAS.

- U.S. Energy Information Administration

Owners – Hierarchy of Needs

Owners – Hierarchy of Needs

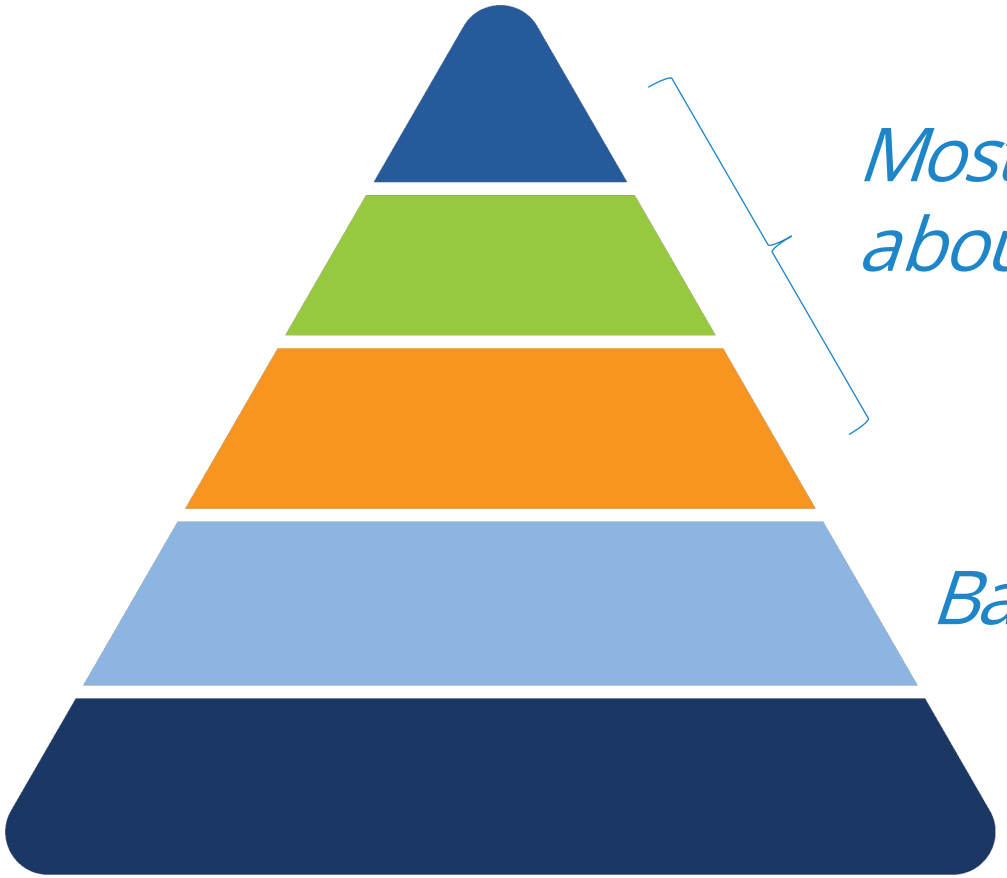
Building is Habitable

Owners – Hierarchy of Needs

Basic Visibility & Control

Building is Habitable

Owners – Hierarchy of Needs



Most of what we've talked about this week

Basic Visibility & Control

Building is Habitable

Integrators

How many accounts could we open up if we could simplify 1 or 2 project delivery steps?

Integrators

Are there projects we can complete without our most senior technical staff?

OPPORTUNITIES IN THE SMALL-TO-MEDIUM BUILDING SPACE

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CHALLENGES IN THE SMALL-TO-MEDIUM BUILDING SPACE

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THE LAST 10%


#1
DO NOT TOUCH AC SETTINGS
SET
HOLD
RUN
Fan
Auto On
System
Cool Off Heat

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72°F
.5
CO2
400 PPM
Humidity
40%
Current
Changes to Unoccupied at 5:30pm
Fan Low, Cool Only
FANIMODE

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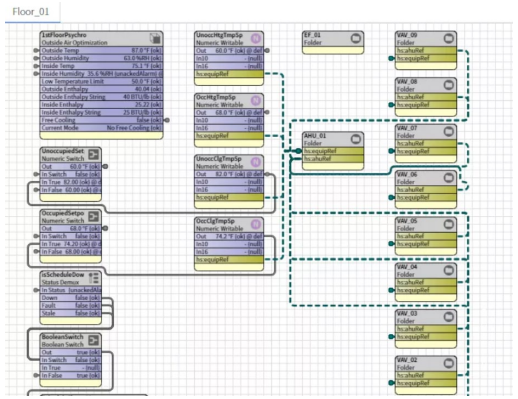
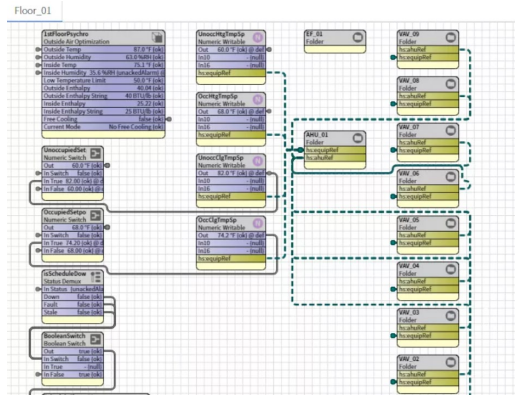
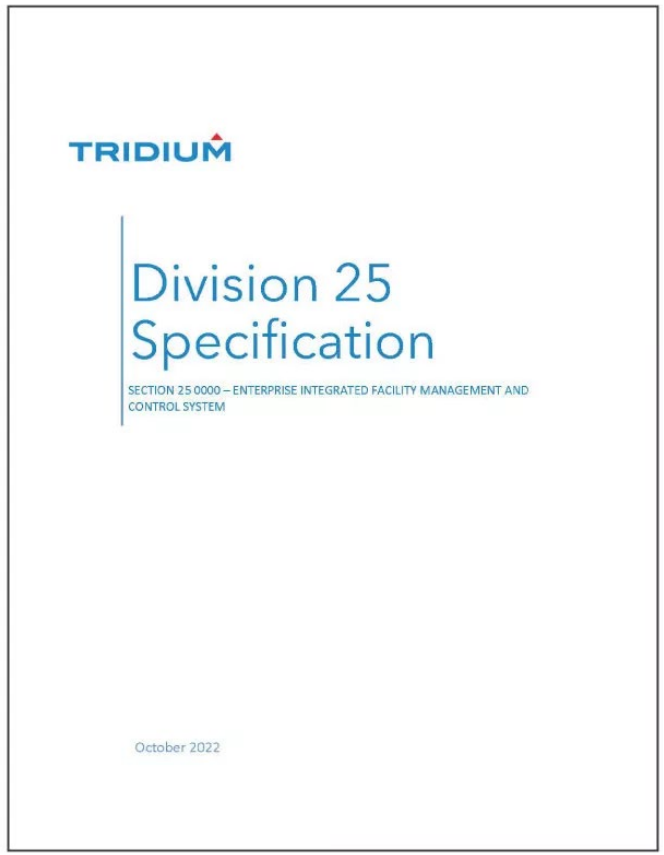


THE LAST 10%



WHO'S SELLING THE SOLUTION?



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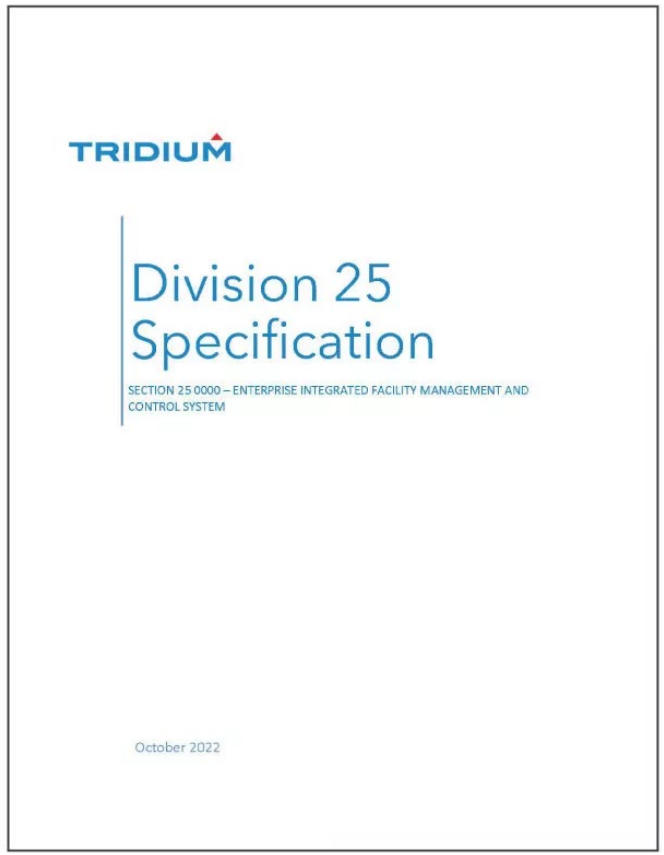

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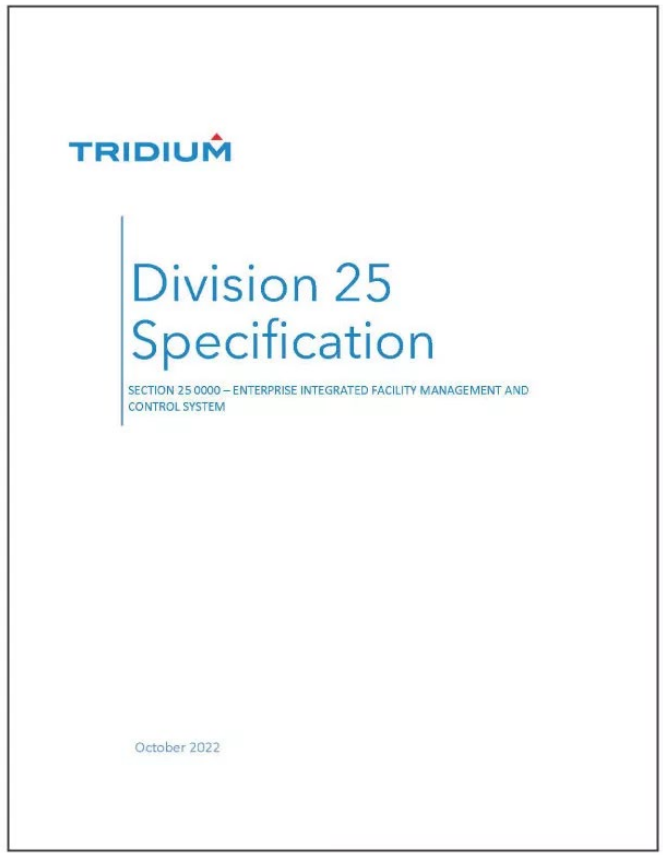

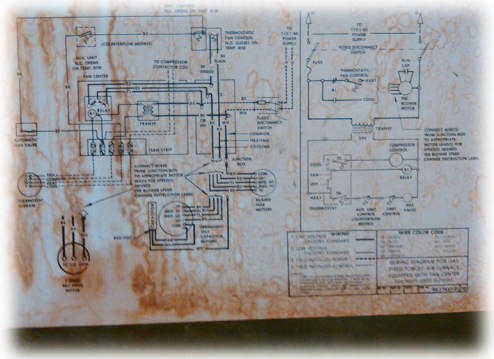

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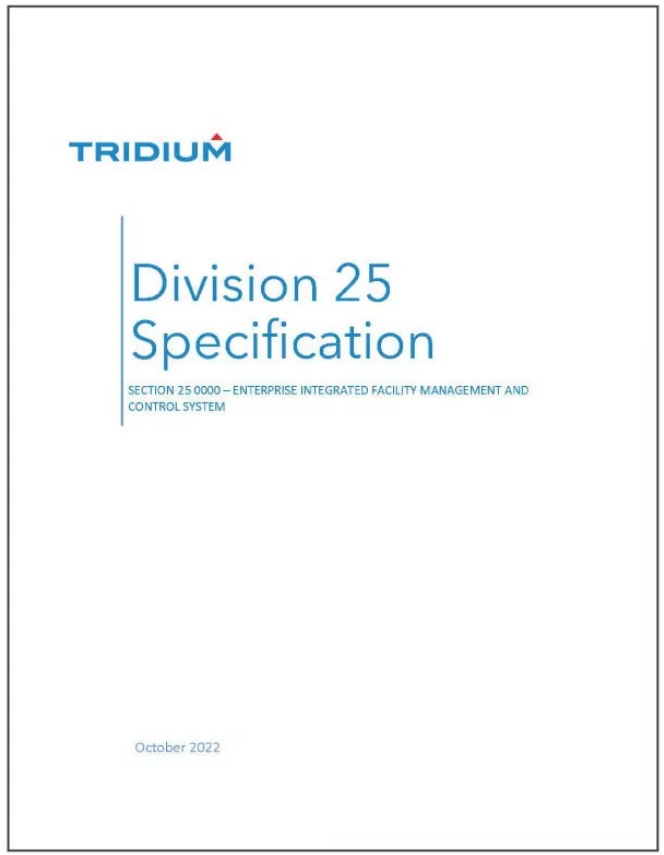

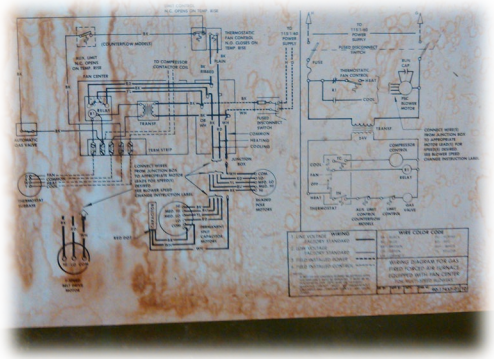

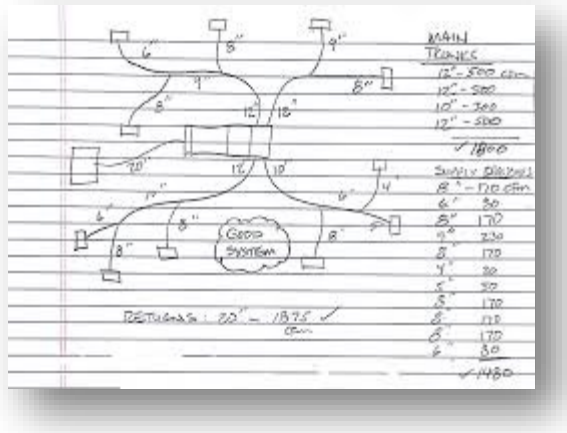

WHAT WE'VE LEARNED

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OUR CORE PRODUCT

OUR CORE PRODUCT

75F Renatus › Getting Started › FAQs

FAQ: Can I use a SmartNode to control a chiller plant?

Matt Blount
Updated 4 months ago

No, a SmartNode will not control your Chiller plant. At this time 75F devices are designed to control nearly any air

OUR LAST 10%: STANDARDS + PRO SERVICES

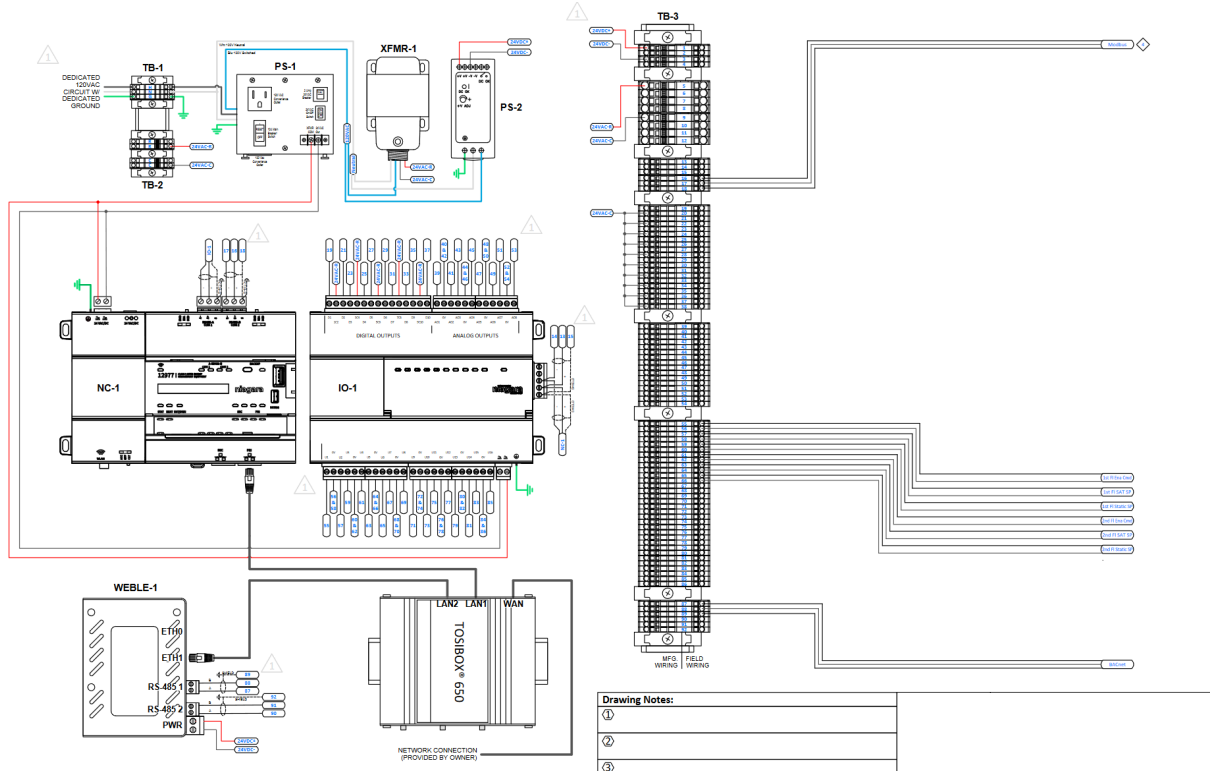
OUR LAST 10%: STANDARDS + PRO SERVICES

11 1 - POINTS LIST

2

POINTS LIST - 75F CUSTOM CONTROL PANEL

TB Point	Panel Point	Wire Label	Point Name	I/O Type	Device Range	Device Mfg.	Device Model #
1-2	24VDC +	24VDC +	24VDC +	-	-	75F	PS-2
3-4	24VDC -	24VDC -	24VDC -	-	-	75F	PS-2
5-8	24VAC R	24VAC R	24VAC R	-	-	75F	XFMR-1
9-12	24VAC C	24VAC C	24VAC C	-	-	75F	XFMR-1
13 14 15	JACE RS485-A COM1	Not Used	NRIO Comm (Internal to Panel)	-	-	-	-
16 17 18	JACE RS485-B COM2	Modbus	Modbus Comm (to CCU)	RS-485	COMM	75F	3X-ND-C1W-X
19 / 20	DO1		Spare				
21 / 22	DO2		Spare				
							(CCU-1 GTW 1ST, RLY 3)
57 / 58	UI2	1st Fl SAT SP	1st Floor Supply Air Temp Setpoint	Voltage (2-Wire)	0-10VDC = 0-100%	75F	7X-CC-K7K-X (CCU-1 GTW 1ST, AO1)
59 / 60	UI3	1st Fl Static SP	1st Floor Duct Static Pressure Setpoint	Voltage (2-Wire)	0-10VDC = 0-100%	75F	7X-CC-K7K-X (CCU-1 GTW 1ST, AO2)
61 / 62	UI4	2nd Fl Ena Cmd	2nd Floor Enable Command	Digital	CC = ENABLE	75F	7X-CC-K7K-X (CCU-2 GTW 2ND, RLY 3)
63 / 64	UI5	2nd Fl SAT SP	2nd Floor Supply Air Temp Setpoint	Voltage (2-Wire)	0-10VDC = 0-100%	75F	7X-CC-K7K-X (CCU-2 GTW 2ND, AO1)
65 / 66	UI6	2nd Fl Static SP	2nd Floor Duct Static Pressure Setpoint	Voltage (2-Wire)	0-10VDC = 0-100%	75F	7X-CC-K7K-X (CCU-2 GTW 2ND, AO2)
67 / 68	UI7		Spare			-	
69 / 70	UI8		Spare			-	
85 / 86	UI16		Spare				
87 88 89	WEBLE-1 RS485-A	BACnet	BACnet Comm (to RTU-1)	RS-485	COMM	BY OTHERS	RTU-1 BACnet Card
90 91 92	WEBLE-1 RS485-B		Spare				



OUR LAST 10%: STANDARDS + PRO SERVICES

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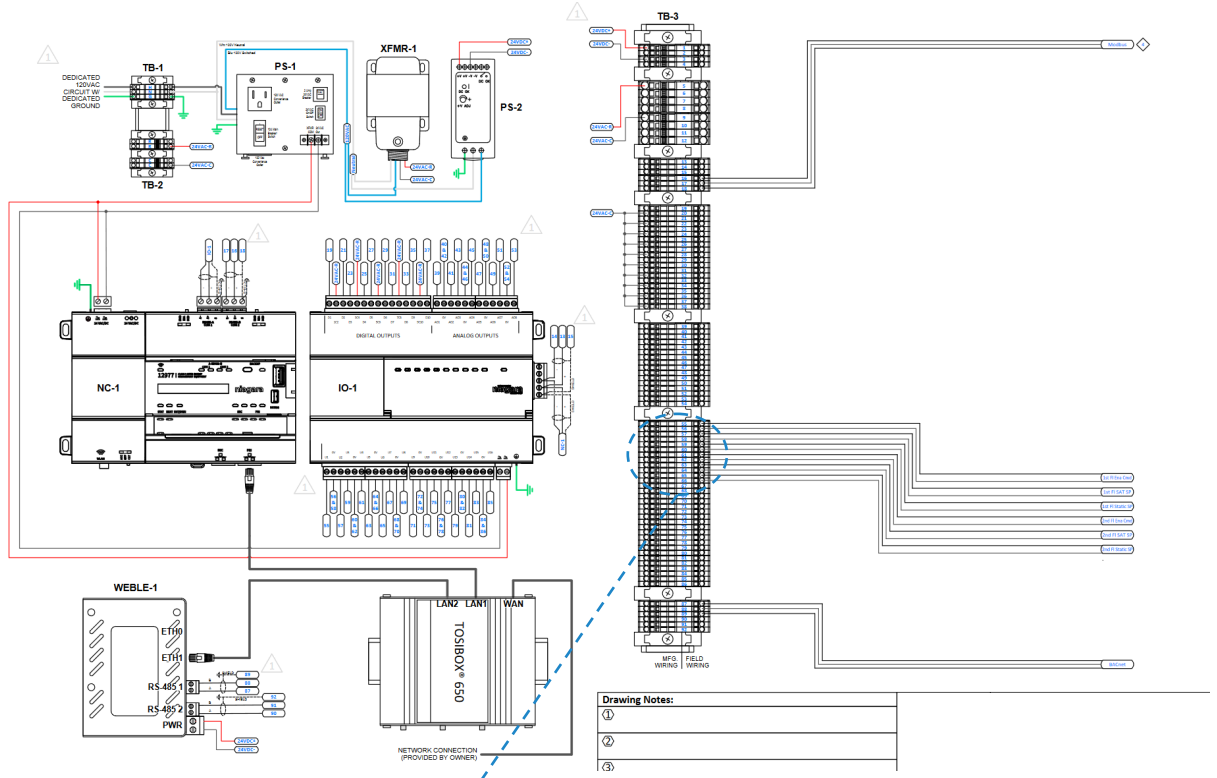

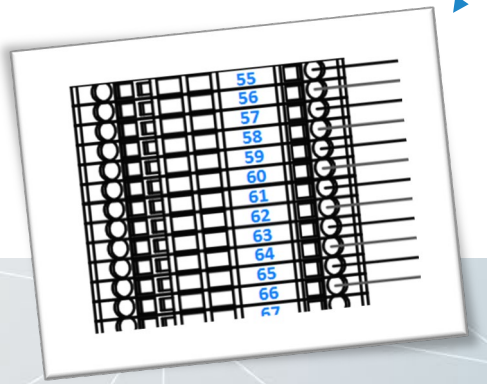

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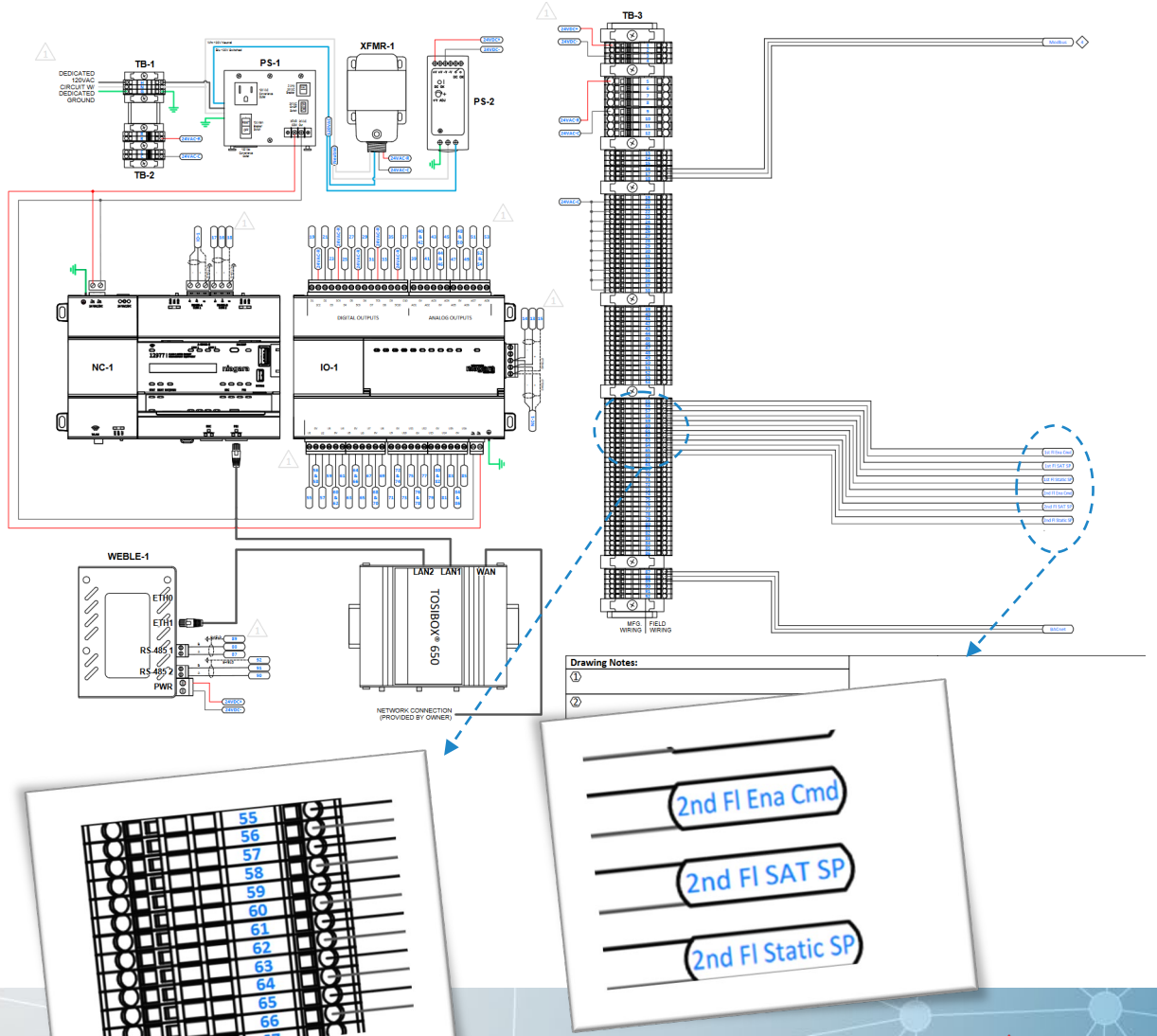
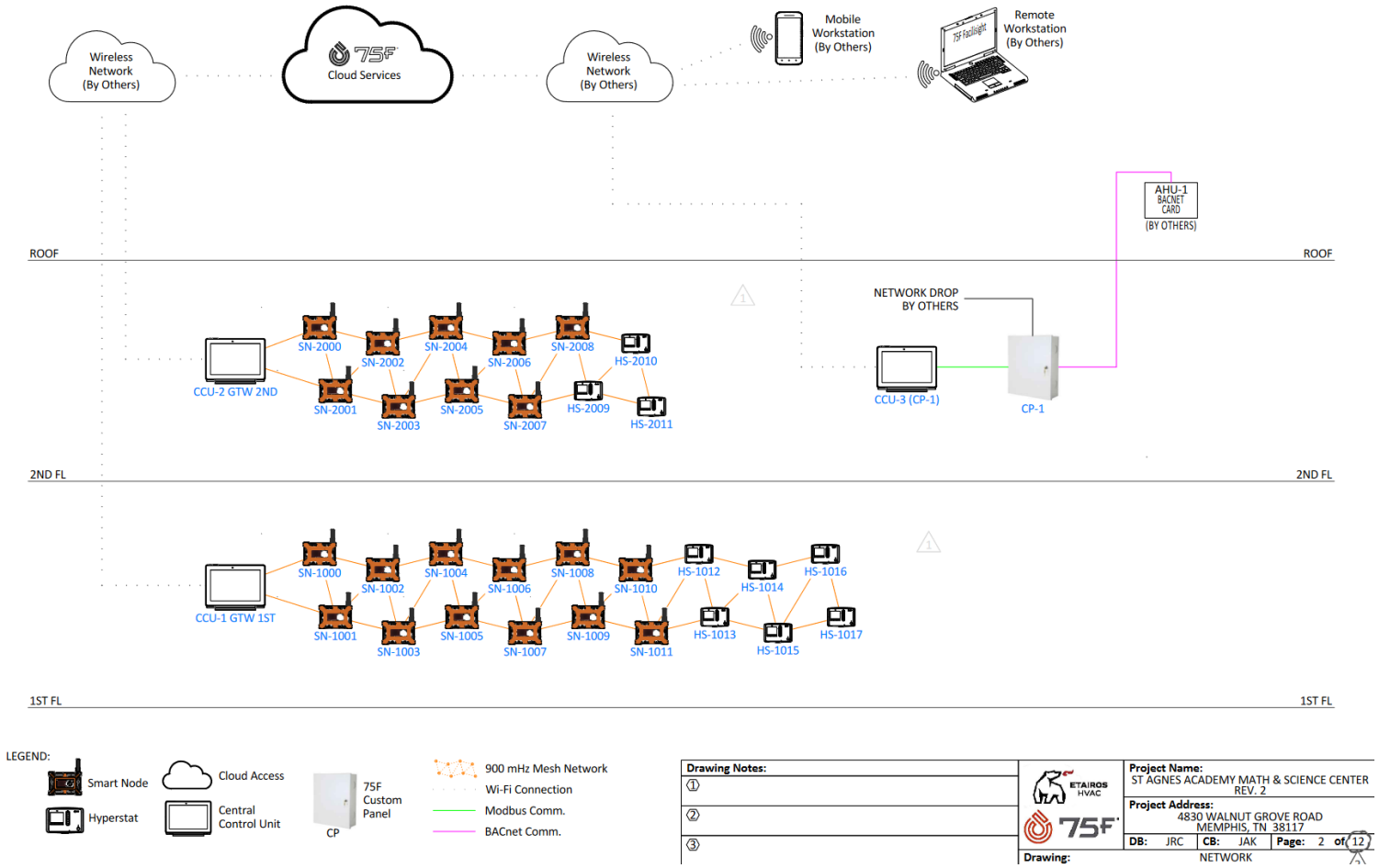


OUR LAST 10%: STANDARDS + PRO SERVICES



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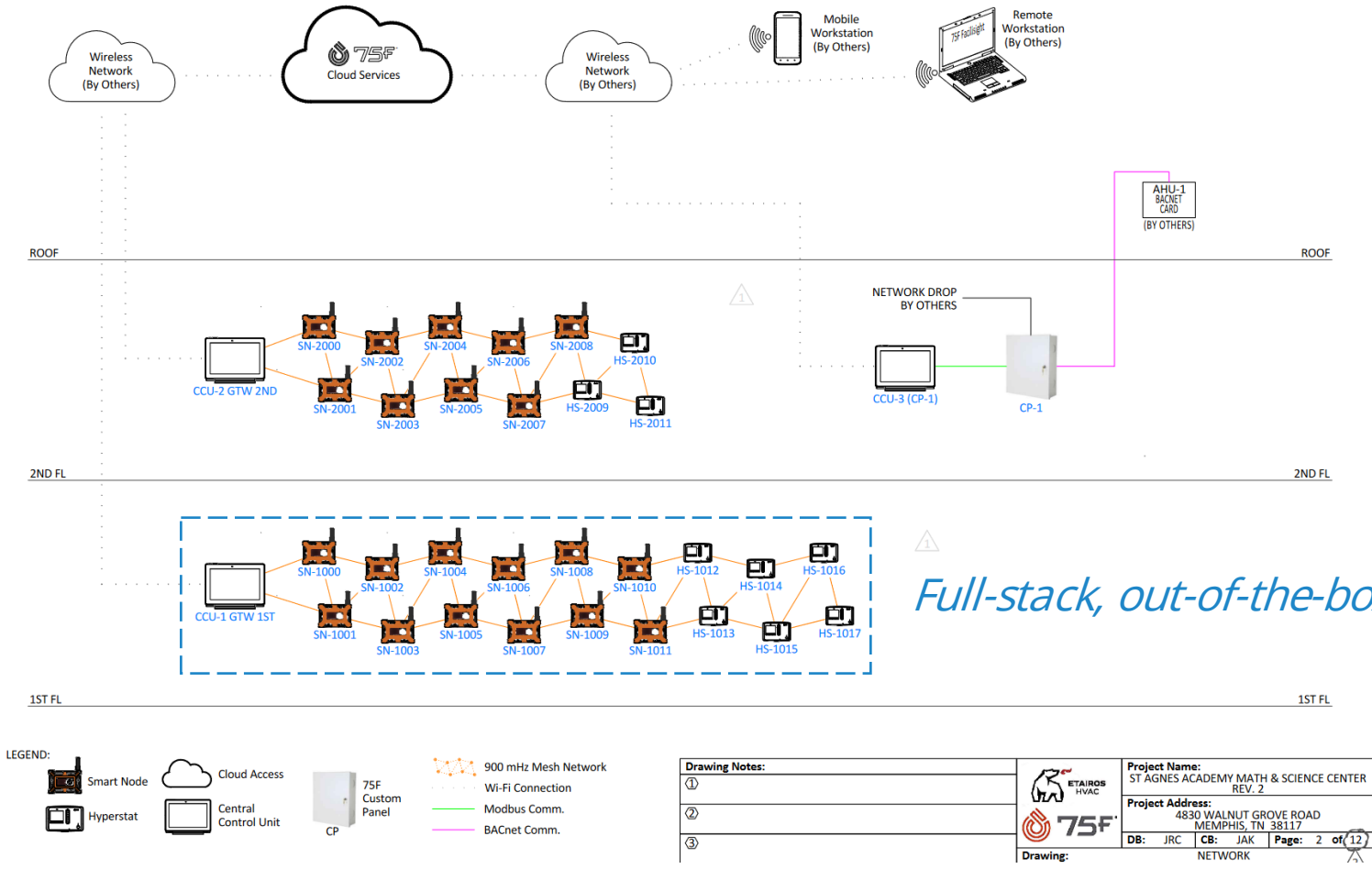
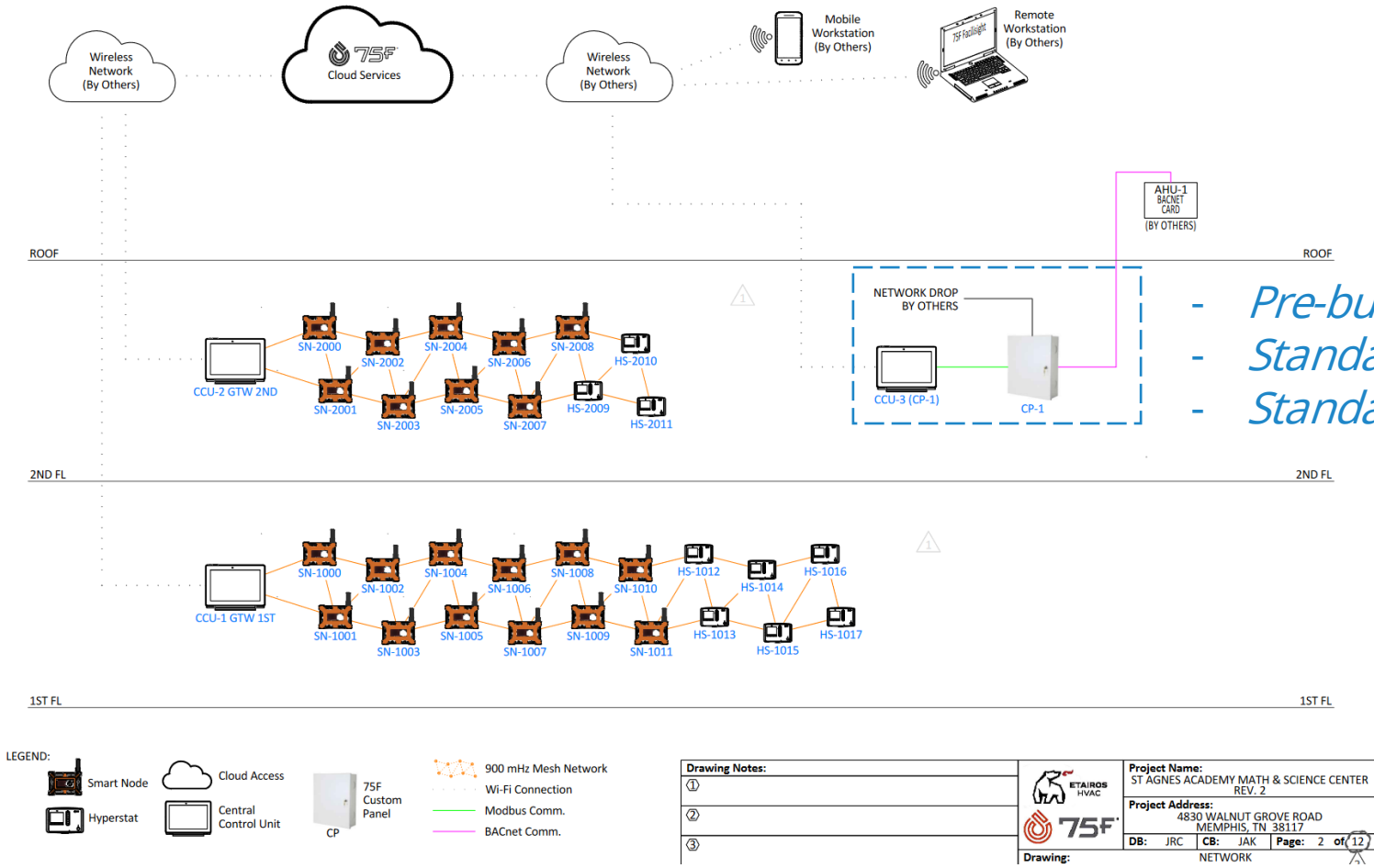


Full-stack, out-of-the-box hardware

OUR LAST 10%: STANDARDS + PRO SERVICES



- *Pre-built, pre-programmed panels*
- *Standard stations*
- *Standard VPN solution*

HOW NIAGARA TECH TOOLS HAVE HELPED

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PROBLEM #1: DATA PIPING

floor	Lower-Level	floor | floorNum | orientation
zone	Brew Lab	bacnetId | bacnetType | ccuRef | room | scheduleRef
floor	Upper-Level	floor | floorNum | orientation
zone	Emily's Office	bacnetId | bacnetType | ccuRef | room | scheduleRef
equip	Prill Treehouse-MONITORING-1001	ahuRef | bacnetId | bacnetType | ccuRef | equip | group | hyperstat | monitoring | profile | zone
schedule	Zone Schedule	ccuRef | cooling | days | followBuilding | heating | kind | schedule | temp | unoccupiedZoneSetback | zone
zone	Hallway/Living Room	ccuRef | room | scheduleRef
equip	Prill Treehouse-cpuecon-1000	bacnetId | bacnetType | ccuRef | cpu | equip | gatewayRef | group | hyperstatsplit | priorityLevel | profile | standalone | zone
schedule	Zone Schedule	ccuRef | cooling | days | heating | kind | schedule | temp | unoccupiedZoneSetback | zone
floor	Garage	floor | floorNum | orientation
zone	Garage Monitoring	bacnetId | bacnetType | ccuRef | room | scheduleRef
equip	Prill Treehouse-MONITORING-1002	ahuRef | bacnetId | bacnetType | ccuRef | equip | group | hyperstat | monitoring | profile | zone
schedule	Zone Schedule	ccuRef | cooling | days | followBuilding | heating | kind | schedule | temp | unoccupiedZoneSetback | zone
equip	Prill Treehouse-SystemEquip	bacnetId | bacnetType | ccuRef | default | equip | profile | system
device	CM-device	cm | device | his | network
device	House	ahuRef | ccu | createdDate | device | fmEmail | gatewayRef | installerEmail
point	Prill Treehouse-CM-otaStatus	ccuRef | cur | diag | enum | his | hisInterpolate | kind | ota | point | sp | status | zone
point	Prill Treehouse-SystemEquip-airflowSampleWaitTime	airflow | ccuRef | his | hisInterpolate | incrementVal | kind | maxVal | minVal | point | sample | sp | system | time | tuner | tunerGroup | unit | wait | writable
point	Prill Treehouse-SystemEquip-backFillDuration	backfill | ccuRef | config | duration | enum | kind | point | sp | system | unit | ventilation | writable
point	Prill Treehouse-SystemEquip-ccuAlarmVolumeLevel	alarm | ccuRef | his | hisInterpolate | incrementVal | kind | level | maxVal | minVal | point | sp | system | tuner | tunerGroup | volume | writable
point	Prill Treehouse-SystemEquip-clockUpdateInterval	ccuRef | clock | his | hisInterpolate | incrementVal | interval | kind | maxVal | minVal | point | sp | system | tuner | tunerGroup | unit | update | writable
point	Prill Treehouse-SystemEquip-cmCurrentTemp	bacnetId | bacnetType | ccuRef | cm | current | his | hisInterpolate | kind | point | sp | system | temp | unit
point	Prill Treehouse-SystemEquip-cmHeartBeatInterval	ccuRef | cm | heartbeat | his | hisInterpolate | incrementVal | interval | kind | level | maxVal | minVal | point | sp | system | tuner | tunerGroup | unit | writable

PROBLEM #1: DATA PIPING

floor	Lower-Level	floor | floorNum | orientation
zone	Brew Lab	bacnetId | bacnetType | ccuRef | room | scheduleRef
floor	Upper-Level	floor | floorNum | orientation
zone	Emily's Office	bacnetId | bacnetType | ccuRef | room | scheduleRef
equip	Prill Treehouse-MONITORING-1001	ahuRef | bacnetId | bacnetType | ccuRef | equip | group | hyperstat | monitoring | profile | zone
schedule	Zone Schedule	ccuRef | cooling | days | followBuilding | heating | kind | schedule | temp | unoccupiedZoneSetback | zone
zone	Hallway/Living Room	ccuRef | room | scheduleRef
equip	Prill Treehouse-cpuecon-1000	bacnetId | bacnetType | ccuRef | cpu | equip | gatewayRef | group | hyperstatsplit | priorityLevel | profile | standalone | zone
schedule	Zone Schedule	ccuRef | cooling | days | heating | kind | schedule | temp | unoccupiedZoneSetback | zone
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equip	Prill Treehouse-MONITORING-1002	ahuRef | bacnetId | bacnetType | ccuRef | equip | group | hyperstat | monitoring | profile | zone
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equip	Prill Treehouse-SystemEquip	bacnetId | bacnetType | ccuRef | default | equip | profile | system
device	CM-device	cm | device | his | network
device	House	ahuRef | ccu | createdDate | device | fmEmail | gatewayRef | installerEmail
point	Prill Treehouse-CM-otaStatus	ccuRef | cur | diag | enum | his | hisInterpolate | kind | ota | point | sp | status | zone
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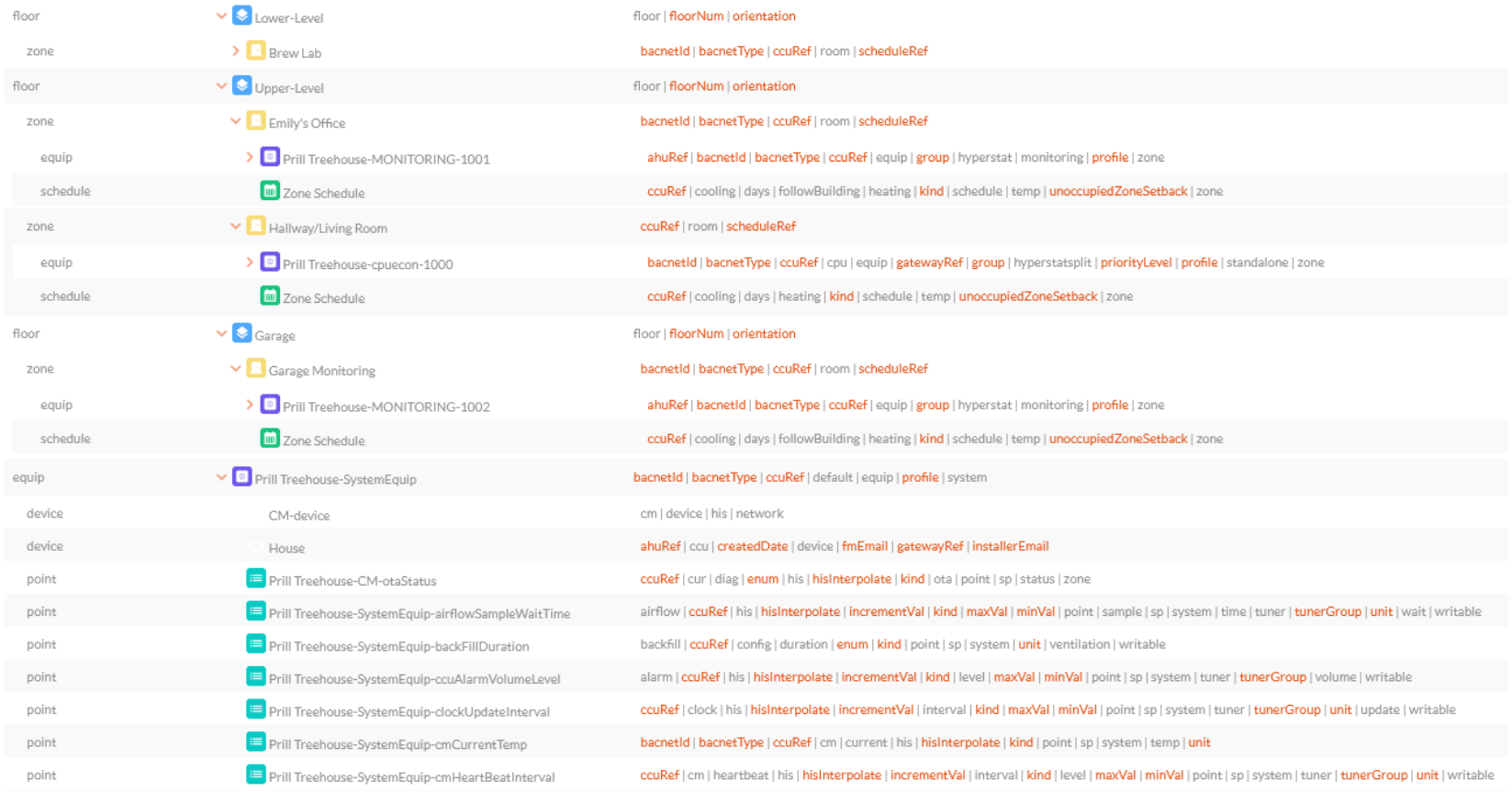
Cloud-Based, Haystack-Native Digital Twin

PROBLEM #1: DATA PIPING



Cloud-Based, Haystack-Native Digital Twin

…so it's easy to pull in all our existing legacy *[pick your old OEM protocol]* controllers, right?

PROTOCOLS (NOT GREAT)

PROTOCOLS (NOT GREAT)


```
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"equipType": "CentralPlant",
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        "registerNumber": 40005,
        "registerType": "holdingRegister",
        "parameterDefinitionType": "decimal",
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                    {
```

PROTOCOLS (NOT GREAT)


```
"modbusEquipId (_id)": "6f2f11cd14c56f4f1d9a2fe23",
"name": "CentralPlant",
"description": "Central Plant Points",
"equipType": "CentralPlant",
"vendor": "75F",
"model": [
    "CentralPlant"
],
"registers": [
    {
        "registerAddress": 4,
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                    {
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                    },
                    {
                        "tagName": "chiller"
                    },
                    {
                        "tagName": "enable"
                    },
                    {
                        "tagName": "command"
                    },
                    {
```

PROTOCOLS (NOT GREAT)


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"modbusEquipId (_id)": "6f2f11cd14c56f4f1d9a2fe23",
"name": "CentralPlant",
"description": "Central Plant Points",
"equipType": "CentralPlant",
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"model": [
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                    {
                        "tagName": "chiller"
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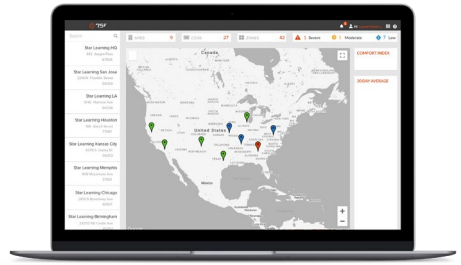
                    {
```

PROTOCOLS (NOT GREAT)




```
"modbusEquipId (_id)": "6f2f11cd14c56f4f1d9a2fe23",
"name": "CentralPlant",
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                        "tagName": "chiller"
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                    {
                        "tagName": "enable"
                    },
                    {
                        "tagName": "command"
                    },
                    {
```

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"description": "Central Plant Points",
"equipType": "CentralPlant",
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                "name": "Chiller Enable - BAS",
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                        "tagName": "chiller"
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                    {
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```
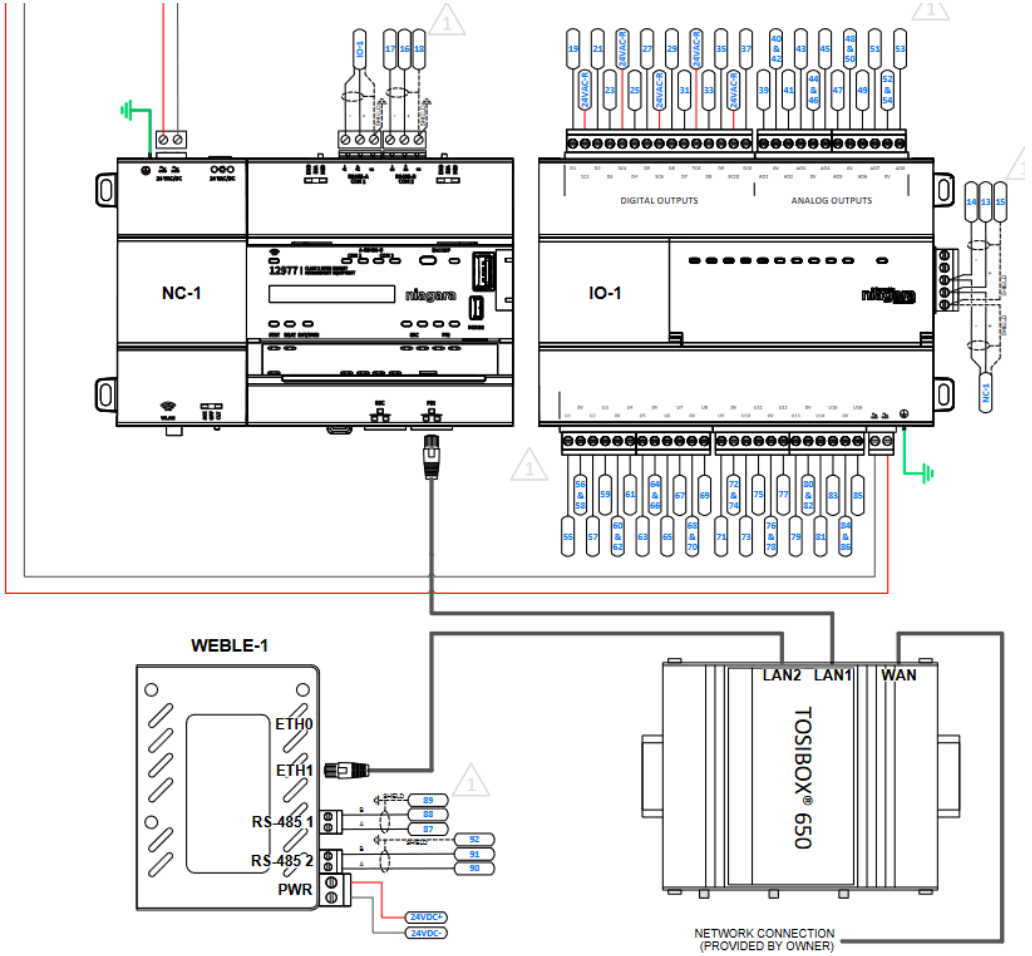
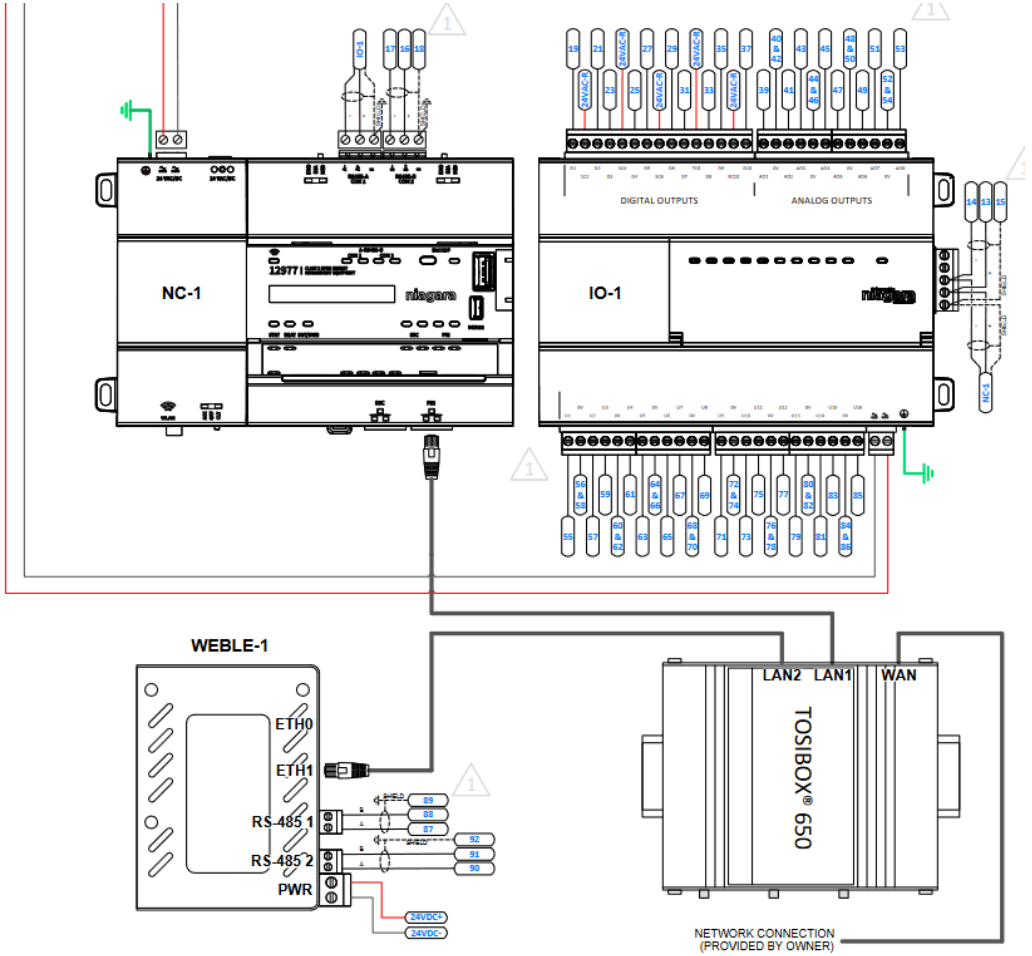

GATEWAYS + APIS (GOOD ENOUGH FOR US)

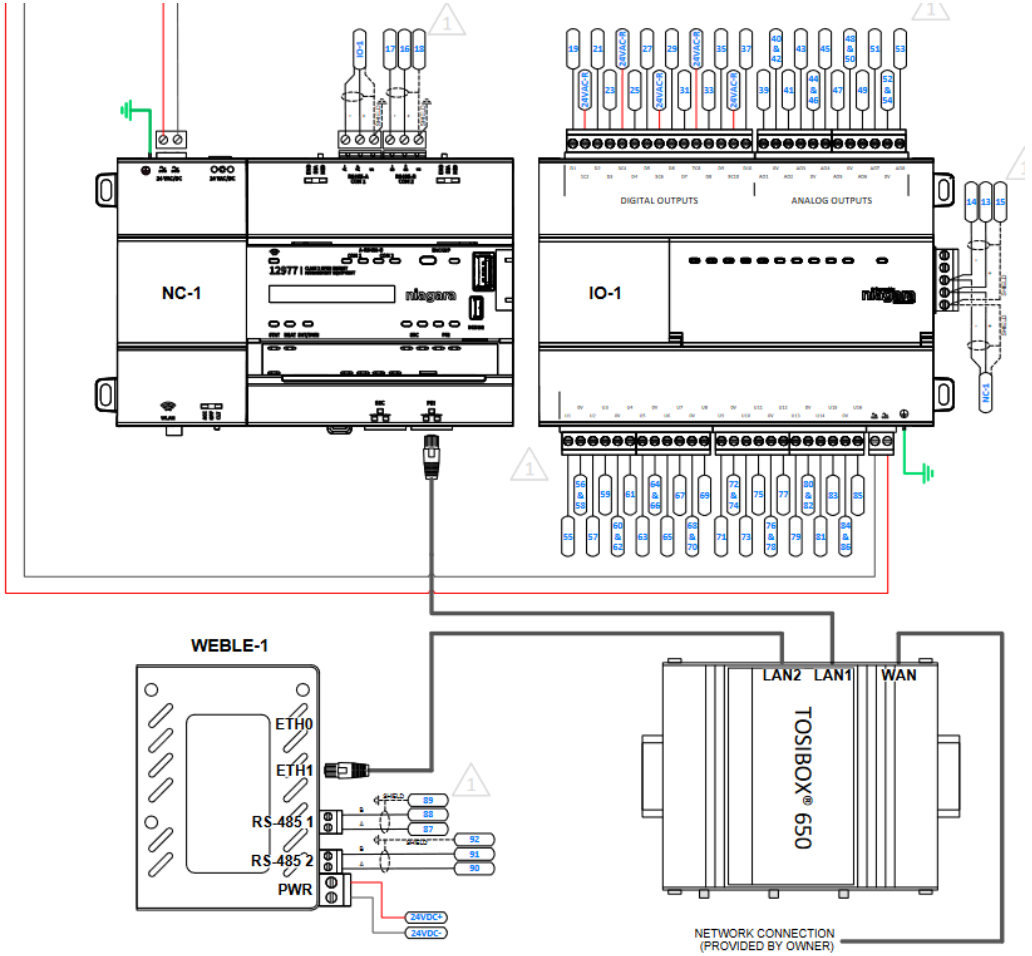


GATEWAYS + APIS (GOOD ENOUGH FOR US)



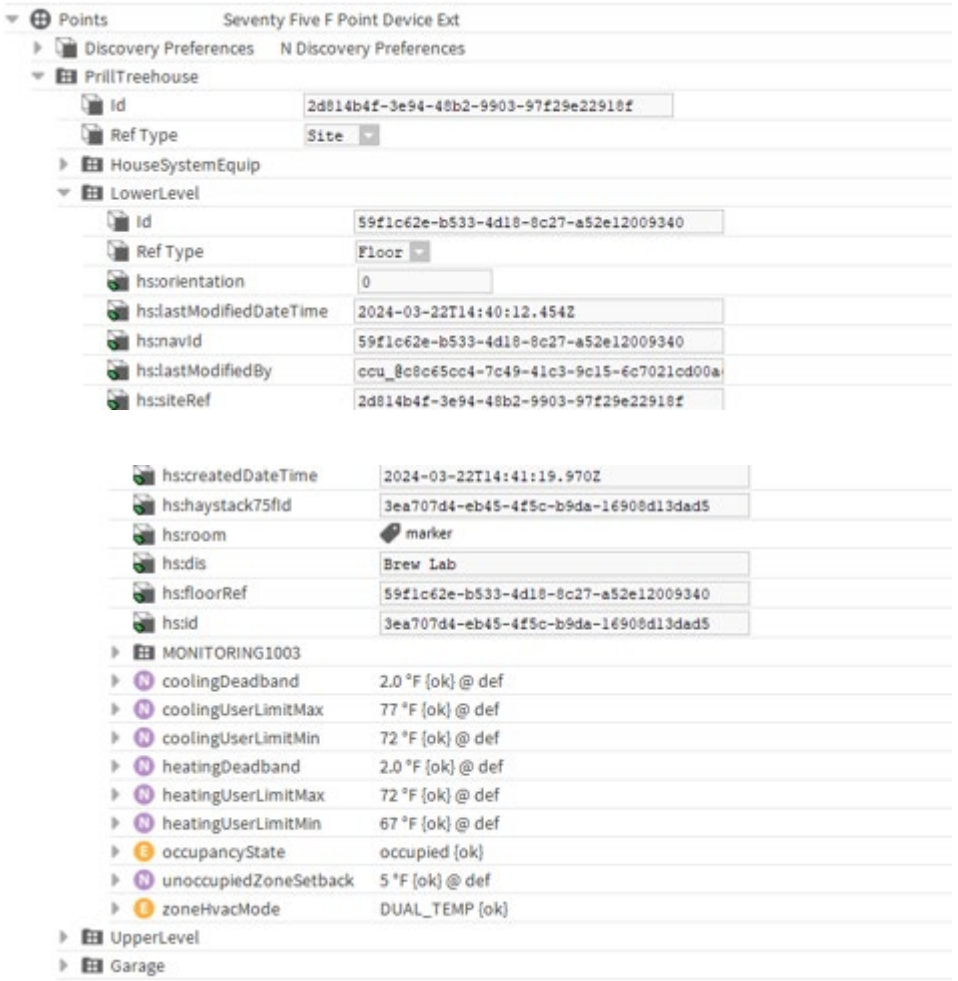
LAN1: BACnet/IP to JACE

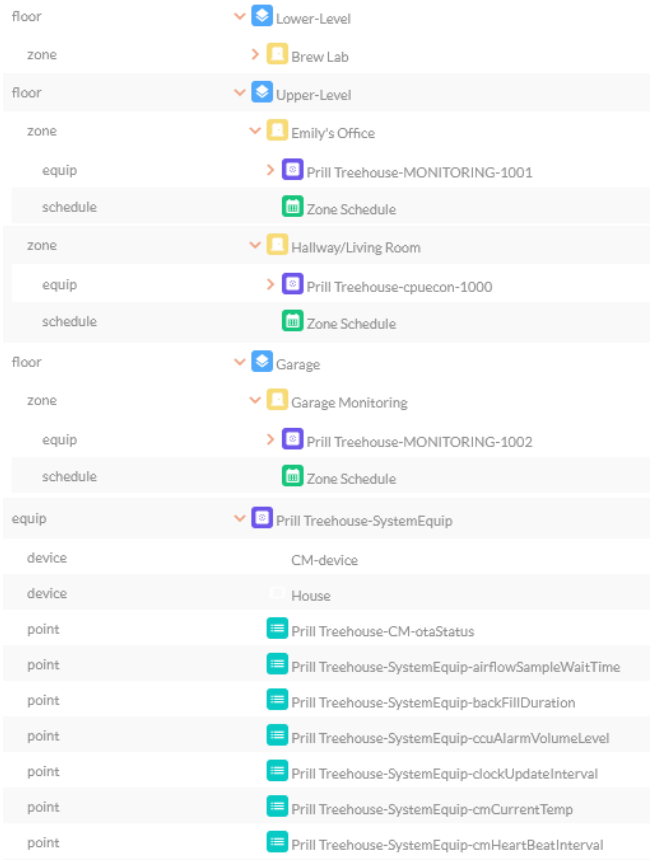
GATEWAYS + APIS (GOOD ENOUGH FOR US)



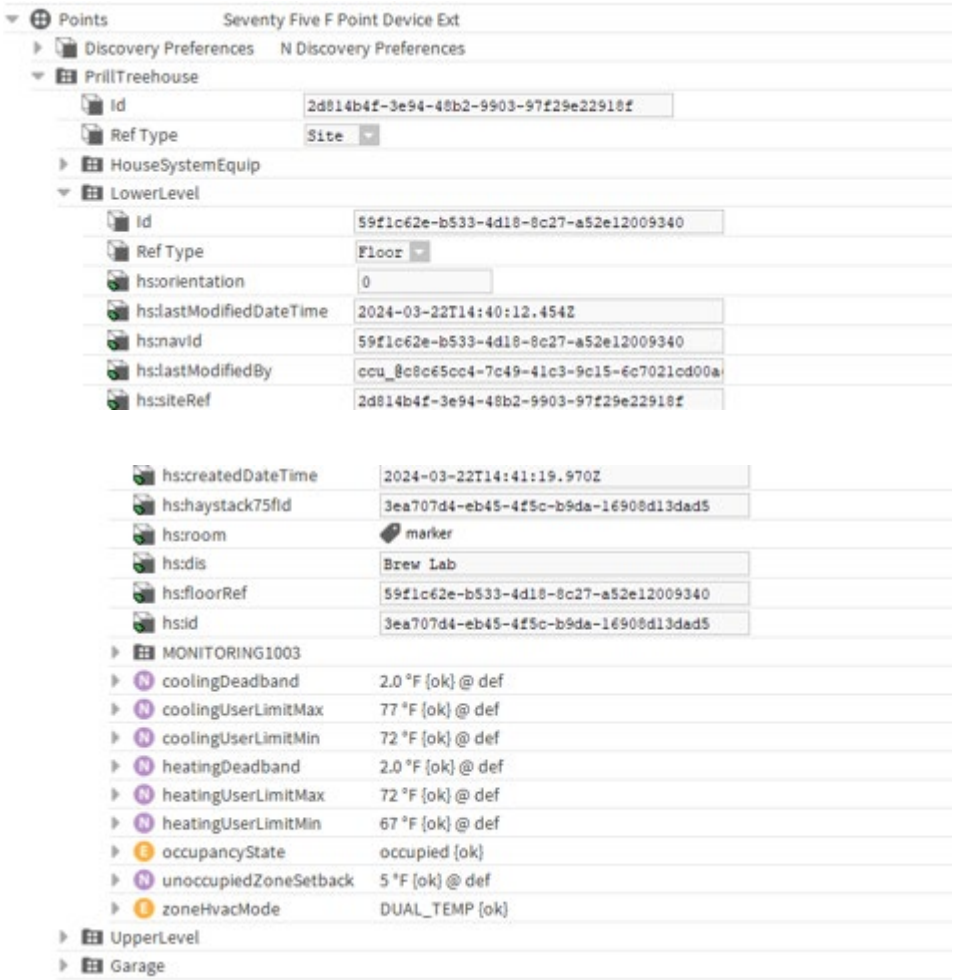
LAN1: BACnet/IP to JACE
LAN2: API connection to 75F Cloud

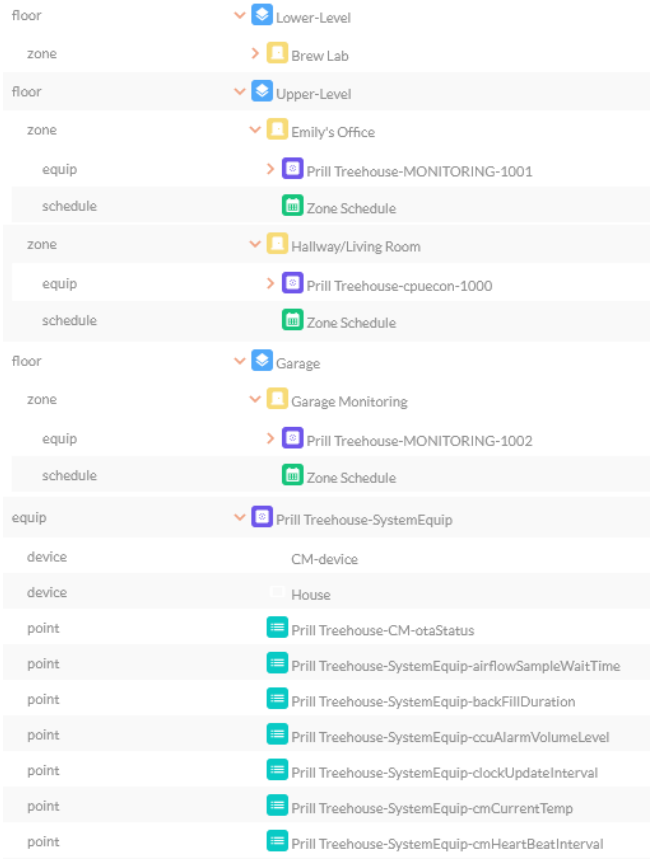
DIRECT-TO-CLOUD DRIVER (SCALABLE FOR ALL)



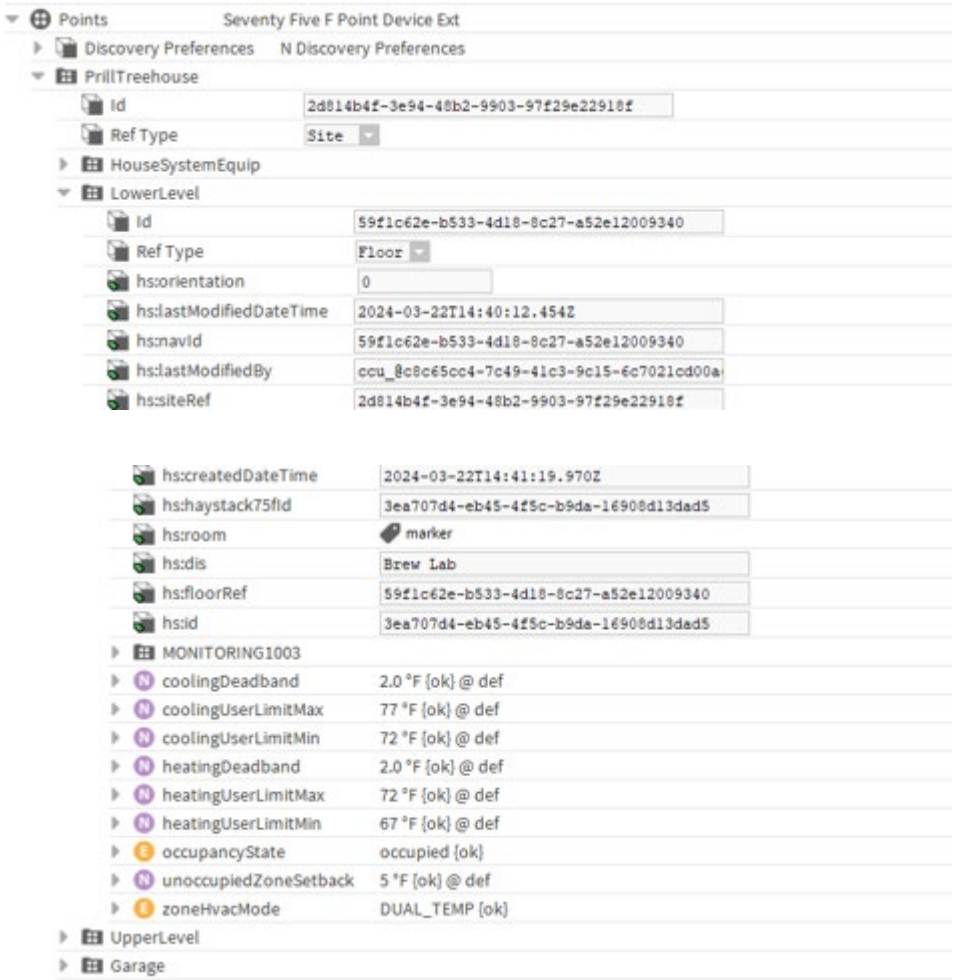


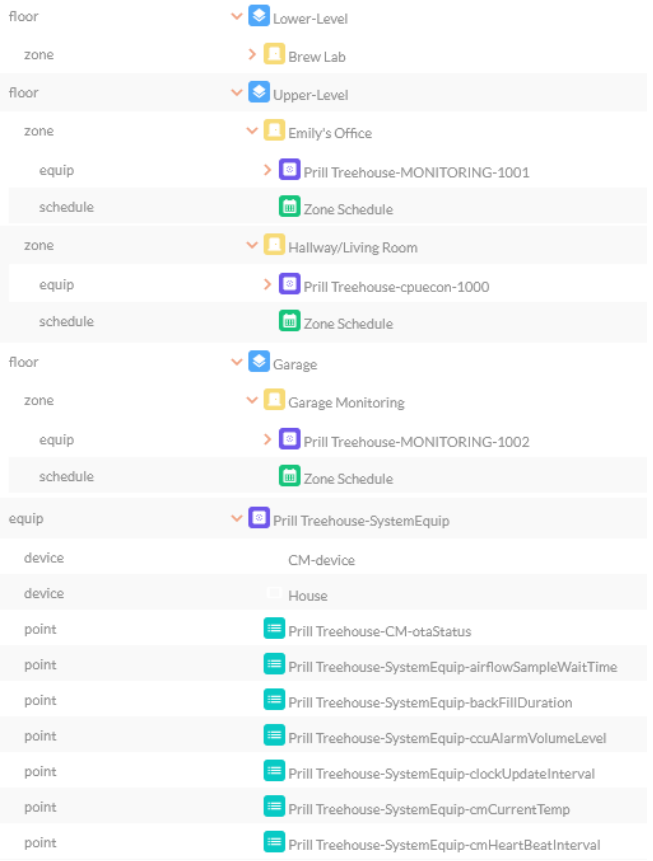
DIRECT-TO-CLOUD DRIVER (SCALABLE FOR ALL)



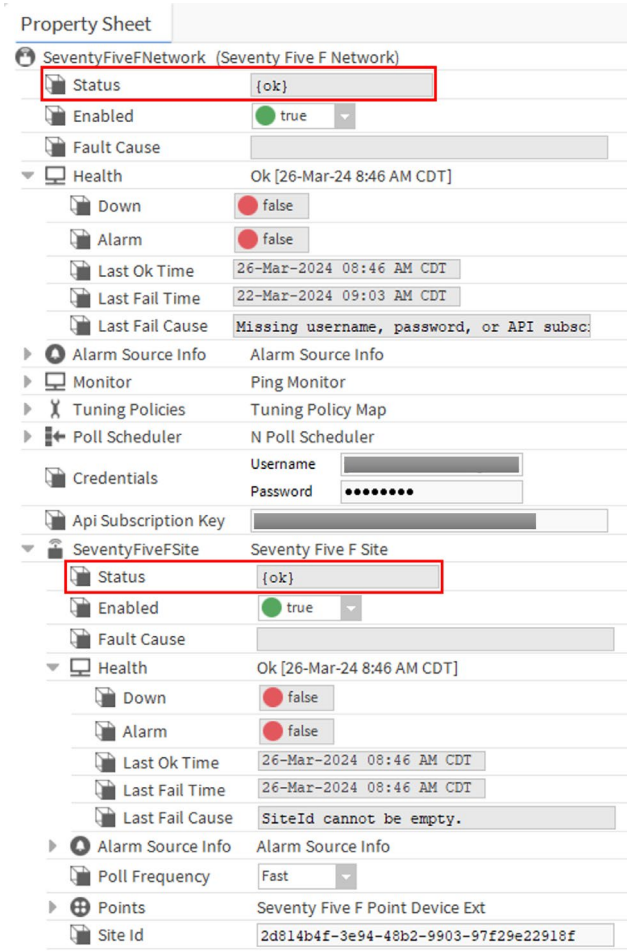


DIRECT-TO-CLOUD DRIVER (SCALABLE FOR ALL)





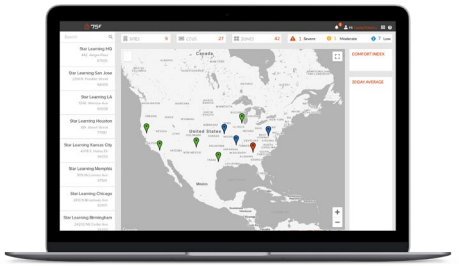
DIRECT-TO-CLOUD DRIVER (SCALABLE FOR ALL)



DIRECT-TO-CLOUD DRIVER (SCALABLE FOR ALL)

Property Sheet

SeventyFiveFNetwork (Seventy Five F Network)	
Status	{ok}
Enabled	true
Fault Cause	
Health	Ok [26-Mar-24 8:46 AM CDT]
Down	false
Alarm	false
Last Ok Time	26-Mar-2024 08:46 AM CDT
Last Fail Time	22-Mar-2024 09:03 AM CDT
Last Fail Cause	Missing username, password, or API subsc
Alarm Source Info	Alarm Source Info
Monitor	Ping Monitor
Tuning Policies	Tuning Policy Map
Poll Scheduler	N Poll Scheduler
Credentials	Username [redacted] / Password ••••••••
Api Subscription Key	[redacted]
SeventyFiveFSite	Seventy Five F Site
Status	{ok}
Enabled	true
Fault Cause	
Health	Ok [26-Mar-24 8:46 AM CDT]
Down	false
Alarm	false
Last Ok Time	26-Mar-2024 08:46 AM CDT
Last Fail Time	26-Mar-2024 08:46 AM CDT
Last Fail Cause	SiteId cannot be empty.
Alarm Source Info	Alarm Source Info
Poll Frequency	Fast
Points	Seventy Five F Point Device Ext
Site Id	2d814b4f-3e94-48b2-9903-97f29e22918f



House-Brew Lab-MONITORING-1003-zoneVOCThreshold

ccuRef, concentration, config, cpu, createdDateTime, dis, equipRef, floorRef, group, his, hisInterpolate, kind, lastModifiedBy, lastModifiedDateTime, point, roomRef, siteRef, sp, standalone, threshold, tz, unit, voc, writable, zone

Lvl 7 > 1200
Lvl 8 > 1000

DIRECT-TO-CLOUD DRIVER (SCALABLE FOR ALL)

Property Sheet

SeventyFiveFNetwork (Seventy Five F Network)	
Status	{ok}
Enabled	true
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Credentials	Username [redacted] / Password ••••••••
Api Subscription Key	[redacted]
SeventyFiveFSite	Seventy Five F Site
Status	{ok}
Enabled	true
Fault Cause	
Health	Ok [26-Mar-24 8:46 AM CDT]
Down	false
Alarm	false
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Last Fail Time	26-Mar-2024 08:46 AM CDT
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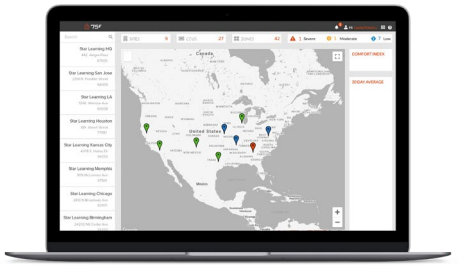
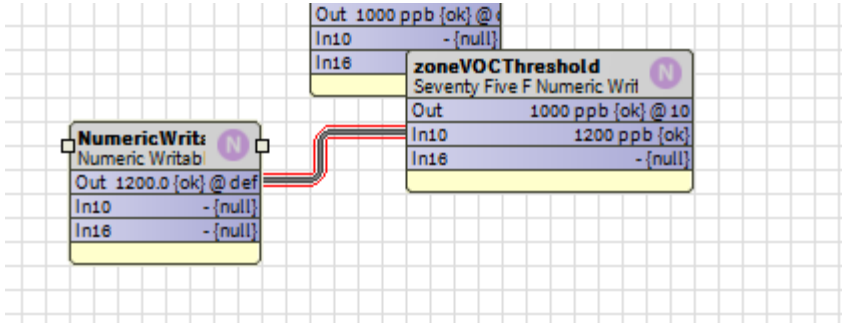
Alarm Source Info	Alarm Source Info
Poll Frequency	Fast
Points	Seventy Five F Point Device Ext
Site Id	2d814b4f-3e94-48b2-9903-97f29e22918f



House-Brew Lab-MONITORING-1003-zoneVOCThreshold

ccuRef, concentration, config, cpu, createdDateTime, dis, equipRef, floorRef, group, his, hisInterpolate, kind, lastModifiedBy, lastModifiedDateTime, point, roomRef, siteRef, sp, standalone, threshold, tz, unit, voc, writable, zone

Lvl 7 > 1200
Lvl 8 > 1000



DIRECT-TO-CLOUD DRIVER (SCALABLE FOR ALL)

Property Sheet

SeventyFiveFNetwork (Seventy Five F Network)

Status	{ok}
Enabled	true
Fault Cause	
Health	Ok [26-Mar-24 8:46 AM CDT]
Down	false
Alarm	false
Last Ok Time	26-Mar-2024 08:46 AM CDT
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Last Fail Cause	Missing username, password, or API subsc
Alarm Source Info	Alarm Source Info
Monitor	Ping Monitor
Tuning Policies	Tuning Policy Map
Poll Scheduler	N Poll Scheduler
Credentials	Username [redacted] / Password ••••••••
Api Subscription Key	[redacted]
SeventyFiveFSite	Seventy Five F Site
Status	{ok}
Enabled	true
Fault Cause	
Health	Ok [26-Mar-24 8:46 AM CDT]
Down	false
Alarm	false
Last Ok Time	26-Mar-2024 08:46 AM CDT
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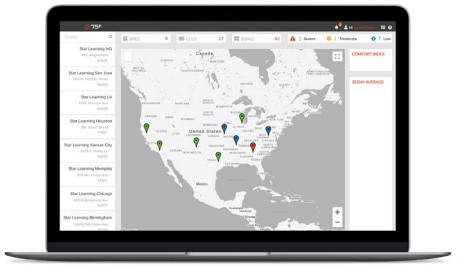
Last Fail Cause	SiteId cannot be empty.
Alarm Source Info	Alarm Source Info
Poll Frequency	Fast
Points	Seventy Five F Point Device Ext
Site Id	2d814b4f-3e94-48b2-9903-97f29e22918f



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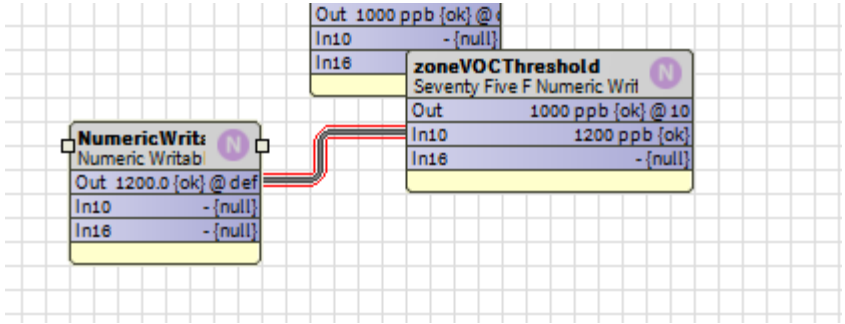
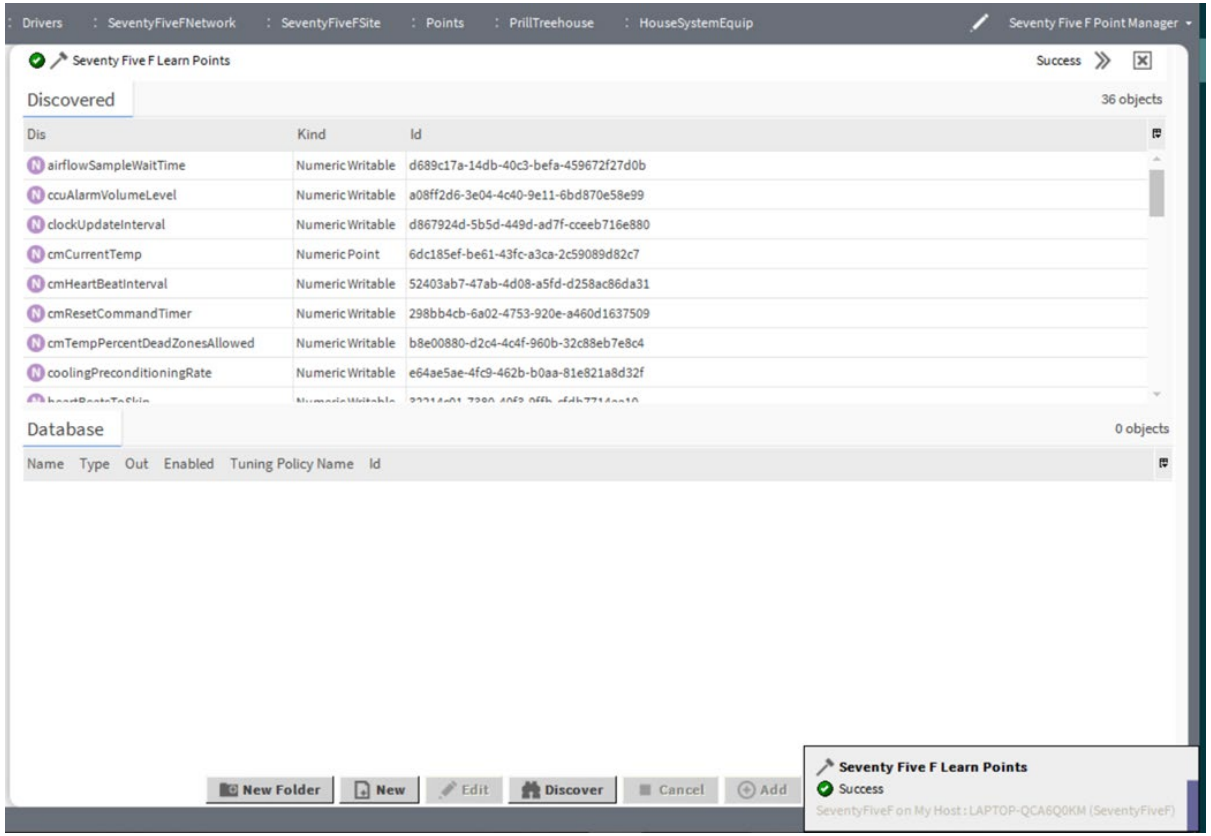
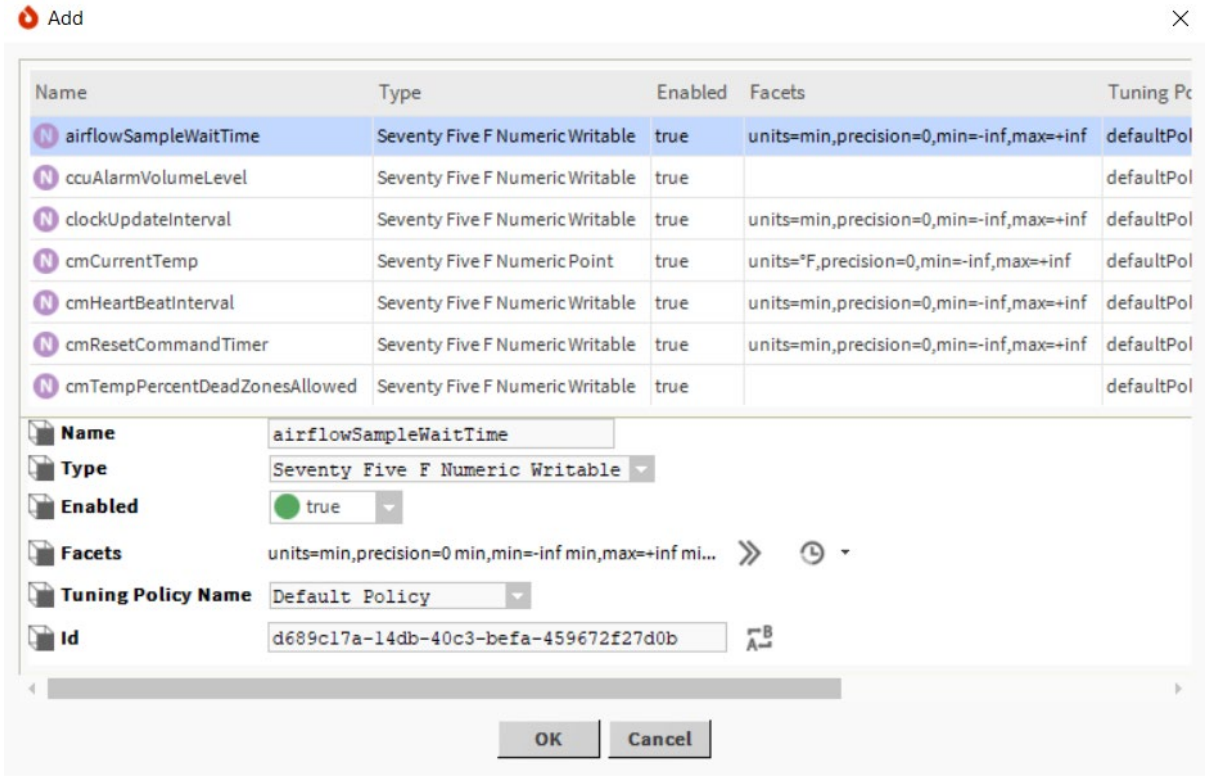


DIRECT-TO-CLOUD DRIVER (SCALABLE FOR ALL)





WHAT'S NEXT?

NS2024

APRIL 15 - 17 | ANAHEIM, CA

TRIDIUM

TRIDIUM

Thank You!

NS2024
APRIL 15 - 17 | ANAHEIM, CA

TRIDIUM

NS2024

POWER OF PARTNERSHIP

NS2024

APRIL 15 - 17 | ANAHEIM, CA

Leveraging Niagara to maximize the value of smart and connected field devices

TRIDIUM

Our Mission

Belimo is the global market leader in the development, production and sales of field devices for the energy-efficient control of heating, ventilation, and air-conditioning systems.

The focus of our core business is damper actuators, control valves, sensors, and meters.

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FIELD DEVICE APPLICATIONS

Providing energy-efficient control of heating, ventilation, and air-conditioning systems

Air

Fire & Smoke Protection

Air Handling Unit

Room Comfort

Water

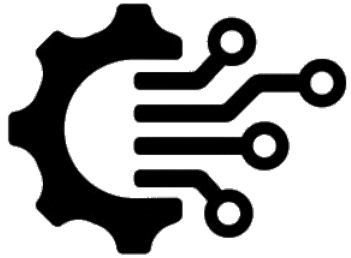
Cooling Tower

Cooling Coil

Heating Coil

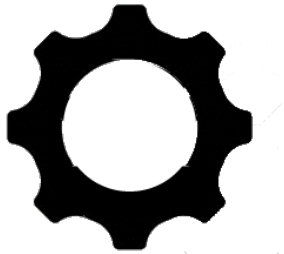
ANALOG VS DIGITAL DEVICES

- On/off or 2-10v control
- Sensor values represented as voltage or resistance requiring conversion
- Configuration using a screw-driver, jumpers or dip switches
- No extra data

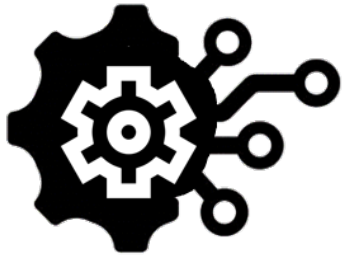


- On/off, 2-10v or BUS control
- Sensor values represented as real world properties
- Configuration using hand-held tools or smartphone
- Device operation KPIs

BASIC VS SMART DEVICES

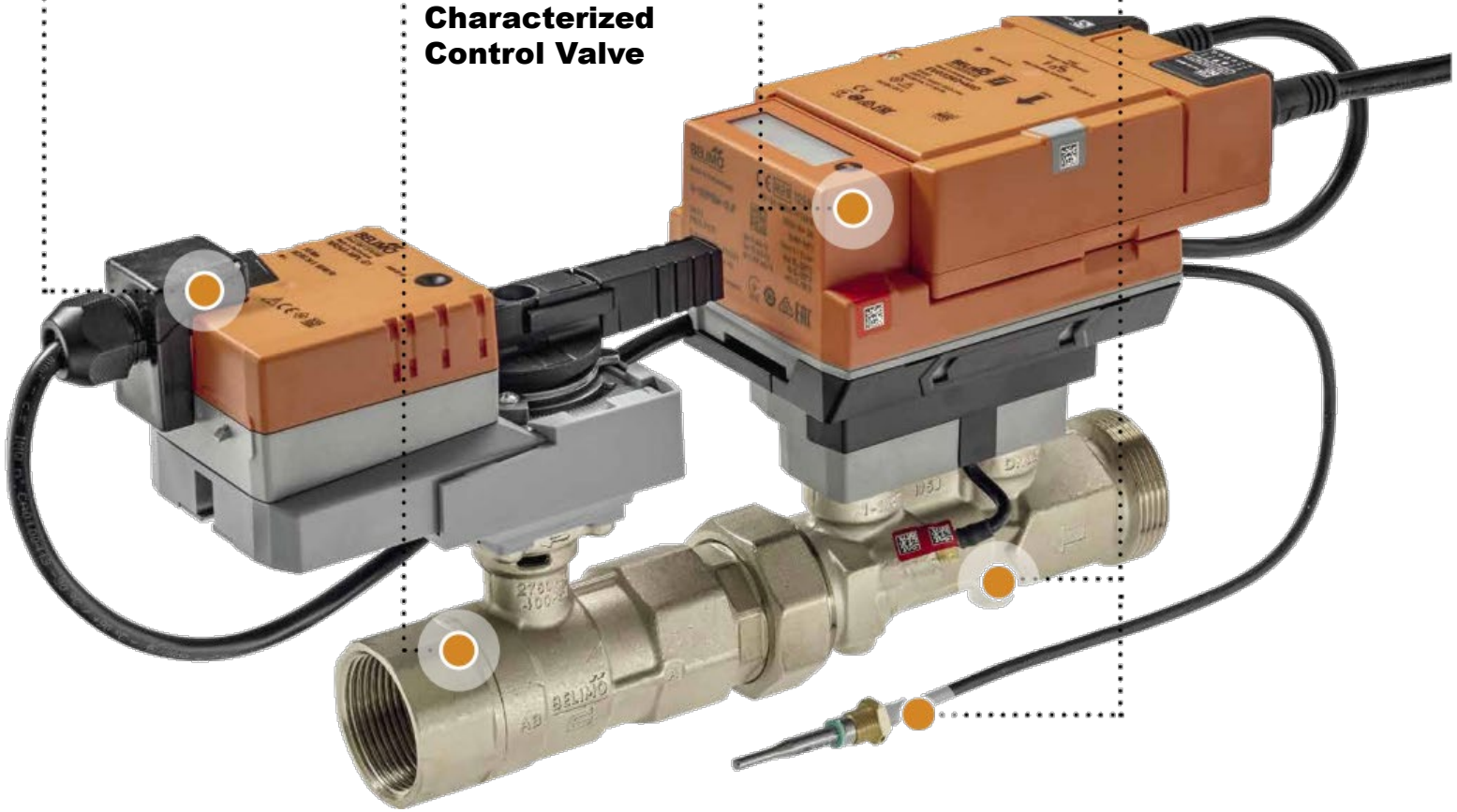


- Position setpoint from BACS
- No optimization
- No UI
- No extra data

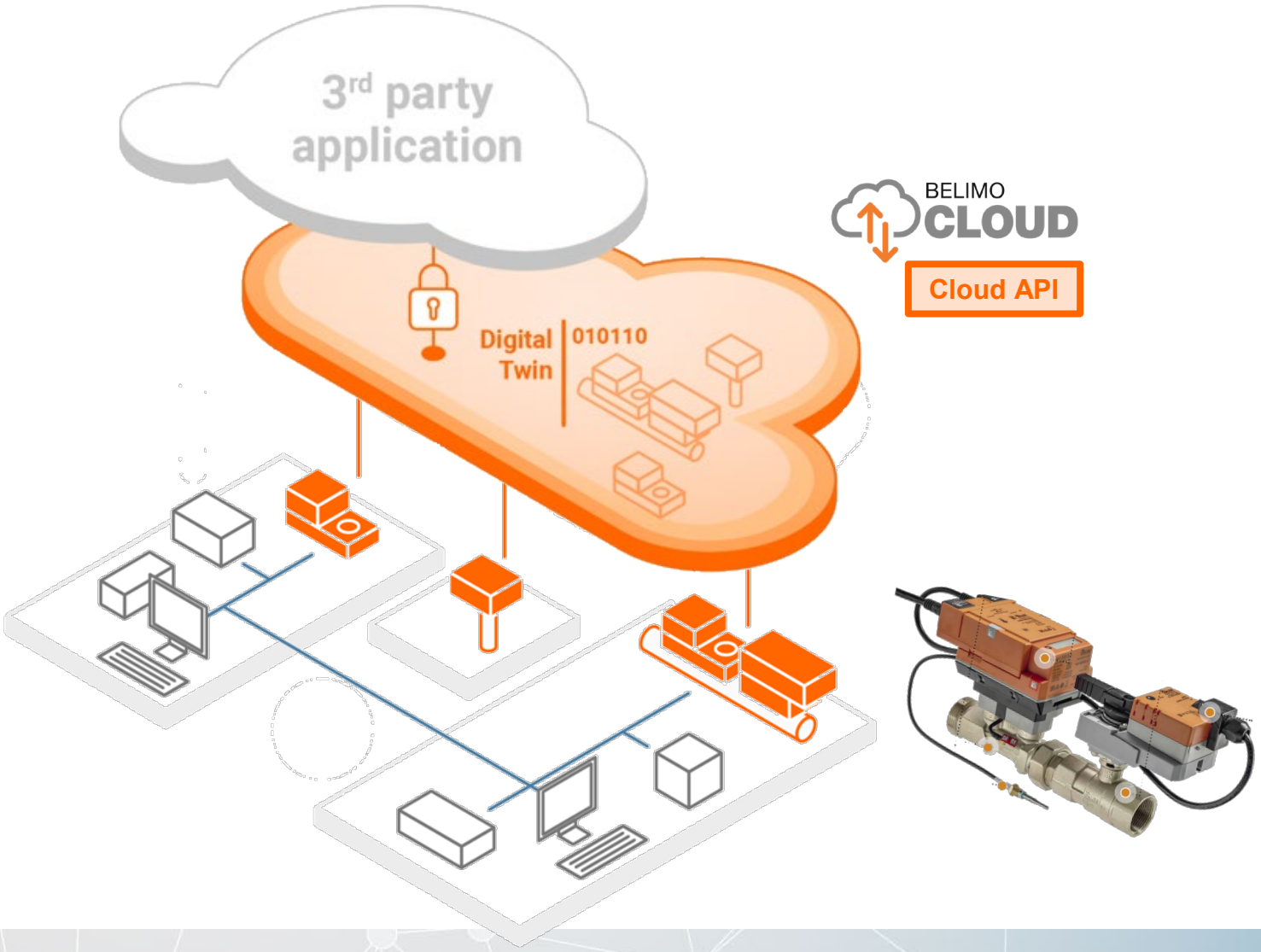


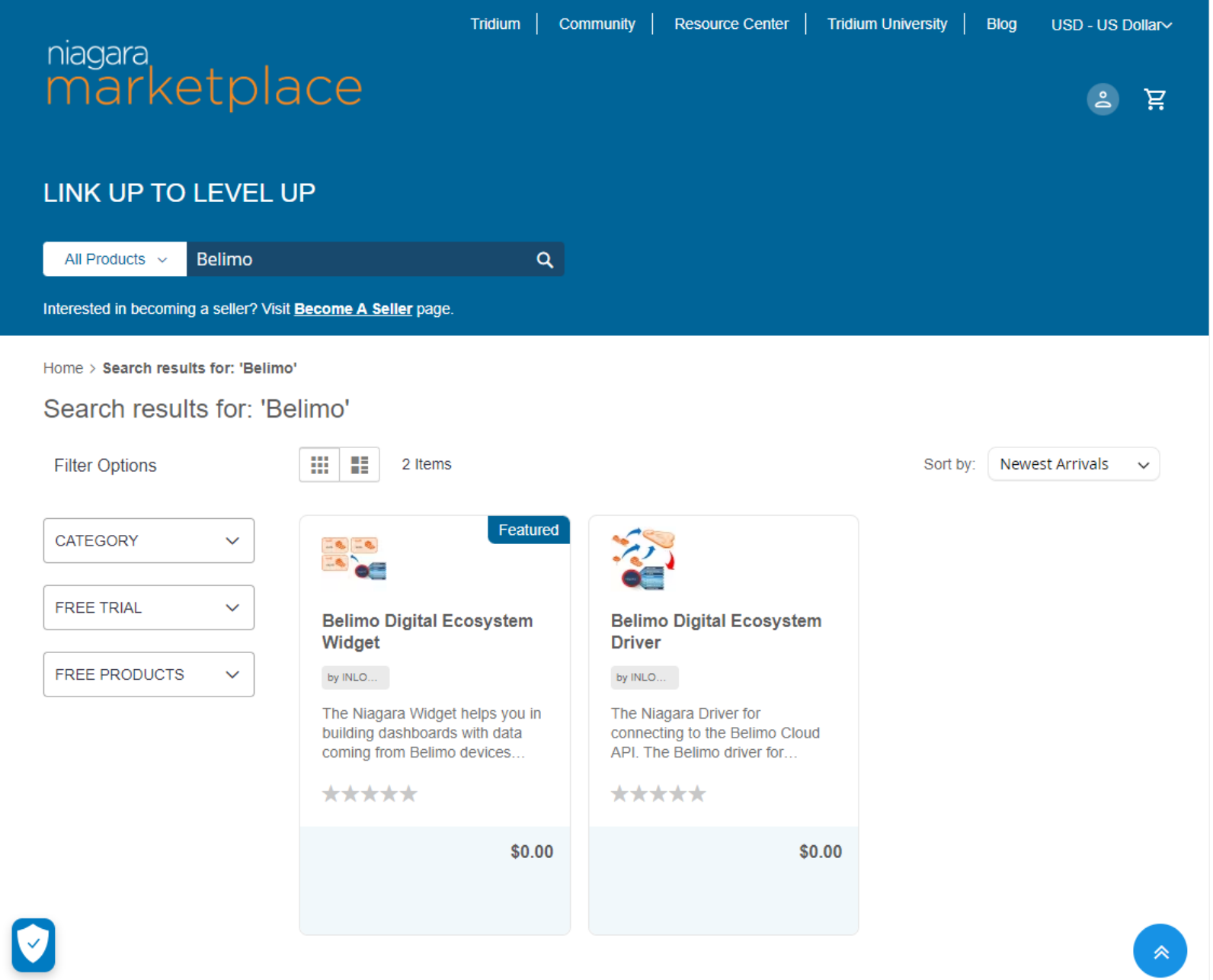
- Setpoint from BACS with local control process – i.e.; flow or temperature
- Local optimization
- Local UI
- Application data

ENERGY VALVE - SMART DEVICE



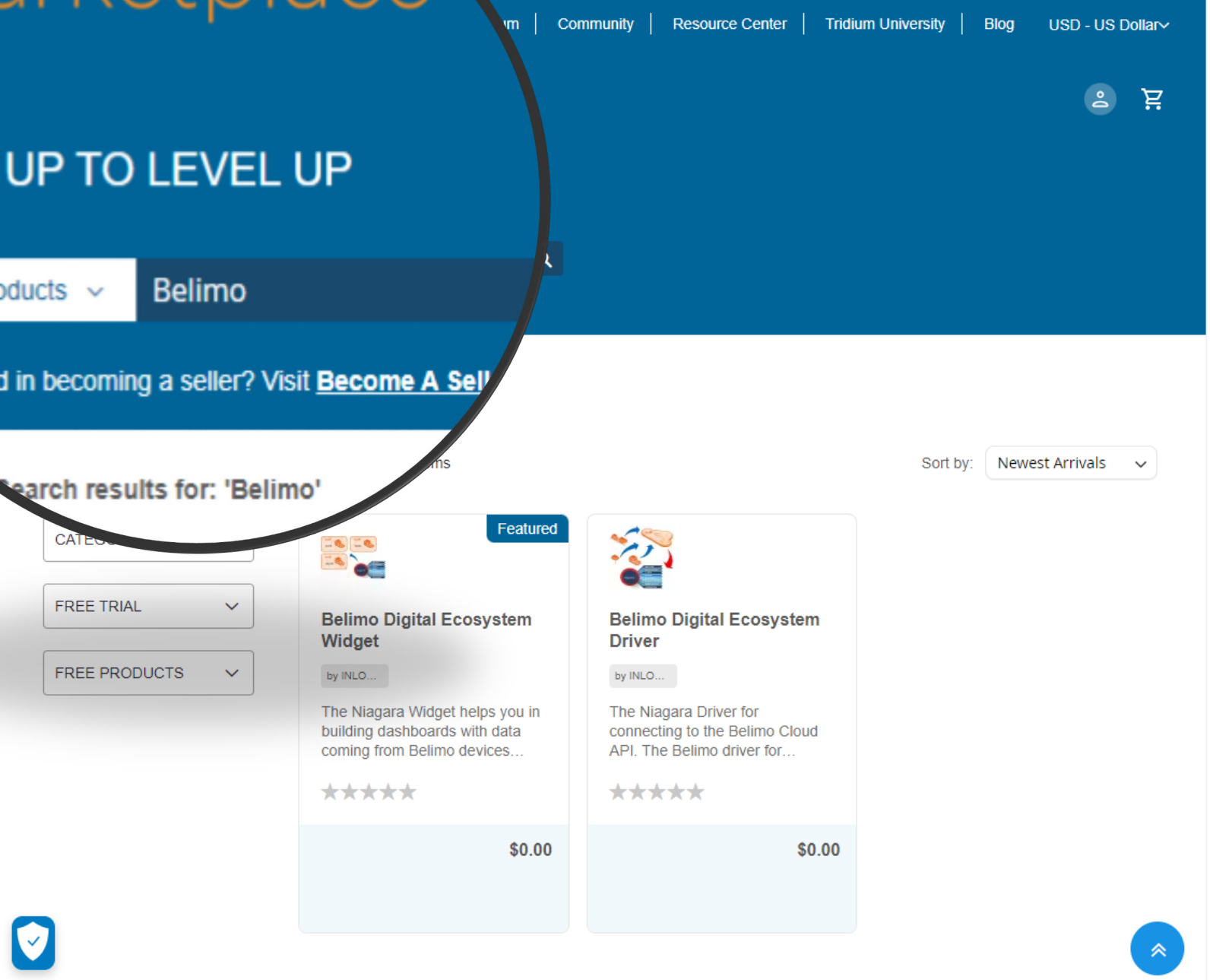
SMART DEVICE DIGITAL TWINS





The widget and driver have both been developed by Inlon Engineering and are offered free of charge through the Niagara Marketplace

ENGINEERING INLON THE CONTROL NETWORK COMPANY



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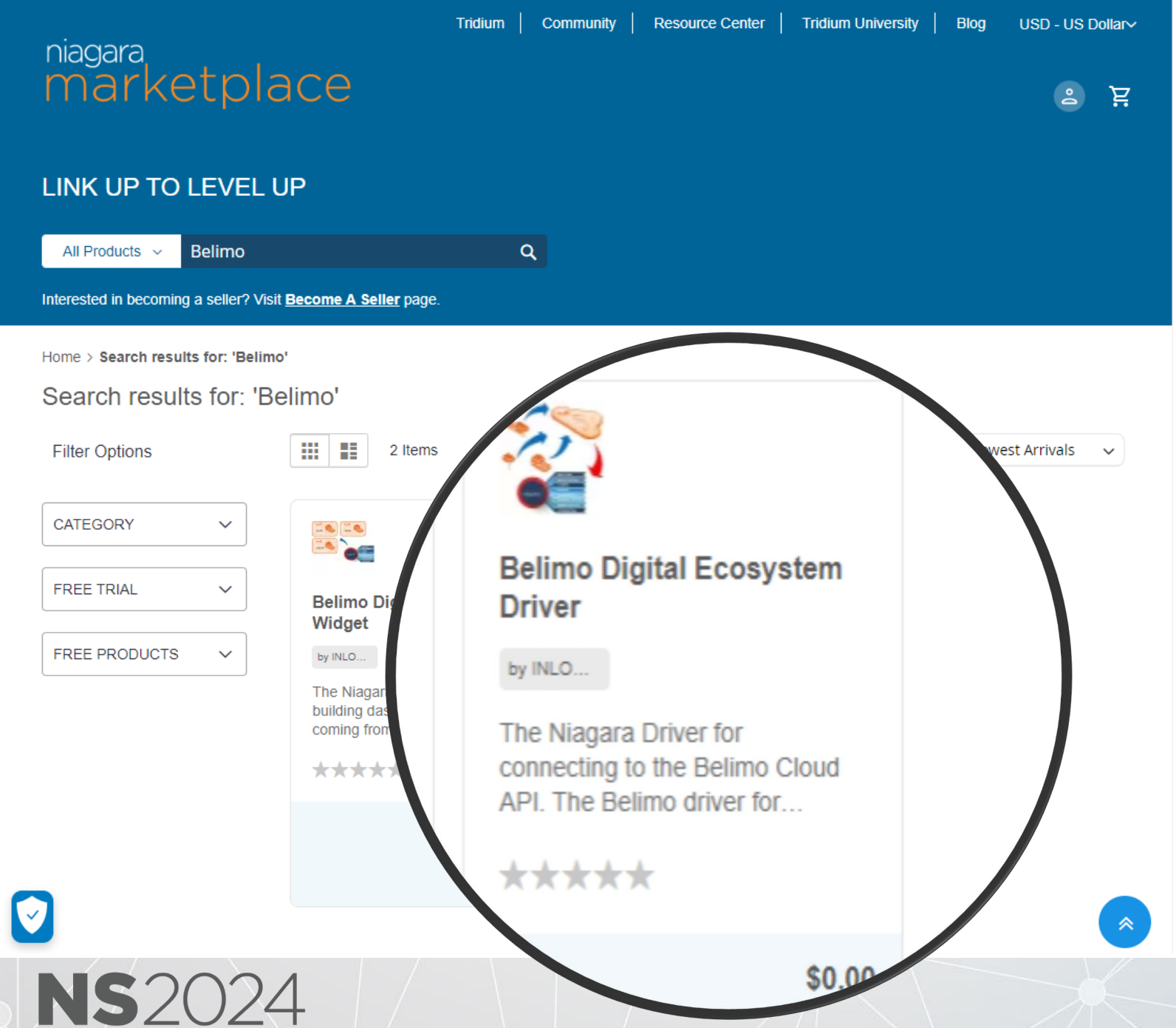
ENGINEERING INLON THE CONTROL NETWORK COMPANY



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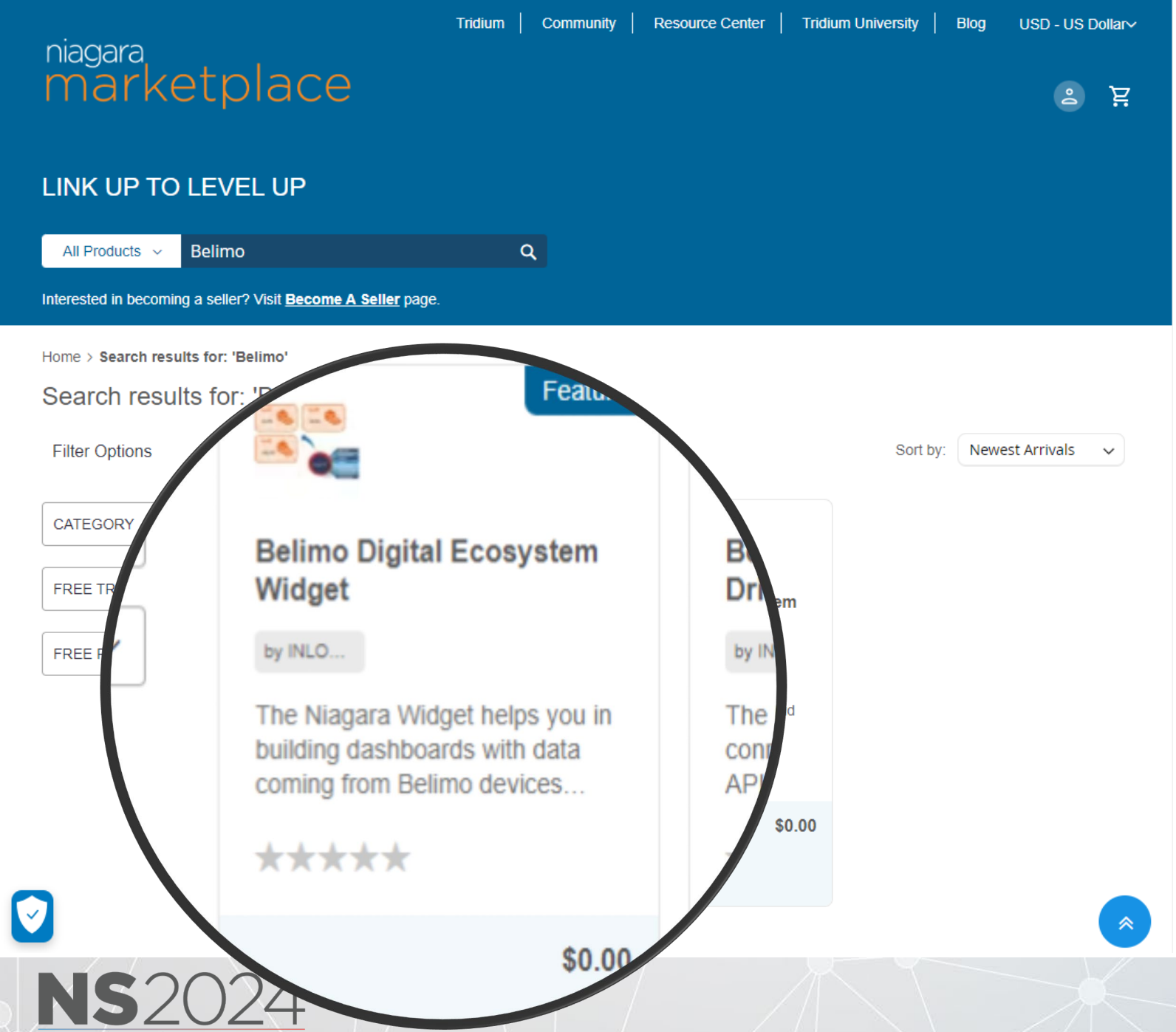

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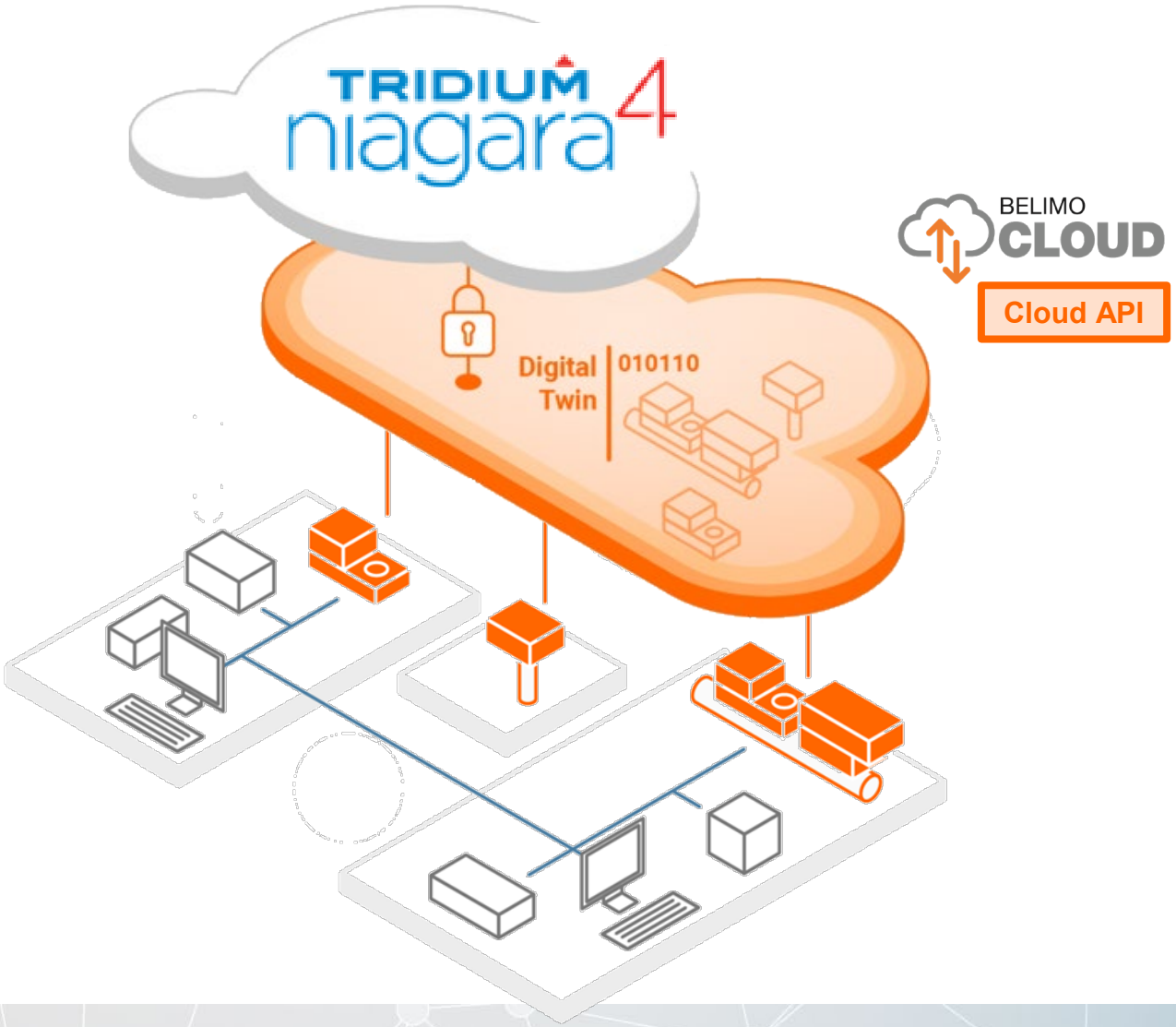
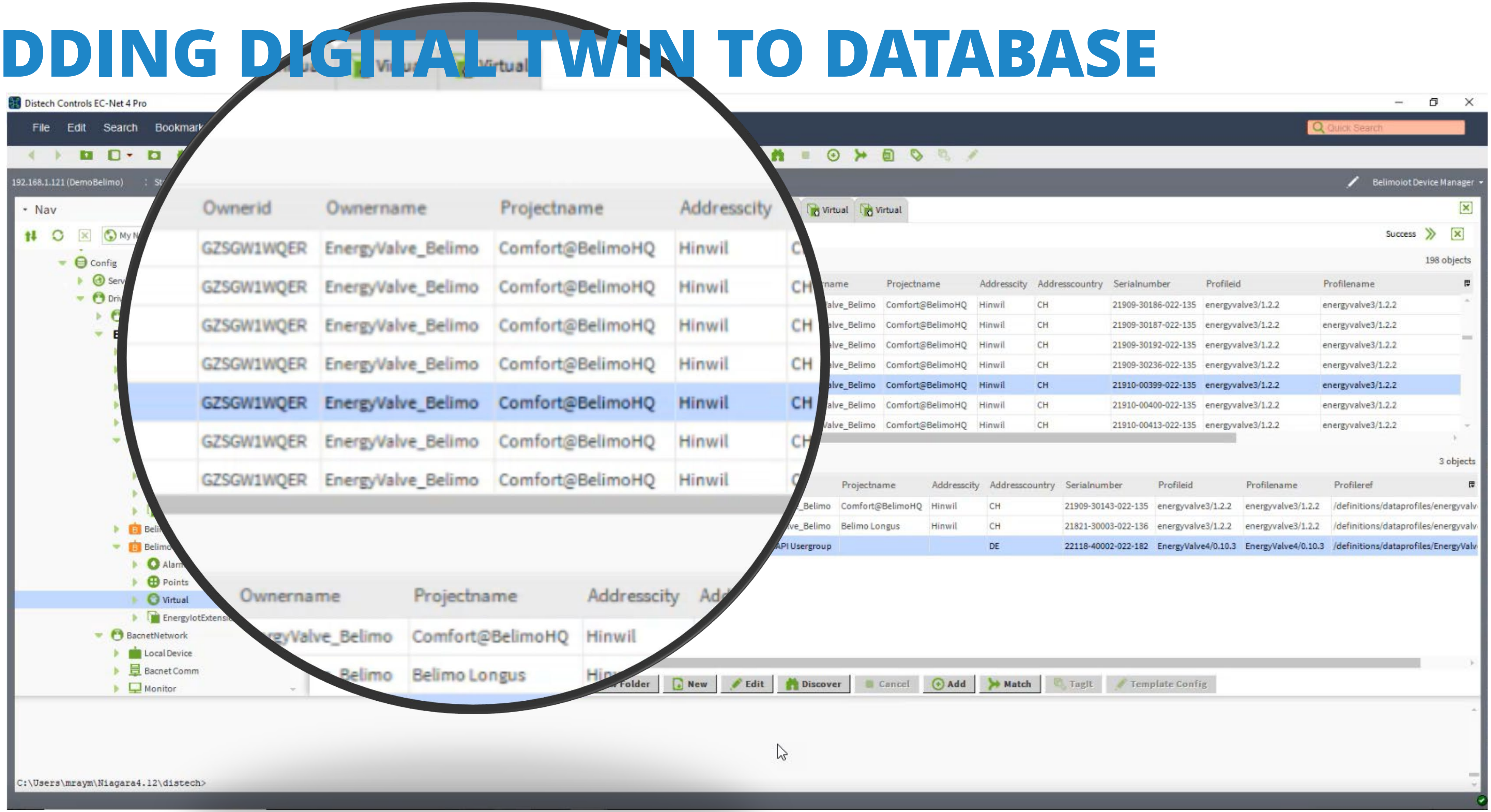
ENGINEERING INLON THE CONTROL NETWORK COMPANY

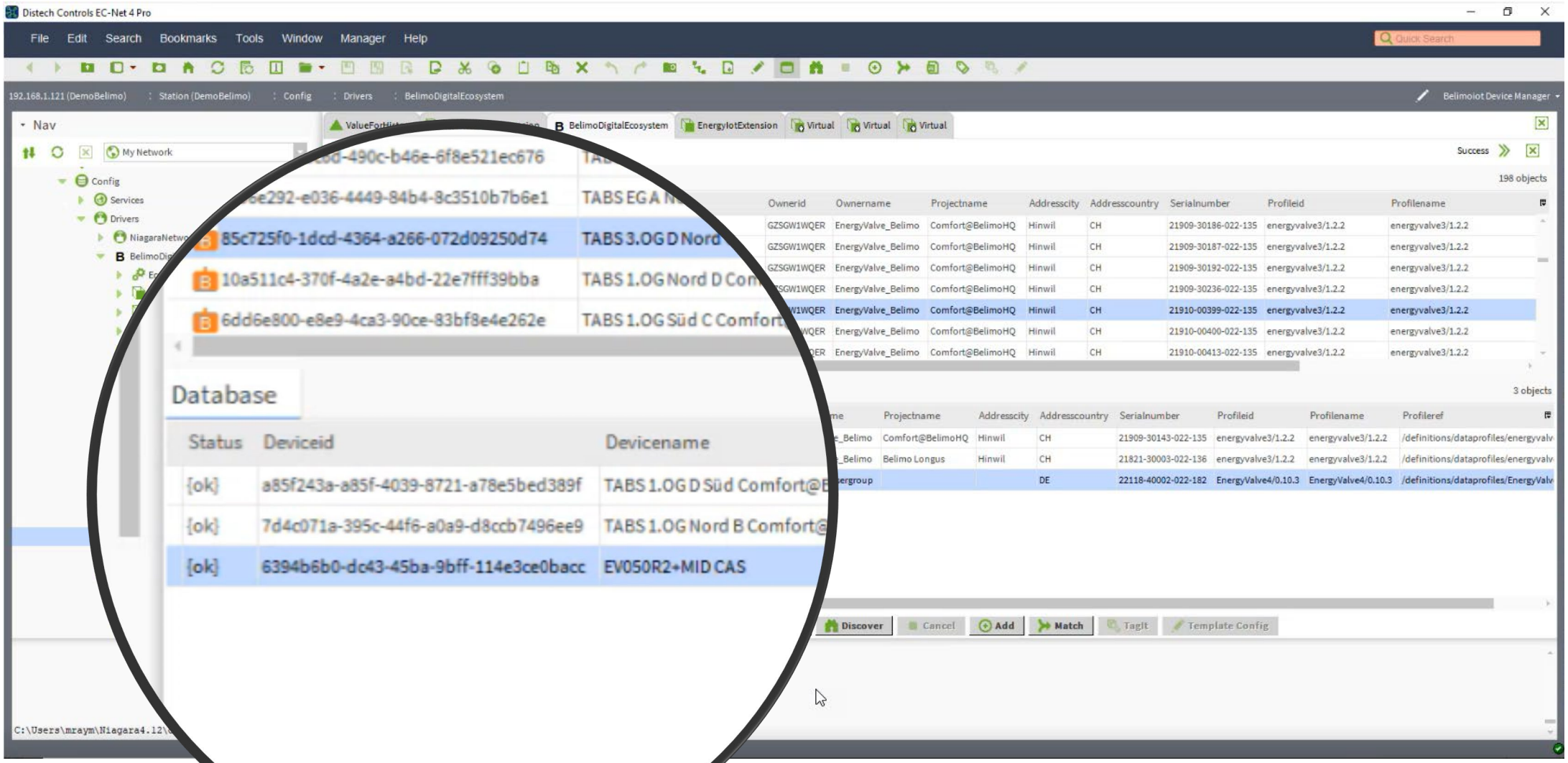
SMART DEVICE DIGITAL TWINS



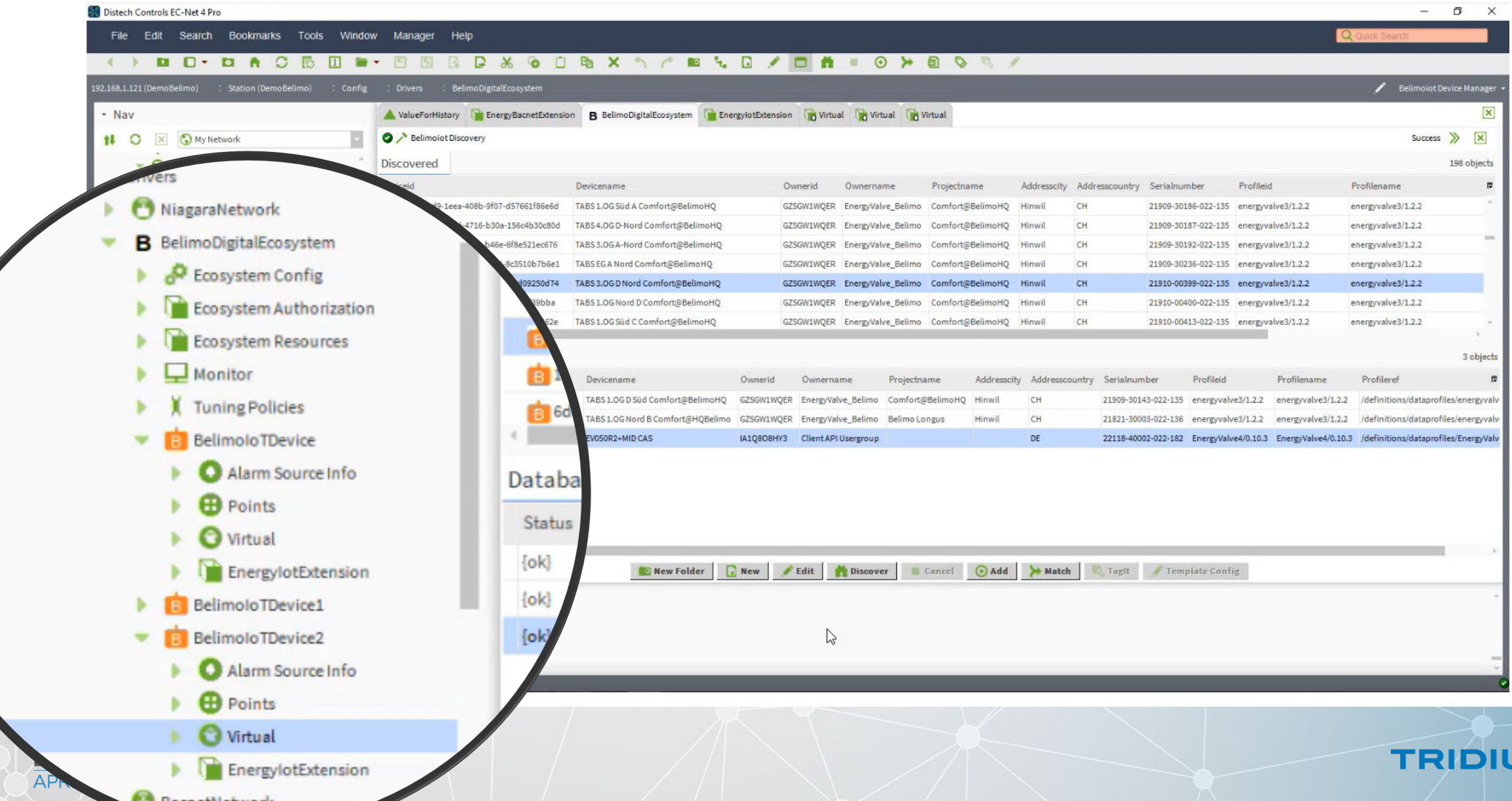
ADDING DIGITAL TWIN TO DATABASE



ADDING DIGITAL TWIN TO DATABASE

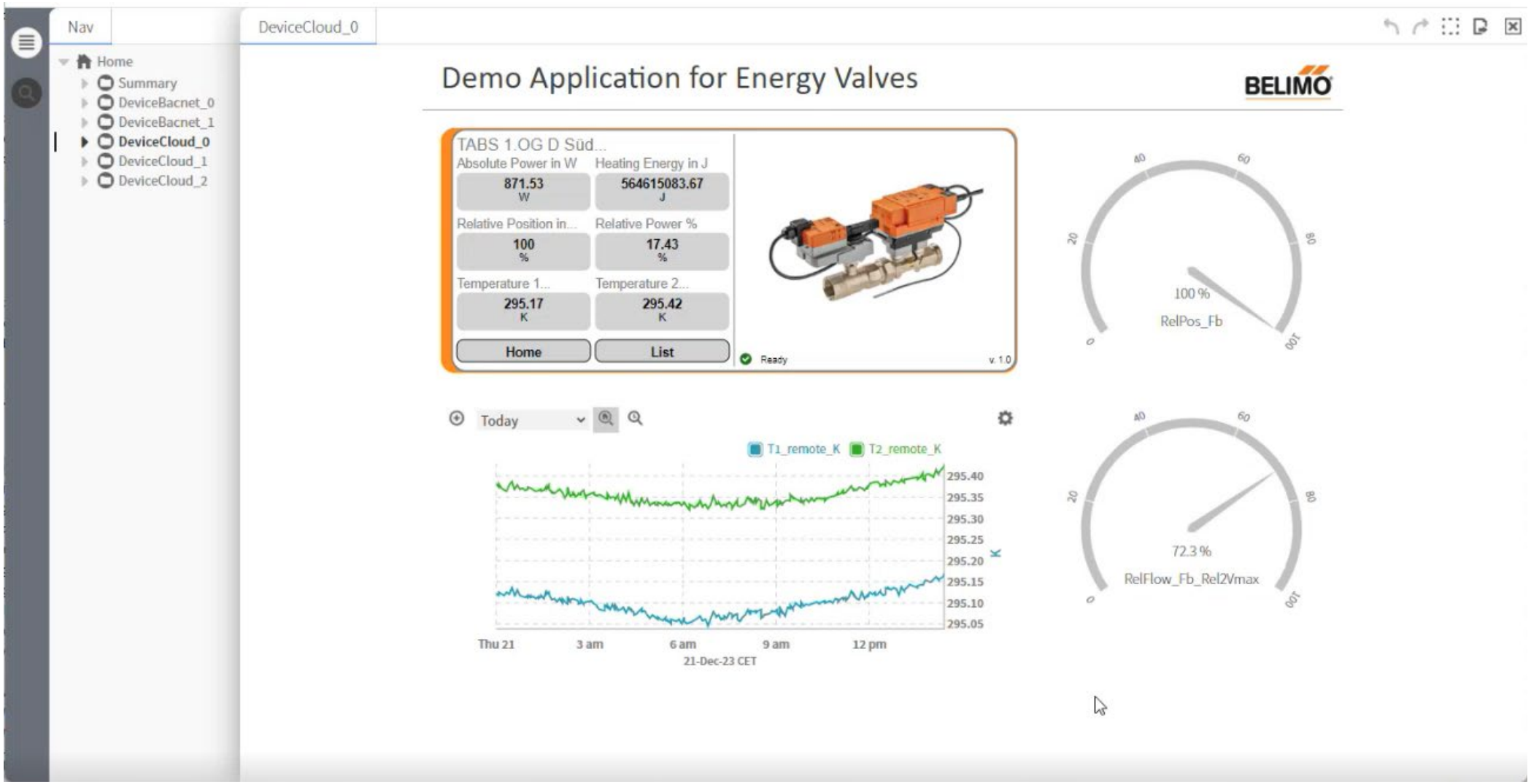


ADDING DIGITAL TWIN TO DATABASE



TRIDIUM

PRE-BUILT VIEWS USING EXTENSIONS



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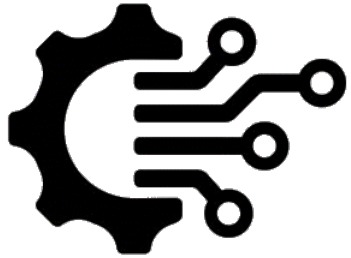
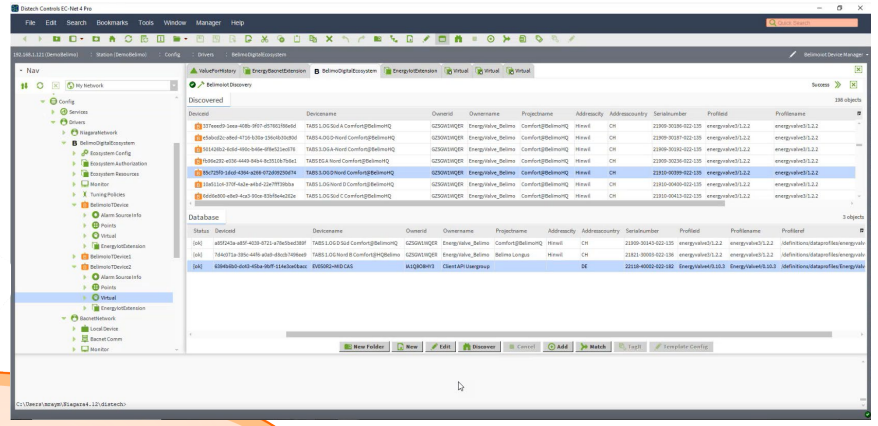
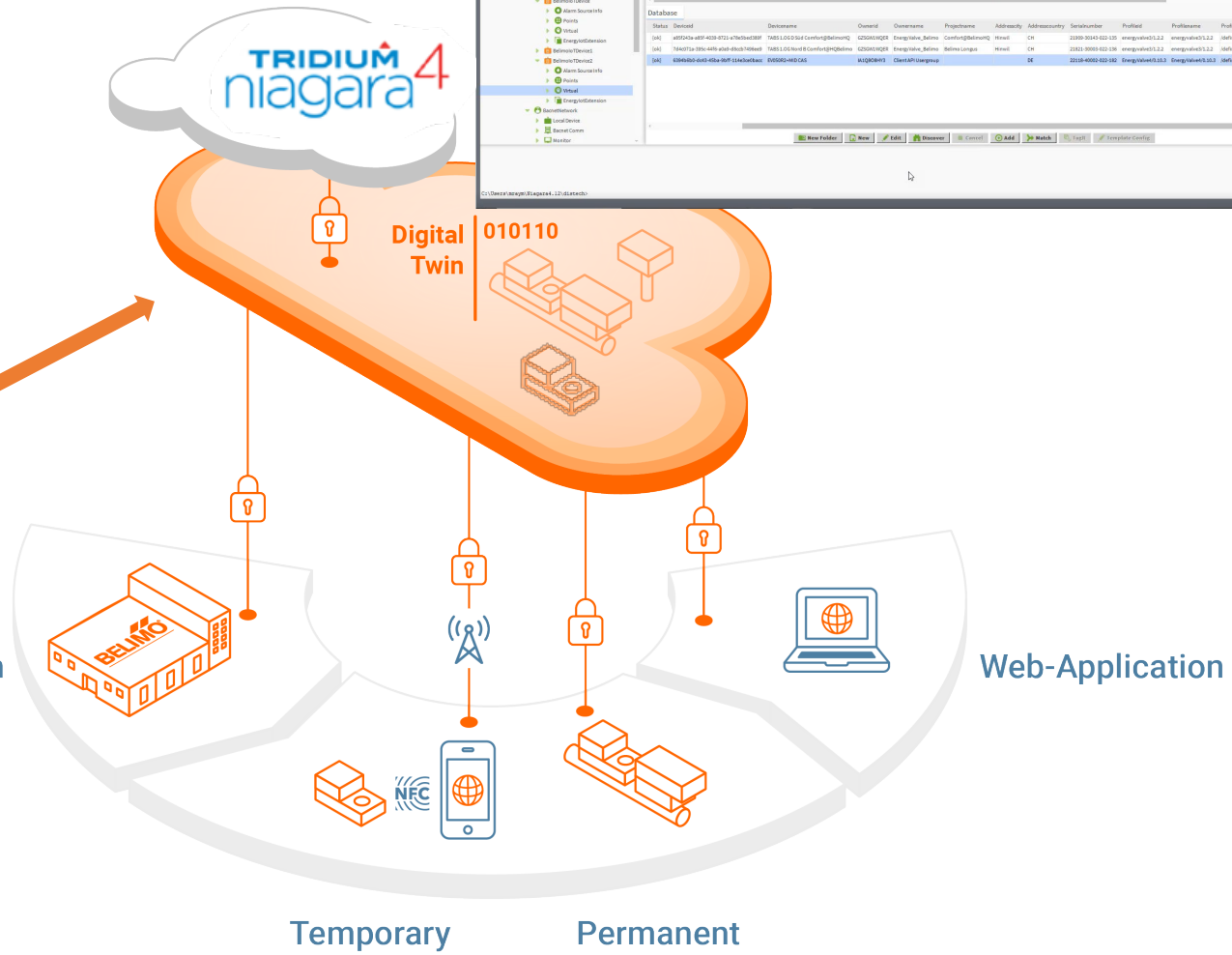


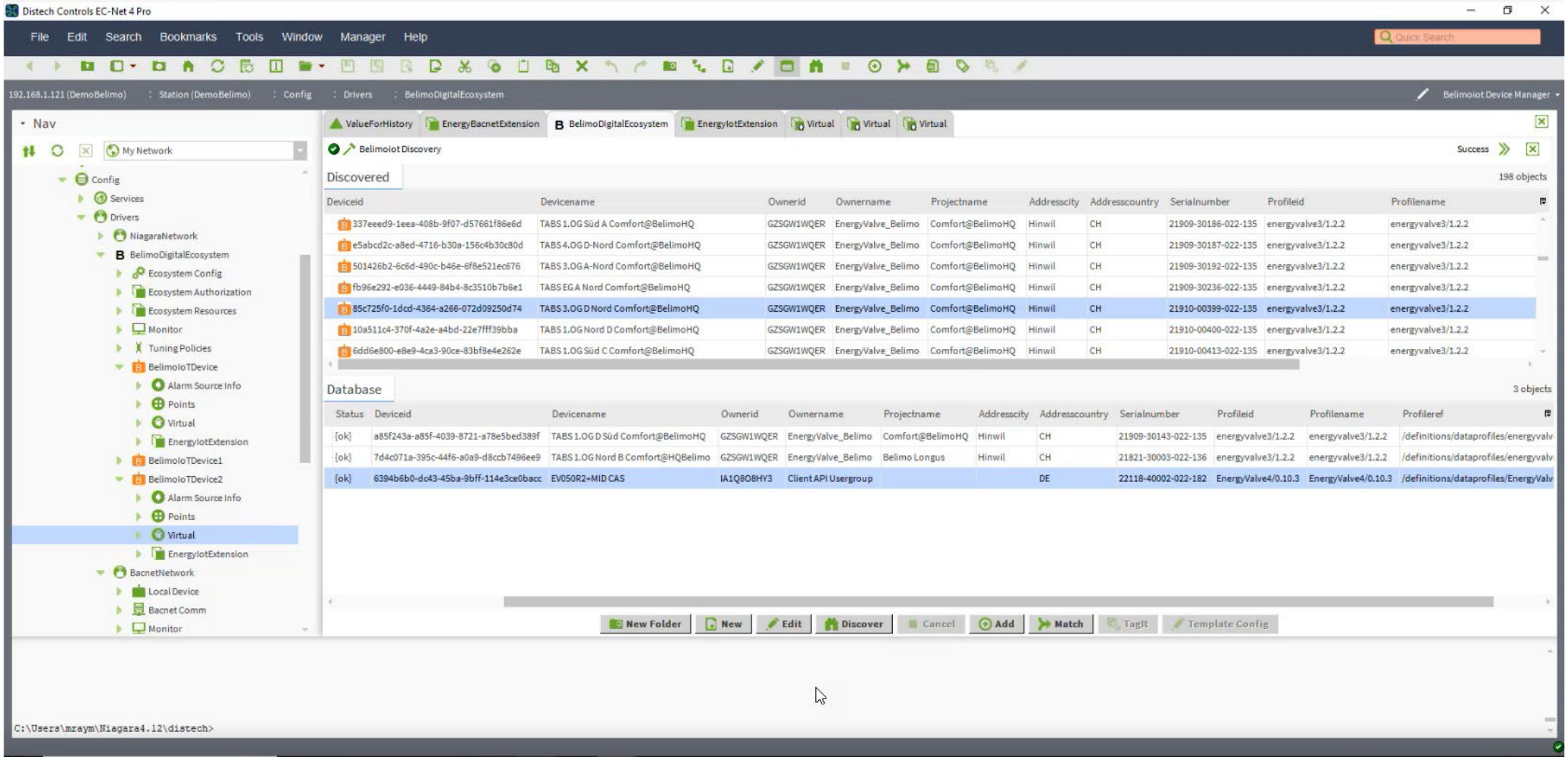
- On/off, 2-10v or BUS control
- Sensor values represented as real world properties
- **Configuration using hand-held tools or smartphone**
- Device operation KPIs

BASIC DEVICE DIGITAL TWINS



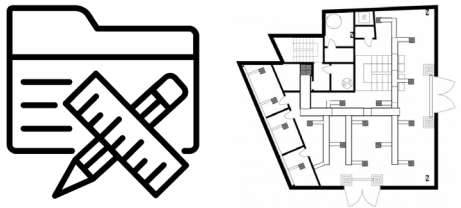


ENTIRE PROJECT OF DEVICE DIGITAL TWINS

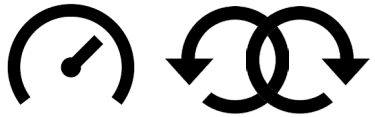


DIGITAL TWIN INFO VIEWABLE AND/OR CHANGEABLE IN NIAGARA

- Device Properties
  - Model
  - Sales Order
  - Project
  - Application Tag



- Device Settings
  - Signal type / range
  - Speed
  - Direction



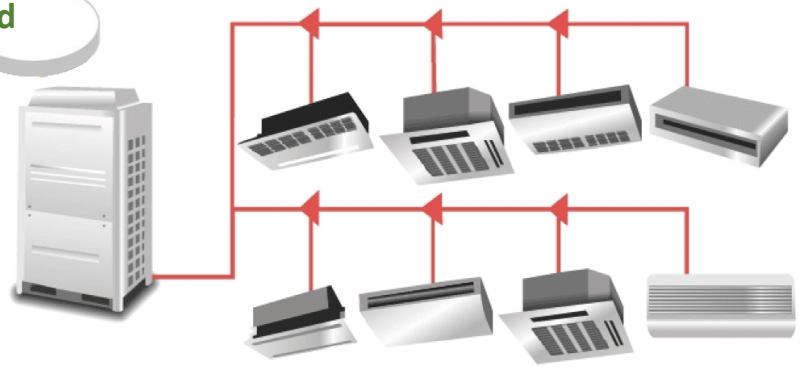
- Device Data
  - Device history
  - Device KPIs
  - Location

VALUE TO A NON-BACS BUILDING

TRIDIUM niagara4

Vendor Cloud

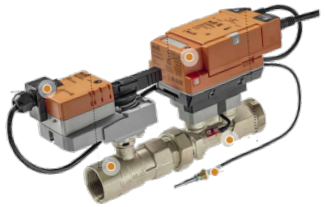
Vendor Cloud



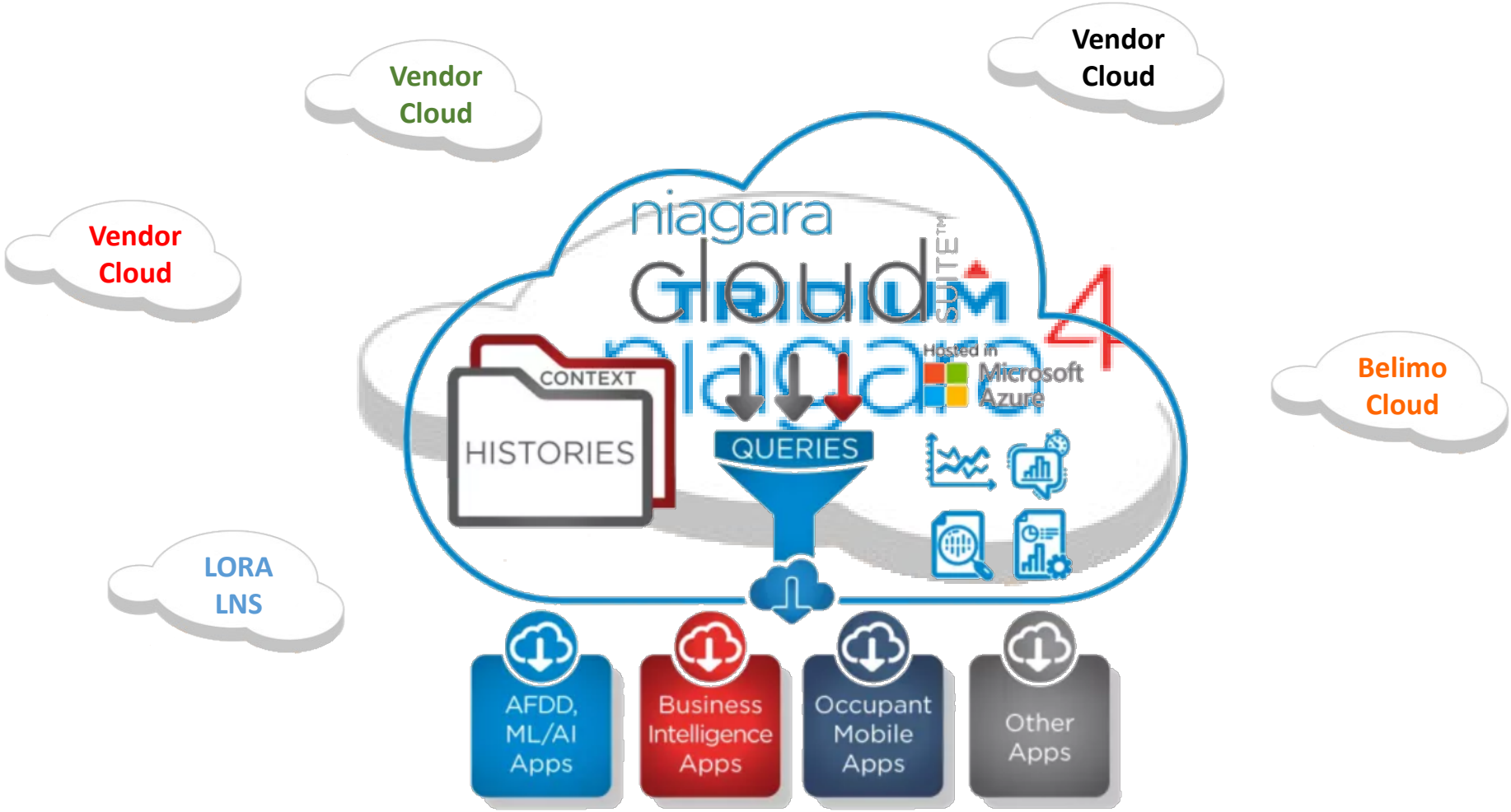
Vendor Cloud

LORA LNS

Belimo Cloud



VALUE TO A NON-BACS BUILDING



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THANK YOU!

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APRIL 15 - 17 | ANAHEIM, CA

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POWER OF PARTNERSHIP