

BACnet/Secure Connect



What is BACnet/SC?

BACnet Secure Connect (BACnet/SC) is a secure communication protocol designed for building automation systems. BACnet/SC is an addendum to the BACnet protocol released by the ASHRAE® BACnet Committee. It is a secure, encrypted communication data link layer that is specifically designed to meet the requirements, policies, and constraints anywhere from minimally managed to professionally managed IP infrastructures. A BACnet/SC datalink is more readily accepted by IT organizations than BACnet/IP. By incorporating industry-standard security technologies, BACnet/SC establishes secure connections between BACnet devices.



What are the advantages?

Standard BACnet communication protocols such as BACnet MSTP or BACnet/IP are not natively secure. To secure them, the BAS industry uses IT best practices such as securing physical access, VPNs, and user management. BACnet/SC networks are secured using certificates in all devices to be authenticated to communicate together. BACnet/SC also uses encryption of messages using the most current version of TLS and digital certificates. These advantages make BACnet/SC the best way to communicate BAS data to our cloud environments without additional hardware or network infrastructure. For Trane specific Benefits, see Trane Tracer® Systems implementation information below.

How does it work?

- **Secure Connection** BACnet/SC allows BACnet devices to establish a secure encrypted connection between each other using IP/Ethernet connections. This connection ensures that the content of their communications is secure and private and cannot be decrypted without proper certifications. Usually, this can be applied to existing customer networks and works through existing firewalls with little or no configuration change.
- **Network Layout:** A BACnet Secure Connect Network consists of Nodes and Hubs that communicate over an ethernet connection. Nodes can send and receive BACnet Secure Connect messages, while Hubs serve the purpose of routing messages to all the Nodes on the network. Devices can act as both a Hub and Node to route and manage BACnet/SC communication.
- **Certificates:** BACnet/SC uses certificates to verify the authenticity of devices. These certificates cannot be forged or faked, ensuring that only legitimate devices can connect. To participate in a BACnet Secure Connect Network, a BACnet/SC must have an Operational Certificate and a Network Authority Certificate.

- **Encryption:** Once the secure connection is established, conventional BACnet messages can be sent and received between the devices. These messages are encrypted, making them unreadable to unauthorized parties. BACnet/SC natively uses the latest TLS-based Encryption.
- **Backward Compatibility:** BACnet/SC is designed to be backward-compatible with existing BACnet deployments. This means that existing BACnet devices can interact with BACnet/SC devices through SC-X routers, enabling a gradual migration to higher levels of security.
- **Multi-vendor integration:** BACnet/SC has been implemented by many vendors in the industry and cross-vendor compatibility is expected. BACnet International and the BACnet SSPC135 committees are actively working on an interoperable way to securely manage certificates.

Who and what is a Certificate Authority?

The Certificate Authority is the entity that signs and distributes certificates for the Network. This is needed because only devices with valid certificates can communicate on the network. This may be an IT department using a Certificate Management tool. Some controllers contain Certificate Management tools to act as the Certificate Authority.

The certificates used for BACnet/SC are not public certificates. They are private certificates specific to the devices on the BACnet/SC network. The Certificate Authority sets the expiration date for certificates. IT departments may have requirements around expirations.

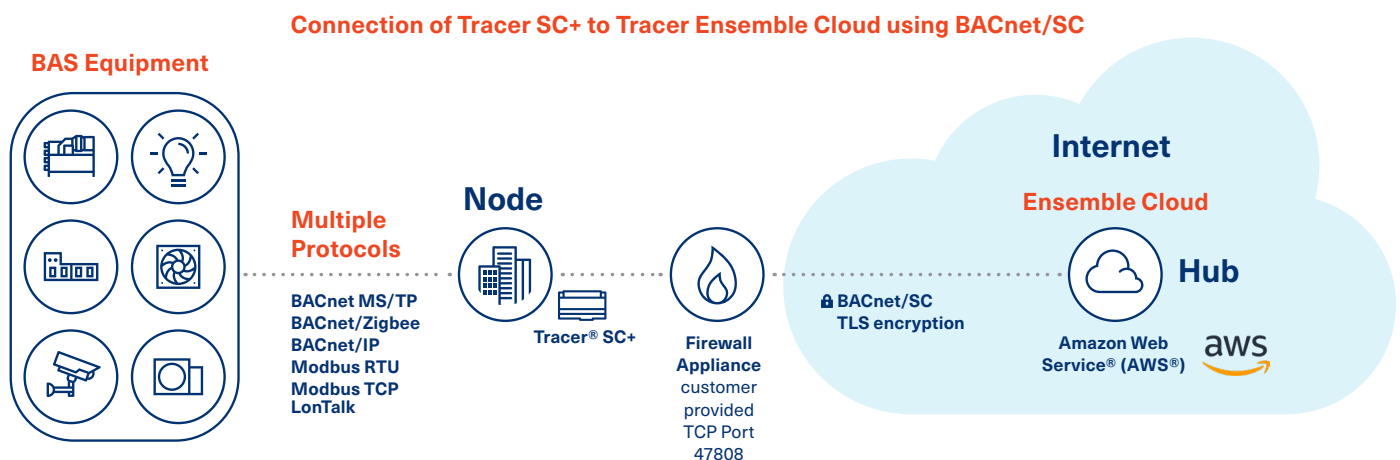
Trane Tracer Systems Implementation of BACnet/SC

Trane Tracer systems are capable of BACnet/SC communication. The implementation for BACnet/SC consists of installing a Tracer® SC+ controller into Tracer Ensemble Cloud.

- **Certificates:** These Tracer products can act as the Certificate Authority for the BACnet/SC network. Trane products can manage network access, certificate expiration, and devices without needing an IT department. Alternatively, this can be managed by a customer's IT department.
- **Network layout:** Tracer products are also flexible when participating on a BACnet/SC network. They can act as Node or Hub type devices, or a combination of both. This allows for flexibility with planning and provides options for integrating with 3rd party systems.

Connecting a Tracer SC+ to Tracer Ensemble Cloud can be achieved with BACnet/SC. To enable this type of connection, the following items must be configured:

- One Tracer SC+ will be configured as the BACnet/SC Node.
- All other HVAC equipment controllers can continue using conventional open communication protocols to communicate with the System controller: Tracer SC+. In most cases, no changes are required for any devices connected to the Tracer SC+.
- By default, Tracer Ensemble Cloud is ready to act as the Certificate Authority Mode (Node+Hub+CA mode) with certificate expirations set at 5 years.
- Firewall requirements allow outbound Traffic on TCP port 47808. Most commercial firewalls allow this natively and require no changes.



Benefits of Connecting a Tracer SC+ to Tracer Ensemble Cloud using BACnet/SC

- Improved network security and TLS encryption.
- New Cloud setups are fast, and project delays are less frequent.
- Adding and editing buildings in Tracer Ensemble can be done quickly by Trane Technicians, without IT intervention.
- DHCP is allowed for the SC+, Static IPs are not required.
- BACnet/SC works without an IPSec Tunnel.
- Works immediately with most firewalls (uses Outbound TCP port 47808)

Trane is committed to maintaining and developing products and services that follow industry standards.



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