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Smart Buildings SHOW

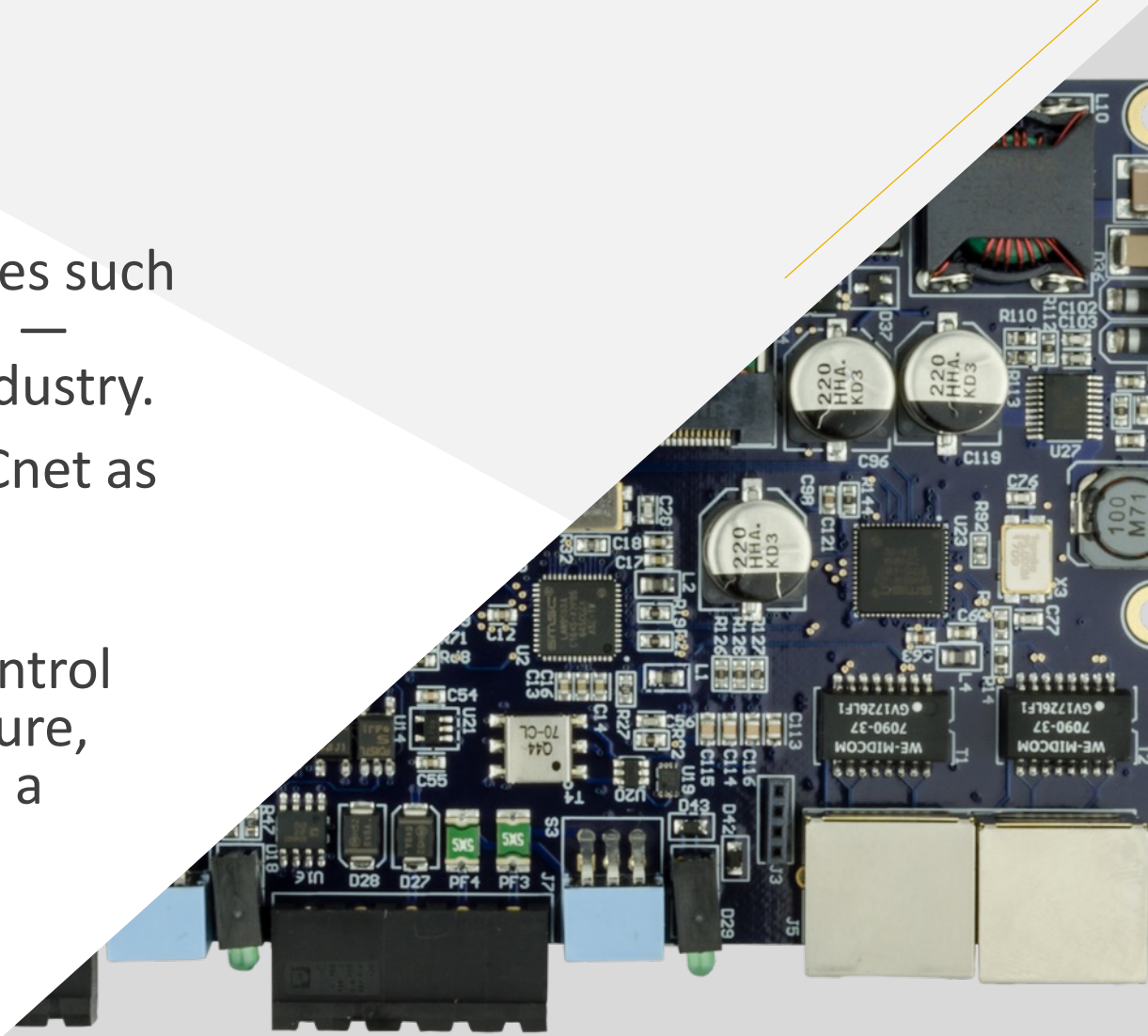
18-19 October 2023 • ExCel London

BACnet License-free Controllers and Robust Ethernet Infrastructure for Building Control Applications

CONTEMPORARY CONTROLS®

Our Products

- Our products are built upon open technologies such as BACnet®, Ethernet, Modbus®, and Sedona — typically found in the building automation industry.
- We are committed to open controls with BACnet as the protocol and license-free Sedona as the programming language.
- We provide unrestricted access to the BAScontrol Toolset, a free set of software tools to configure, emulate, and archive controller operation on a Windows PC.



CONTEMPORARY CONTROLS®

Serving EMEA

Contemporary Controls Ltd (CCL)
Coventry, United Kingdom

Contemporary Controls GmbH (CCG)
Leipzig, Germany

https://www.ccontrols.eu/

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BASautomation® — Building on BACnet

- Contemporary Controls solutions simplify BACnet/BMS integration challenges.
  - Supervisors provide BACnet/IP client functionality and control in one package.
  - BACnet routers link IP networks to BACnet MS/TP.
  - Gateways adapt Modbus and EnOcean devices to BACnet.
  - Communicating Thermostats feature BACnet functionality over MS/TP or Wi-Fi.
  - BACnet/IP and MS/TP controllers, and I/O modules do the work.

BAScontrol

- BAScontrol open controllers feature BACnet as a communications protocol and Sedona as a license-free function block programming language.
- Controllers can be programmed over an Ethernet connection using the free BAScontrol Toolset.
- Pre-built application programs for common HVAC applications are available to speed project development.

BASControl Applications

- Constant Volume Air Handlers
  - Staged heating/cooling
  - Modulated heating/cooling
  - Demand Control Ventilation (DCV)
  - Powered exhaust
  - Economizer
- Fan Coils
  - 2-pipe or 4-pipe
  - Single-speed, multi-speed, variable speed
- Constant Volume Heat Pumps
  - Single-stage heating/cooling
  - Single-stage with auxiliary heating

BACnet 22-point Unitary Controllers

BAScontrol22D

- BACnet/IP client/server
- Dual Ethernet ports
- Sedona Open Control
- Outside temperature rated
- Eight universal inputs
- Four binary inputs
- Four analog outputs
- Six binary outputs

BAScontrol22S

- BACnet/IP client/server
- BACnet MS/TP client/server
- Single Ethernet port
- Single BACnet MS/TP port
- Sedona Open Control
- Outside temperature rated
- Eight universal inputs
- Four binary inputs
- Four analog outputs
- Six binary outputs

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BACnet 12-point Cloud Connected Controllers

BASpi-Edge

- BACnet/IP client/server over Ethernet or Wi-Fi
- Optional BACnet MS/TP using USB to EIA-485 dongle
- Azure IoT Central connector
- Sedona Open Control
- Web page configurable over Ethernet or Wi-Fi
- Graphical dashboard served over Ethernet, Wi-Fi, or direct HDMI output
- Six universal inputs
- Six or four relay outputs
- Two or zero analog outputs

Microsoft Azure

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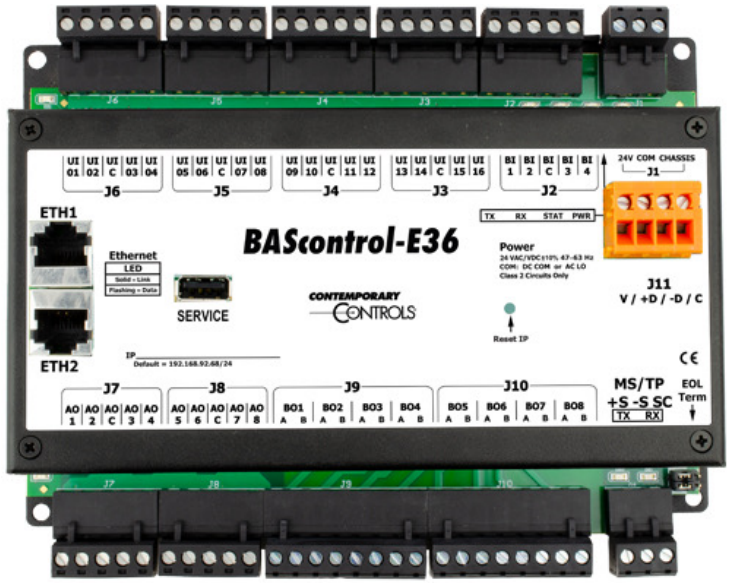
BACnet 36-point Edge Controller



BAScontrolE36

- BACnet/IP and BACnet MS/TP client/server
- BACnet B-ASC device profile
- Web page configuration
- Sedona Open Control
- Built-in 10/100 Mbps Ethernet two-port switch
- Sixteen universal inputs
- Four binary inputs
- Eight analog outputs

- Eight binary outputs
- Digital wall setter port
- Wi-Fi connectivity via USB dongle
- NTP or manually settable RTC
- Azure IoT Central connector
- Dashboards
- Email alarms and notifications
- Weather data accessible to openweathermap.org
- Outside temperature rated

Microsoft Azure

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License-free Dashboards

License-free dashboards are available on the Contemporary Controls' edge controllers.

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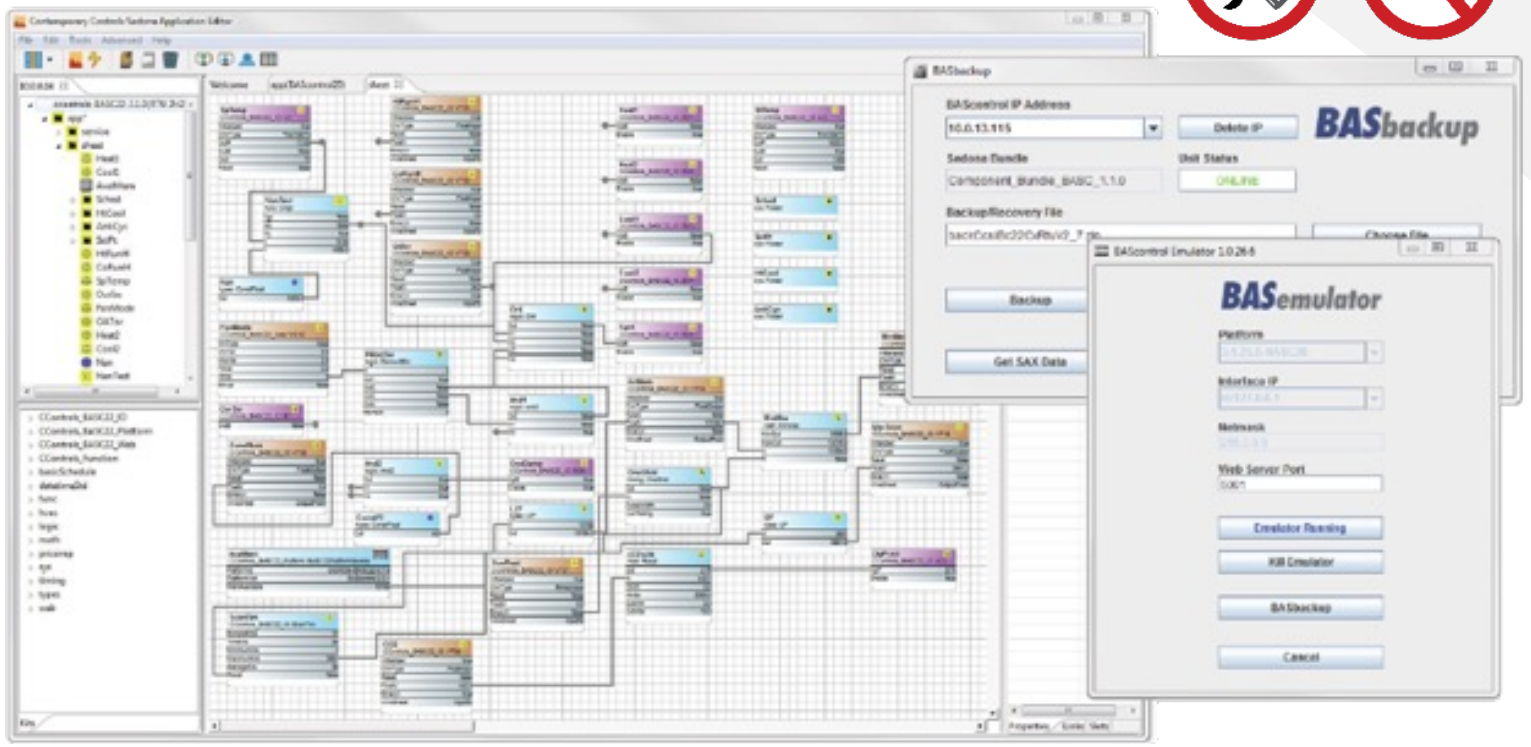
BAScontrol Toolset — Free Programming Tools

- Contemporary Controls has developed the BAScontrol Toolset, a free set of Sedona tools operating on a Windows PC, which includes:
  - **BASemulator** – emulates controller operation on a Windows PC.
  - **Sedona Application Editor (SAE)** – creates function block wiresheet applications in the Sedona environment.
  - **BASbackup** – saves, restores and replicates real or emulated controller settings and Sedona wiresheet applications.



The toolset is provided as a free download on the Contemporary Controls website at www.ccontrols.com.

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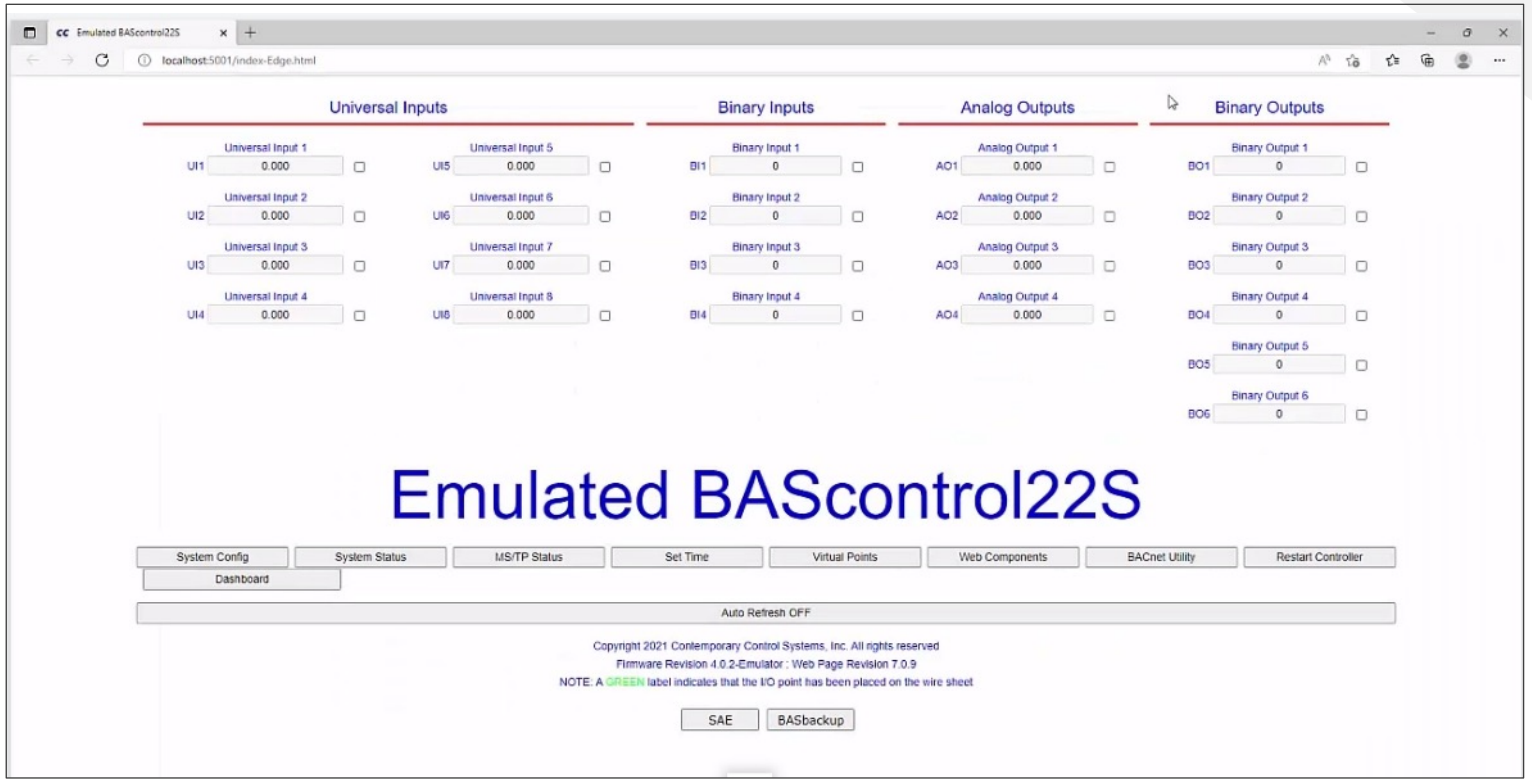
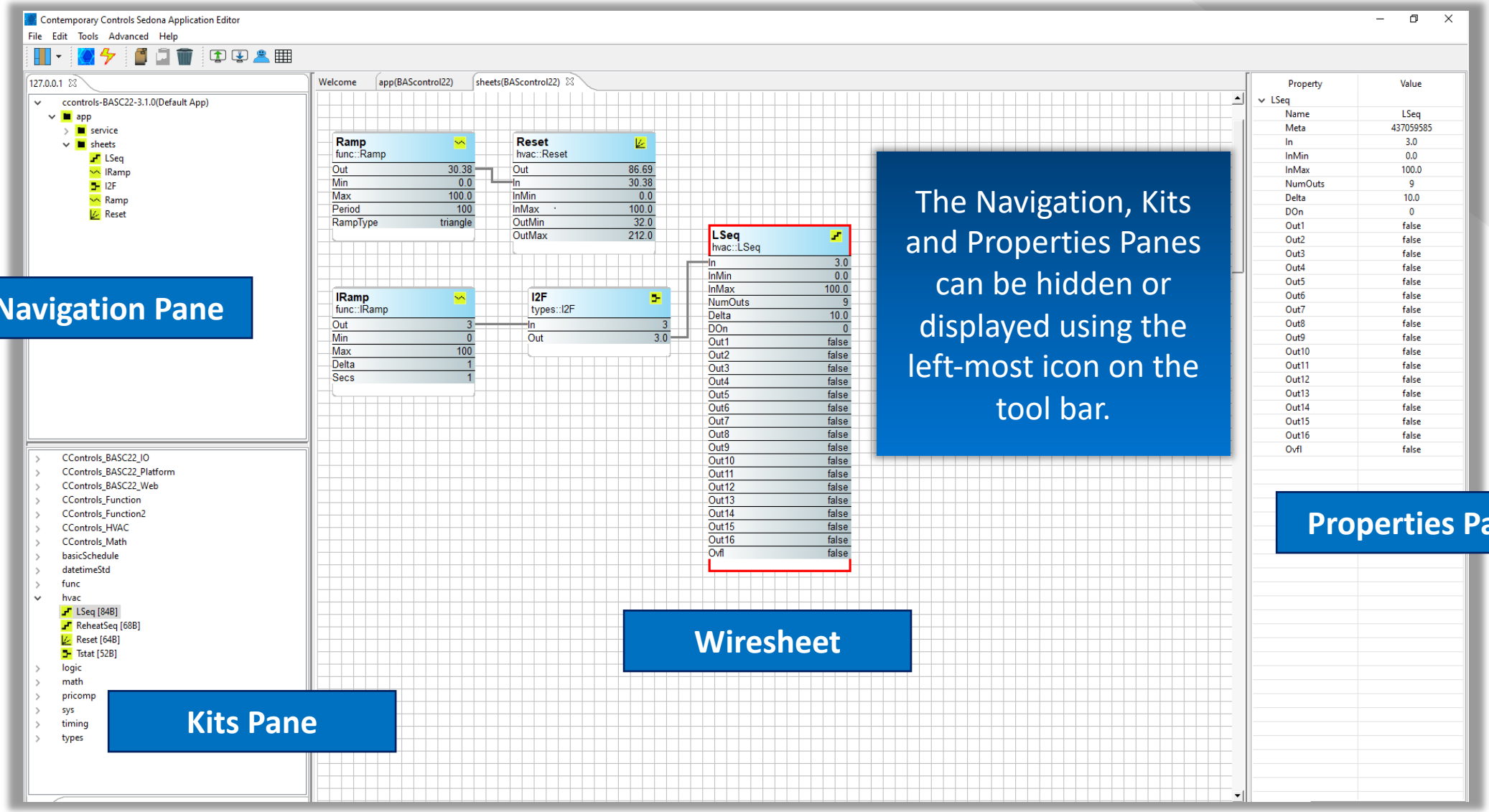
BASemulator — Try Before you Buy

- The BASemulator emulates the BAScontroller operation on a PC, allowing you to experience controller operation in a virtual environment.
- The emulated webpage allows you to configure
  - I/O channels
  - BACnet or IP network settings
  - Time
  - All other webpage configurations
- All settings will be stored and available next time you launch the emulator.

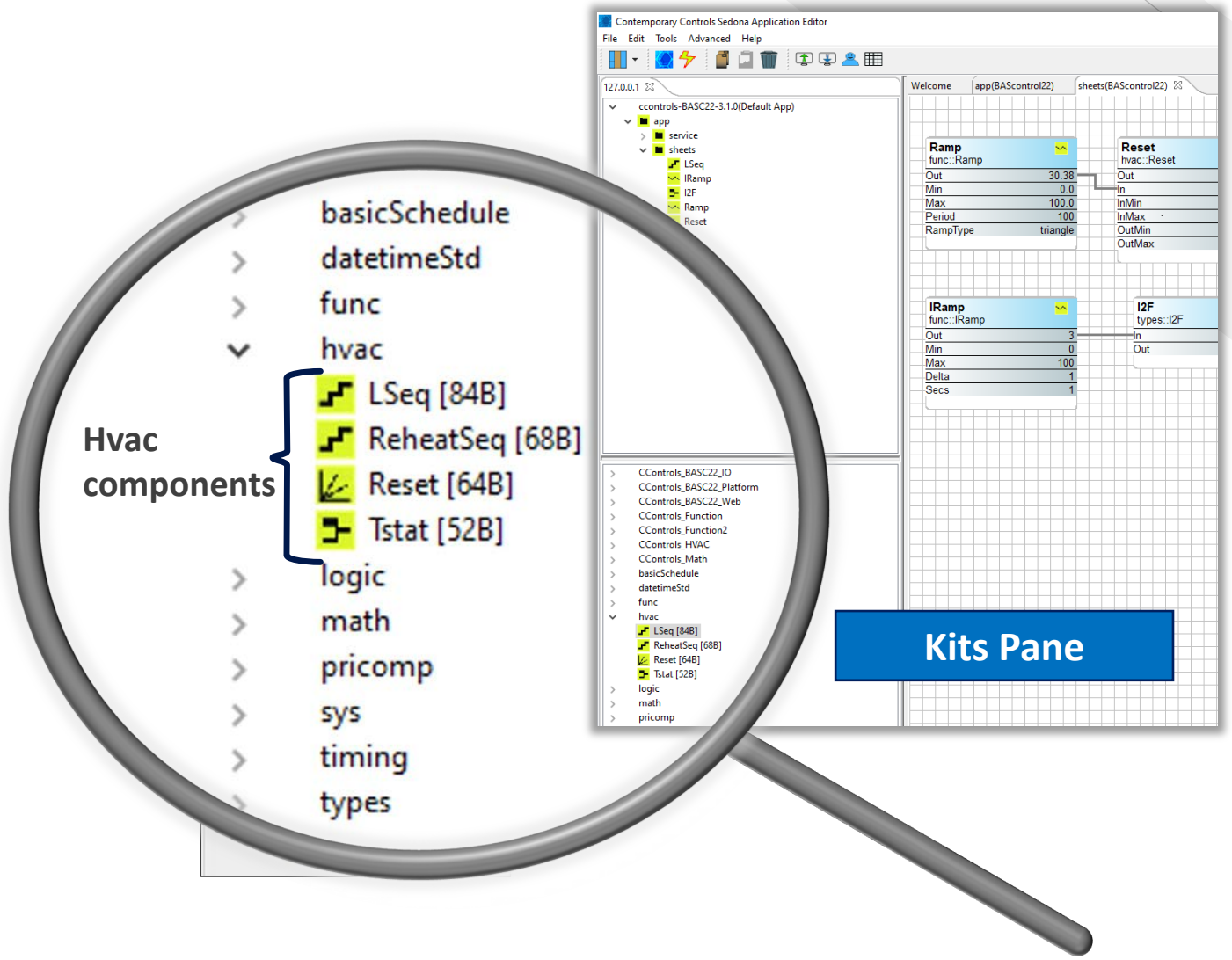


Sedona Application Editor — Wiresheet Structure



Sedona Application Editor — Components

- Components are typically sorted by function and deployed in kits.
- Contemporary Controls has developed much more complex components from the core set to assist the systems integrator in developing custom sequences.



Macro Components — Reduce Wiresheet Complexity

Staged Heat Cool combines one or two-stage heating/cooling binary outputs, supply fan stop/start control, fan proof protection, buffered analog outputs, and emergency shutdown.

Wall Setter manages inputs from either digital or analog type wall setters which provides space temperature, setpoint, humidity, and CO2 control.

Economizer-English Units is a comprehensive "virtual" airside economizer with configuration options that include single or dual dry-bulb, single or dual enthalpy, demand control ventilation (DCV), powered exhaust fan, and a Purge mode.

StgHtCl
CControls_Macro::StgHtCl

CoolAnalogInput	0.0
HeatAnalogInput	0.0
EmergencyOff	Normal
FanFlowProof	Standby
OutY1	false
OutY2	false
OutW1	false
OutW2	false
OutAutoG	false
OutCoolDemand	0.0
OutHeatDemand	0.0
Y1CutIn	50.0
Y1CutOut	5.0
Y2CutIn	95.0
Y2CutOut	55.0
W1CutIn	50.0
W1CutOut	5.0
W2CutIn	95.0
W2CutOut	55.0
G_OnDelayCool	15.0
G_OffDelayCool	30.0
G_OnDelayHeat	5.0
G_OffDelayHeat	45.0

WallSet
CControls_Macro::WallSet

OccupyStatus	Unoccupied
SetpointOhms	0.0
ZoneTempTherm	0.0
ZoneTempVolts	0.0
HumidityVolts	0.0
CO2_Volts	0.0
OutEffCoolingSP	85.0
OutEffHeatingSP	55.0
OutTemperature	0.0
OutHumidity	0.0
OutCO2ppm	0.0
OutOccOvrd	Standby
OutUnocCooling	Off
OutUnocHeating	On
UnocCoolingSP	85.0
OccCoolingSP	75.0
OccHeatingSP	70.0
UnocHeatingSP	55.0
CoolSPminLimit	70.0
HeatSPmaxLimit	72.0
SP_PotInMin	0.0
SP_PotInMax	10000.0
SP_PotOutMin	65.0
SP_PotOutMax	75.0
LocalSP_Deadband	5.0
LocalOvrdDurationMinutes	120.0
CO2_OutMax	2000.0
ZoneTempV_OutMin	50.0
ZoneTempV_OutMax	95.0
ZnTempTorV_Select	UseThermIn
OccupiedSP_Select	UseSP_Pot

EconoE
CControls_P_HVAC2::EconoE

OccupyStatus	Unoccupied
SfanStatus	Standby
ReturnTemp	0.0
ReturnHumidity	0.0
ReturnCO2ppm	0.0
MixedTemp	0.0
OutsideTemp	0.0
OutsideHumidity	0.0
EffectiveCoolingSP	0.0
RetDamperPosVolts	0.0
OutDamperPosVolts	0.0
PurgeCommand	Standby
OutEconoDamperV	2.0
OutRetDmprEffPos	0.0
OutOA_DmprEffPos	0.0
OutOA_TrueBlend	0.0
OutRA_Enthalpy	0.0
OutOA_Enthalpy	0.0
OutOA_Dewpoint	0.0
EconCoolingDemand	0.0
DCV_CO2_Demand	0.0
MechCoolingEnab	Enable
ExhFanEnab	Standby
DryWetModeSelect	Dry bulb
FixedDiffModeSelect	Differential (Dual)
DCV_ModeSelect	Use MinVent only
MinVentPosSP	10.0
MaxDCV_PosSP	50.0
DCV_CO2_Setpoint	1000.0
DryBulbLimitSP	72.0
EnthalpyLimitSP	26.0
MA_LowLimitSP	40.0
ActuatorMinVolts	2.0
MechCoolDelayMinutes	5.0
ExFanCutInSP	80.0
ExFanCutOutSP	40.0
EconPID_Kp	6.0
EconPID_Ki	1.5
CO2_PID_Kp	2.0
CO2_PID_Ki	0.5

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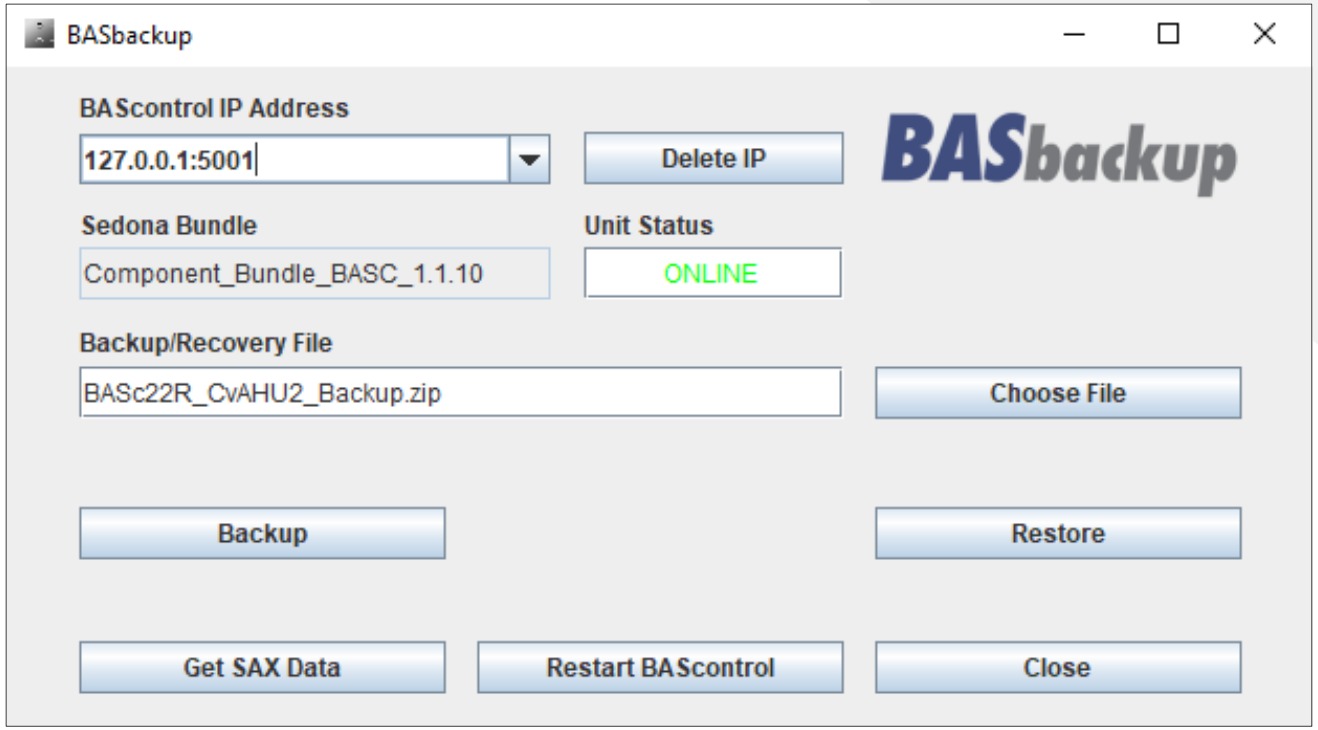
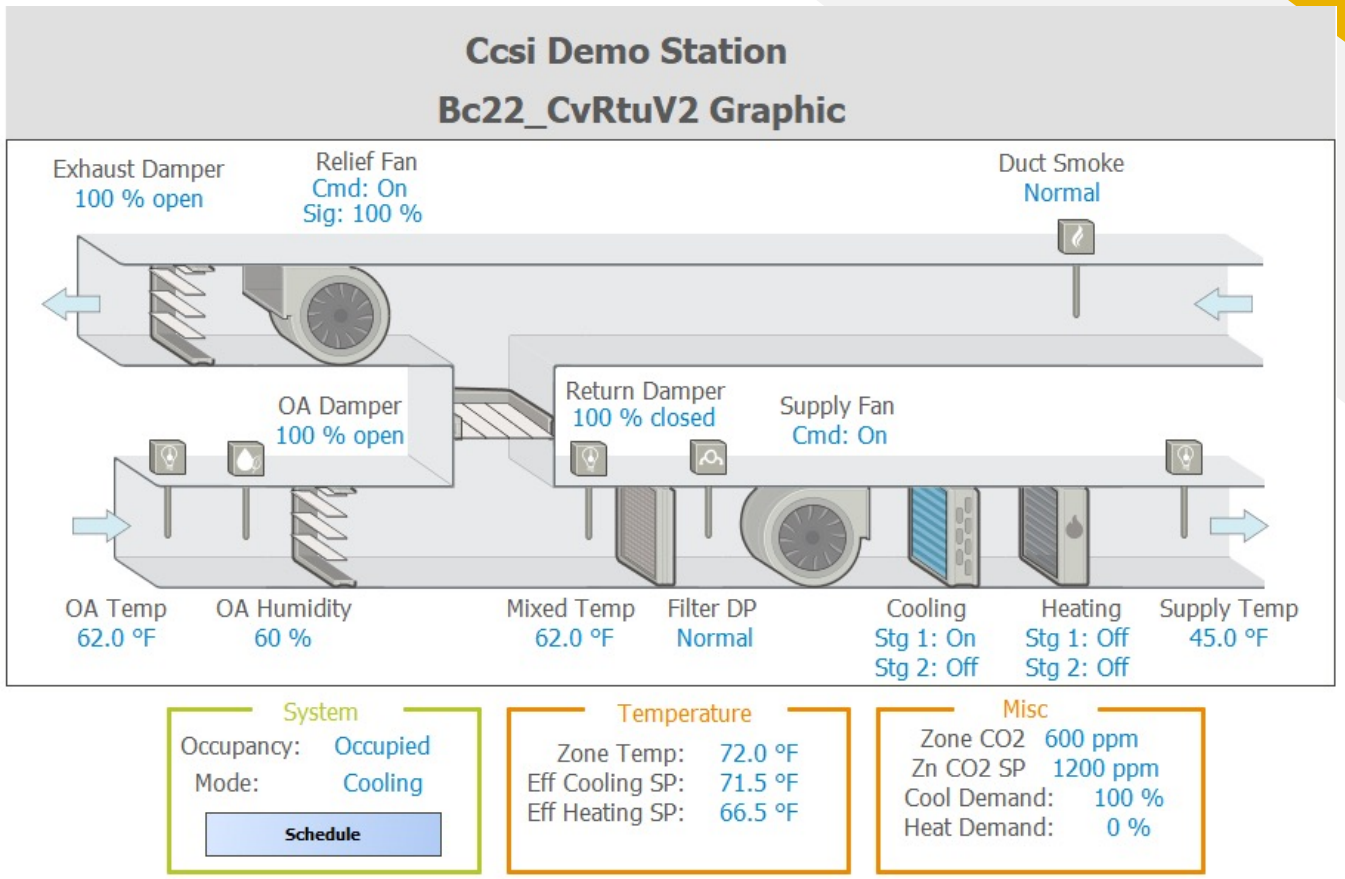
BASbackup — Project Archiving Utility

- With BASbackup, you can save Sedona wiresheet and device configuration together as a single BAScontrol project file.
- This file can then be restored to a real or emulated platform.
- Provides an easy way to template and reuse projects.



Pre-built Sedona Applications — Configurable

- Pre-built applications turn BAScontrollers into an application-specific controllers for:
  - Constant Volume Air Handlers
  - 2-Pipe or 4-Pipe Fan Coils
  - Constant Volume Heat Pumps
- Each pre-built application is available for free and fully supported with complete documentation.
- BAScontrol Toolset can modify the sequence and the underlying control code to meet the needs of the application.
- Once developed and tested, a complete project backup can be made using BASbackup.



Prebuilt Sedona Applications — Package Contents

Each application delivered as a .zip file via download that contains all the documentation, schematics, and application files needed to implement the project.

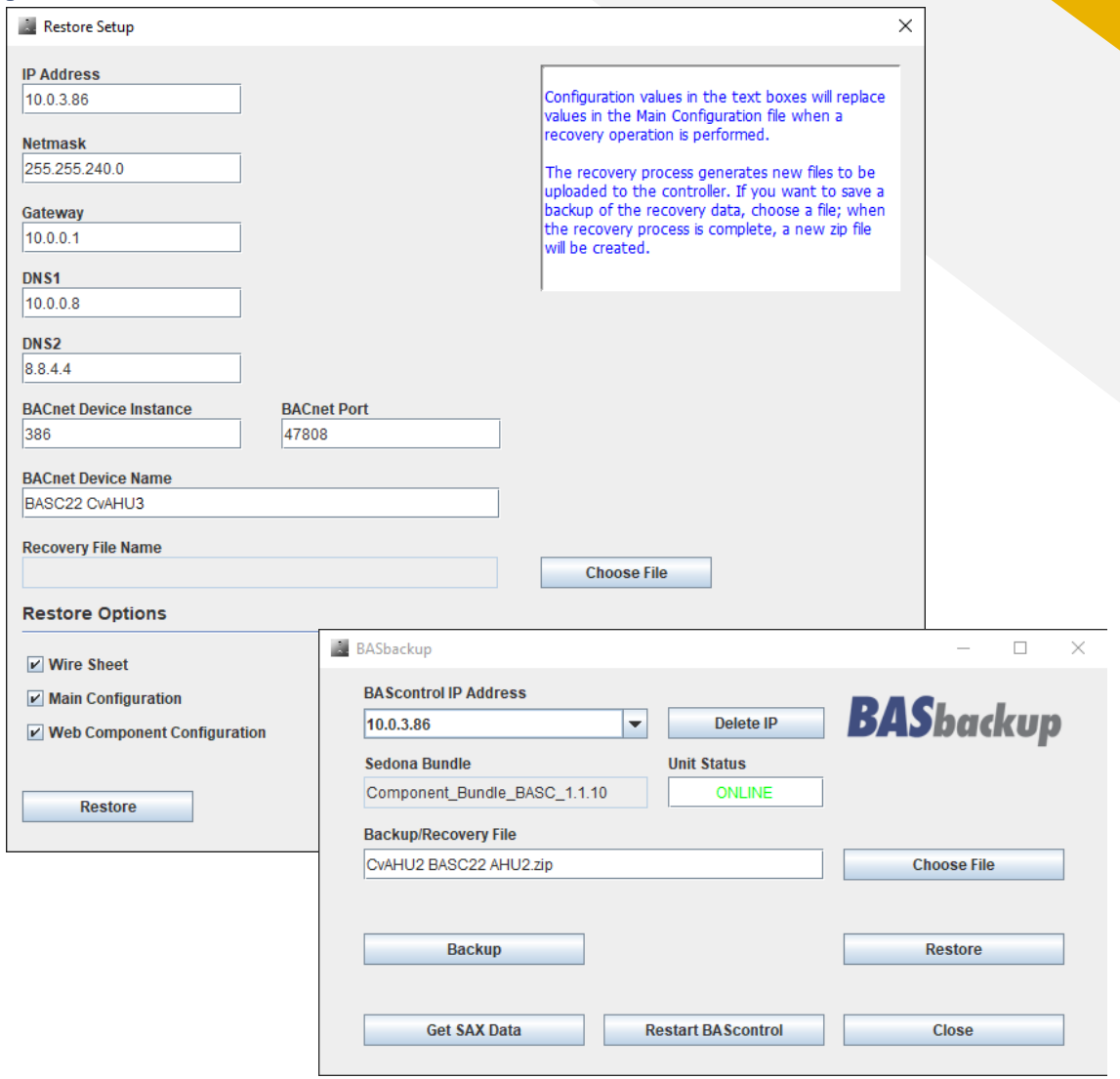
- **Application Notes** — contains useful information on implementing the application and configuring the points in a Word document
- **System Schematic** – contains the schematic ("H" diagram) which documents the air-flow and location of the sensors and actuators required to implement the sequence in a .dxf and .pdf file
- **Points List** – identifies all real, virtual, and web points along with BACnet names and properties in an editable Excel file
- **Sequence of Operation (SOO)** – provides a programmer's SOO making references to some of the BACnet and Sedona tags used in the application in an editable Word file
- **Wiring Diagram** – contains a sample wiring diagram which includes wiring between sensors, actuators, and a controller to assist in control panel design in a .pdf file

Each application .zip file contains a nested BASbackup zip file that bundles the Sedona application.

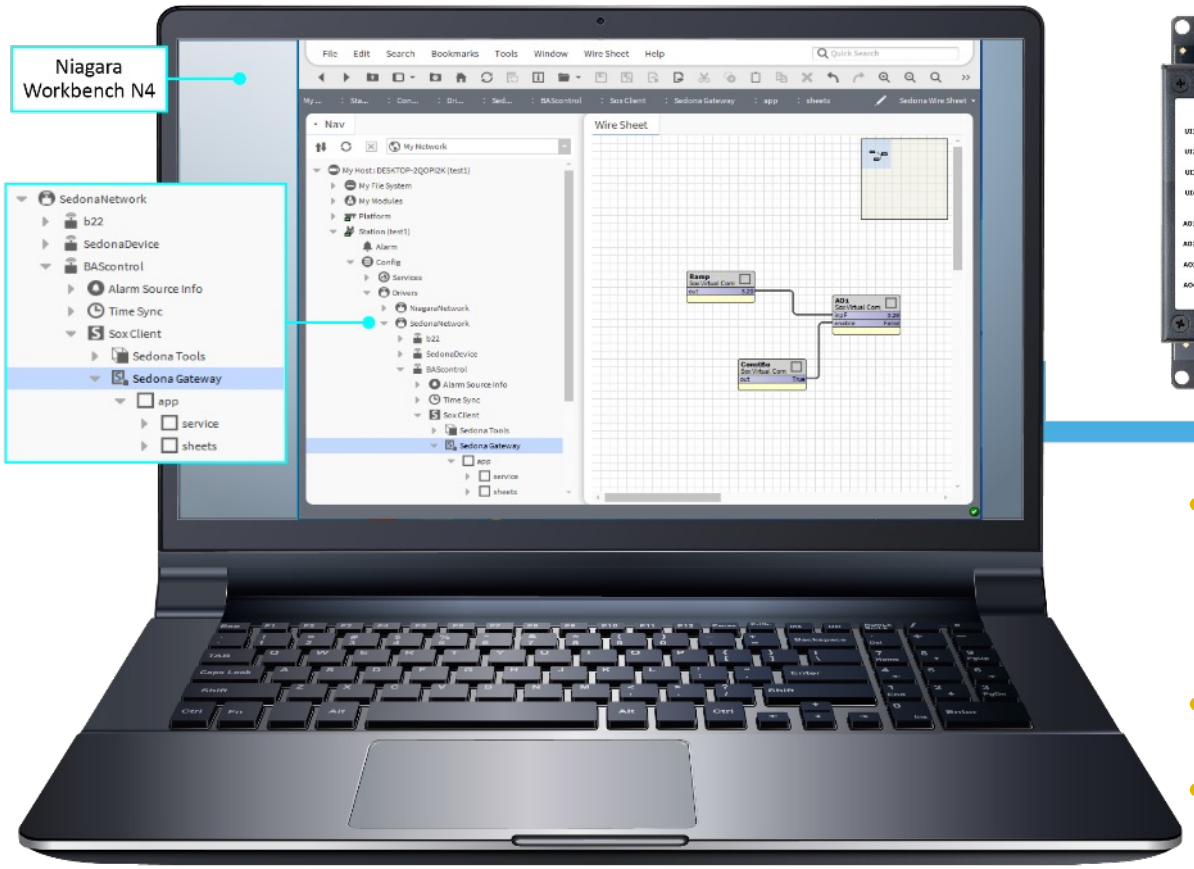
Prebuilt Sedona Applications — Configured Using BASbackup

The BAScontrol Toolset can be used to restore the desired pre-built application to the controller. Once loaded, the application can be modified, configured, and archived using BASbackup.

The proven version can then be used in cloning additional controllers only requiring a modification to individual IP addresses and BACnet device instances.



Sedona Programming for niagara4 Users



- Workbench N4 users can program BAScontrol22 using a licensed N4 Sedona driver from Sedona community member, Ontrol.
- Free to use with Contemporary Controls' products.
- One tool solution for Niagara supervisor and all Contemporary Controls' Sedona controllers.

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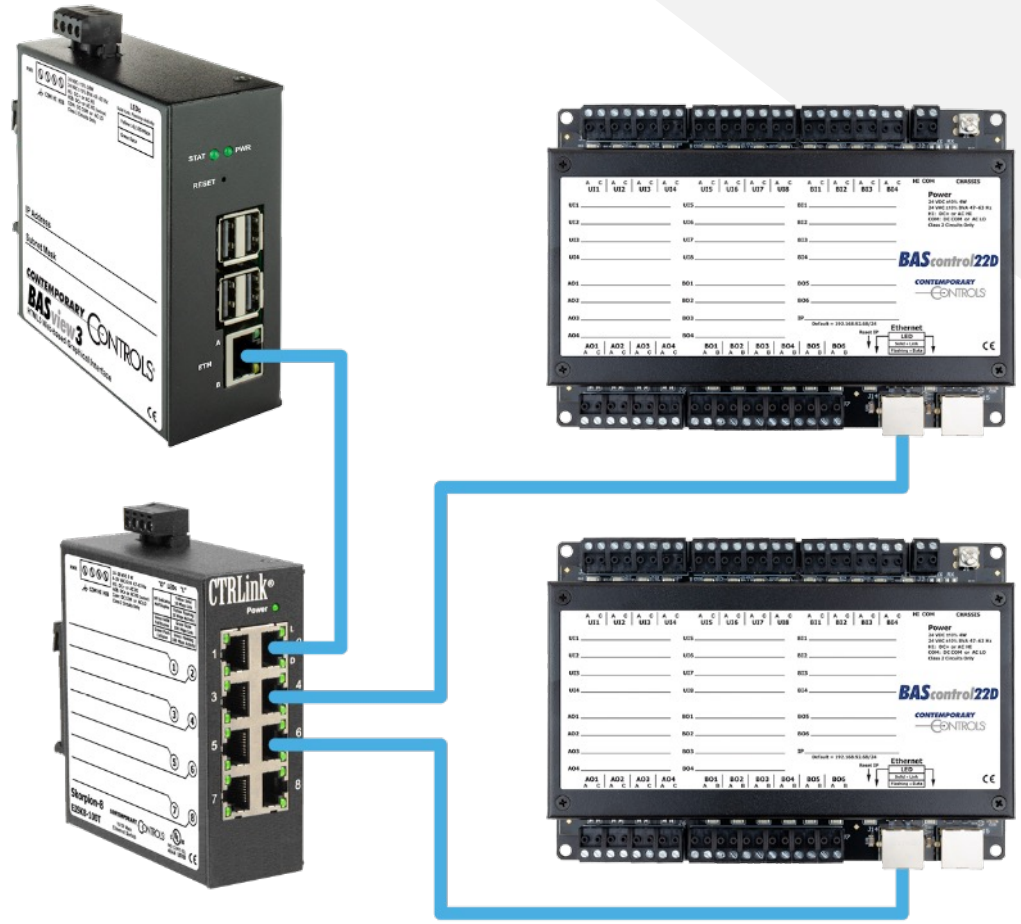
Sedona Open Control — Used for HVAC Education

- At Contemporary Controls, we take great pride in our commitment to HVAC education and training.
- BAS controllers provide cost-effective control without licensing restrictions.
  - The BAScontrol Toolset allows students to configure, test, emulate, and archive controller operation on a Windows PC before using a real controller.
  - Instructors can incorporate pre-built HVAC applications into their training curriculum at their option.

BASview3 — Web-based Graphical Interface

- Stand-alone, embedded, web-based graphical interface that provides both BACnet/IP client functionality and control in one package.
- Accessible from any web browser – providing supervisory functionality to any BACnet/IP or Modbus TCP system
- Contemporary Controls' BASrouter or BASgateway products allow integration of additional protocols, such as BACnet MS/TP and Modbus RTU.



BASview3 — Web-based Graphical Interface

- Supervisory features include:
  - Animated graphics/widgets
  - Scheduling
  - Historical trending
  - Email alarm/ notification
  - Trending
  - Scheduling
  - Programming

Modbus BACnet HTML

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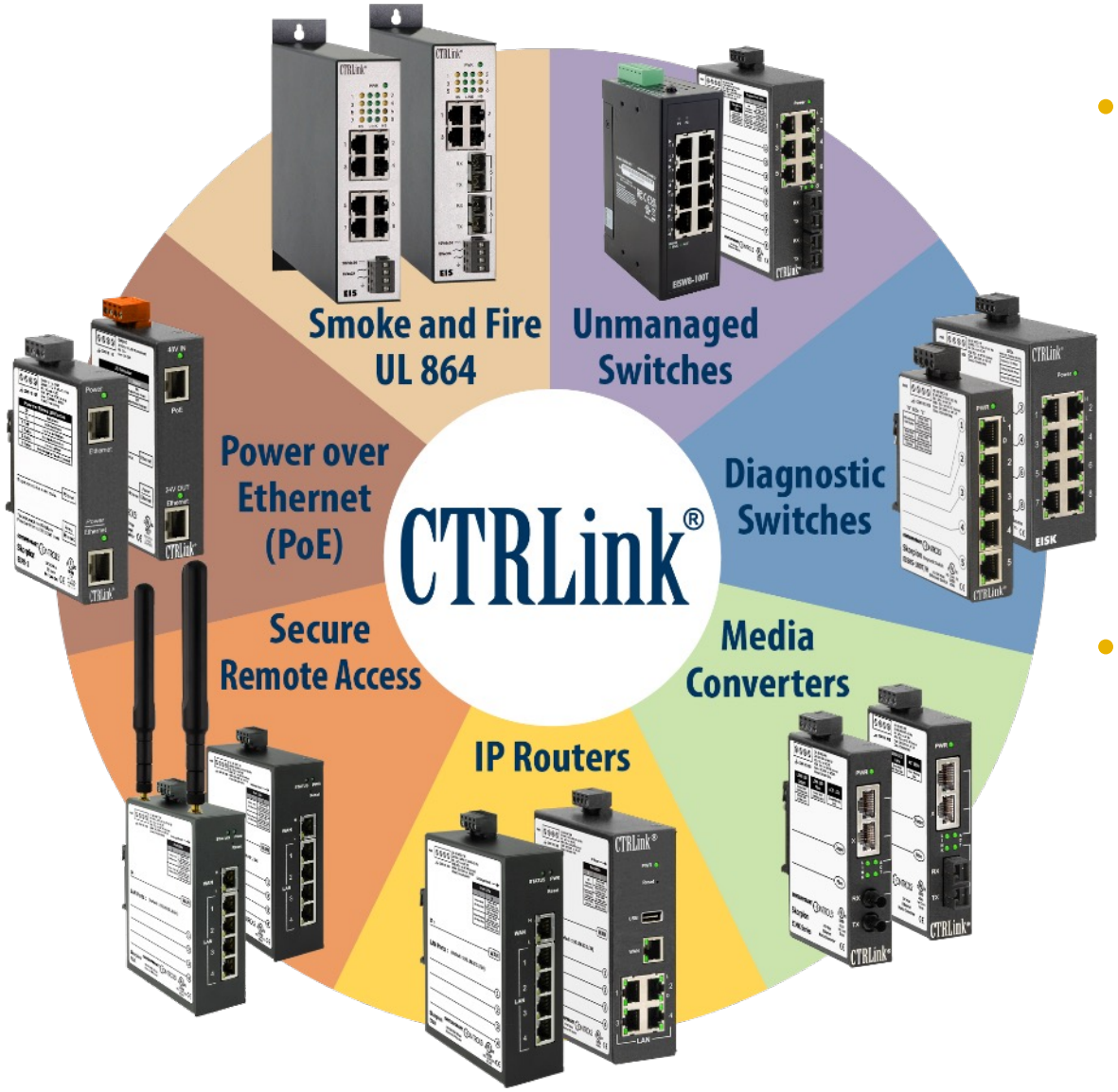
BASview3 — Append BACnet Points to Graphic

CTRLink® — Networking for Automation



- With the rapid acceptance of Industrial Ethernet as a fieldbus replacement, Contemporary Controls introduced the CTRLink® family of Ethernet products used in automation
  - Intended for rugged applications
  - Designed to be as simple-to-use as standard office-grade equipment
- CTRLink products are used in industrial automation, building automation, commercial automation, communications and networking, energy, and transportation

What is Secure Remote Access?

- Accessing devices at a remote job site over the Internet from your home or office
  - Programming, Troubleshooting, Commissioning
- Virtual Private Networks create secure connections between devices/networks, called a VPN tunnel
- Encrypted data is sent over the VPN tunnel
- An IP router is used to securely connect the remote job site infrastructure to the Internet over VPN
  - LAN side – devices, WAN side – Internet

VPN Options

- Three options: RemoteVPN, Self-HostedVPN, BridgeVPN
- Provide a secure, encrypted tunnel between the VPN server and VPN clients (IP Router, PC/Tablet/Phone)
- No need for port forwarding or NAT entries
- All traffic is encrypted and passes over a single IP port
- Access to LAN devices via their dedicated IP addresses
- Uses OpenVPN Technology – customer can setup own VPN server
- Once a VPN connection is made, messages can originate from either side

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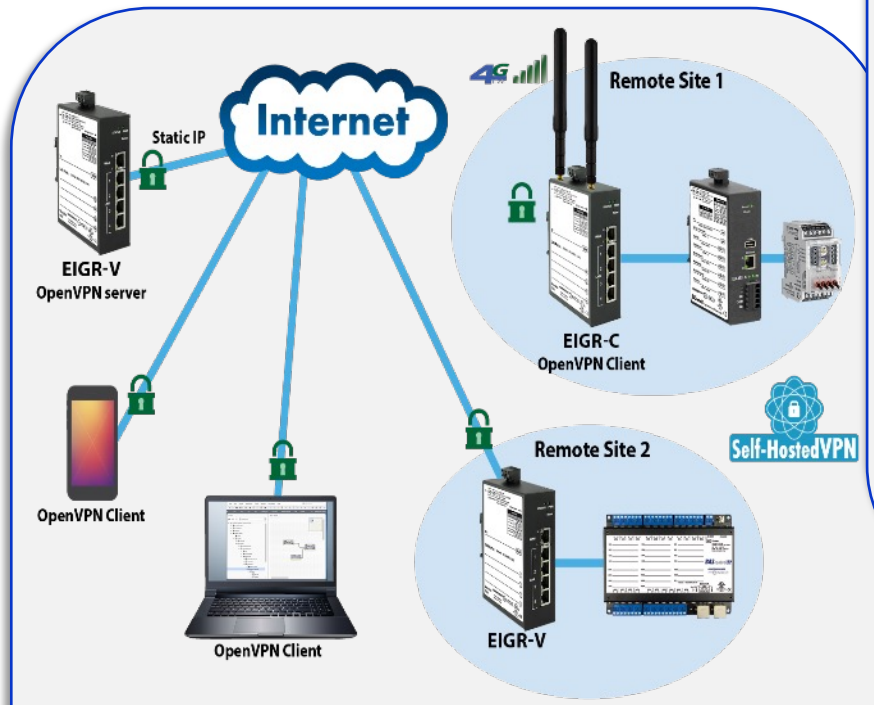
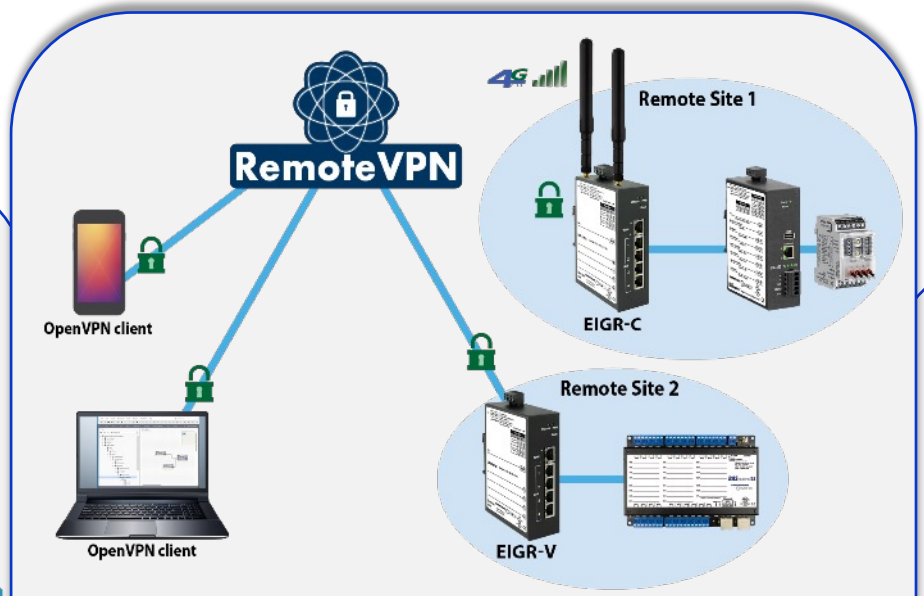
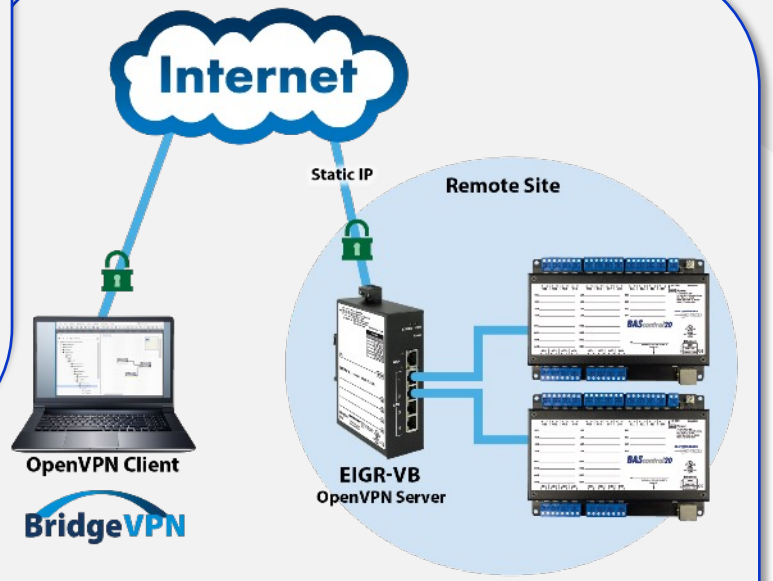
Three VPN Options



Self-Hosted VPN – User Managed,
No Subscription Fee



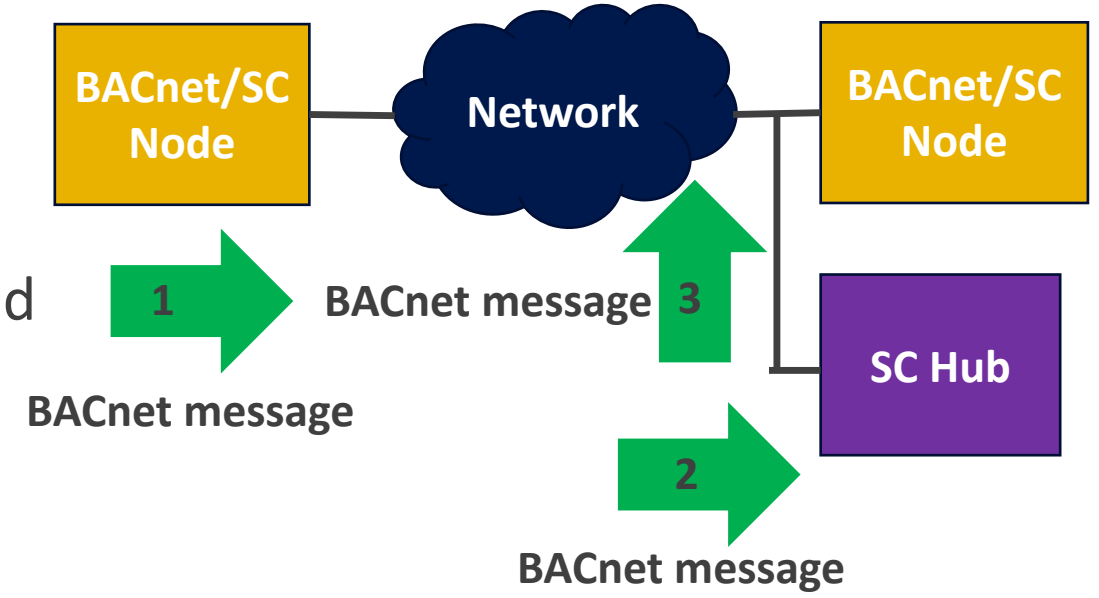
RemoteVPN –Secure Access,
Simple Subscription Service



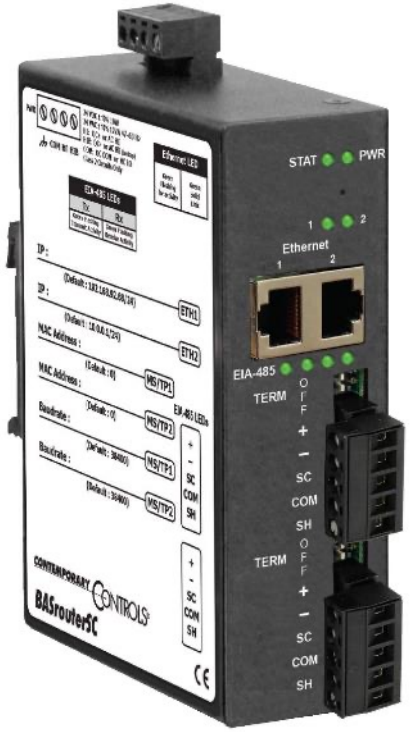
BridgeVPN — Single-site
BACnet without BBMD

BACnet/SC — Secure Connect

- Standard BACnet uses messages which can be received or transmitted by anyone on the network
- Requires dedicated networks for BACnet/IP
- BACnet/SC adds encryption and authentication to BACnet using TLS 1.3
- Each device has a certificate signed by one certificate authority
- Devices typically communicate through a BACnet/SC hub – no broadcasts over Ethernet and no BBMD
- Can also have a failover hub



BASrouter/SC — BACnet/SC Router



- Simple to use BACnet/SC router
- Can provide full BACnet/SC infrastructure for smaller systems
- Built-in Certificate Authority
- Built-in BACnet/SC Hub
- Dual Ethernet ports to allow one port for non-SC communications
- Supports MS/TP, BACnet/IP and BACnet/Ethernet routing
- BACnet/IP to BACnet/SC routing
- BACnet/SC to MS/TP communications
- Dual optically isolated MS/TP ports
- Switchable termination/bias
- MS/TP baud rates from 9600 to 115200 bps
- 24VAC/VDC power

EnOcean Gateway

- EnOcean to BACnet/IP gateway
- Each EnOcean device appears as separate BACnet device
- Bidirectional – received EnOcean messages put into BACnet objects and BACnet commands to the gateway can trigger EnOcean transmissions
- Supports remote commissioning – can modify the link table in an EnOcean device
- Supports remote configuration – can configure EnOcean devices which support remote configuration
- Can view the status of EnOcean devices from webpage in the gateway – shows received value, reception time, and signal strength of received message

Thank You

Please visit us at **Stand C18**

CONTEMPORARY CONTROLS®

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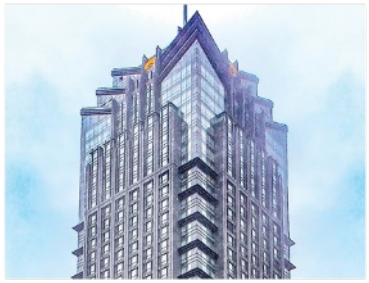

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We look forward to seeing you in 2024