



**BSR/ASHRAE Addendum cb to
ANSI/ASHRAE Standard 135-2024**

Public Review Draft

**Proposed Addendum *cb* to Standard
135-2024, BACnet® - A Data
Communication Protocol for Building
Automation and Control Networks**

**First Publication Public Review (June 2026)
(Draft shows Proposed Changes to Current Standard)**

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ASHRAE, 180 Technology Parkway NW, Peachtree Corners, GA 20092

[This foreword, the table of contents, the introduction, and the rationales" on the following pages are not part of this standard. They are merely informative and do not contain requirements necessary for conformance to the standard.]

FOREWORD

The purpose of this addendum is to present a proposed change for public review. These modifications are the result of change proposals made pursuant to the ASHRAE continuous maintenance procedures and of deliberations within Standing Standard Project Committee 135. The proposed changes are summarized below.

135-2024*ct-1* BACnet Resource Description Framework, p. 3

In the following document, language to be added to existing clauses of ANSI/ASHRAE 135-2024 is indicated through the use of *italics*, while deletions are indicated by ~~strike through~~. Where entirely new subclauses are proposed to be added, plain type is used throughout. Only this new and deleted text is open to comment at this time. All other material in this document is provided for context only and is not open for public review comment except as it relates to the proposed changes.

The use of placeholders like XX, YY, ZZ, X1, X2, NN, x, n, ? etc., should not be interpreted as literal values of the final published version. These placeholders will be assigned actual numbers/letters only after final publication approval of the addendum.

135-2024*cb-1* BACnet Resource Description Framework

Rationale

After 26 years as a standard, BACnet has accumulated various clauses that are effectively obsolete today. These clauses should be removed from the standard for clarity and ease of maintenance and approachability by new implementors.

3.2 Terms Defined for this Standard

...

~~**directly connected network:** a network that is accessible from a BACnet router without messages being relayed through an intervening BACnet router. A PTP connection is to a directly connected network if the PTP connection is currently active and no intervening BACnet router is used.~~

...

~~**half router:** a device or node that can participate as one partner in a PTP connection. The two half router partners that form an active PTP connection together make up a single BACnet router.~~

3.3 Abbreviations and Acronyms Used in this Standard

...

~~**PTP** point to point~~

4.1 The BACnet Collapsed Architecture

BACnet is based on a four-layer collapsed architecture that corresponds to the physical, data link, network, and application layers of the OSI model as shown in Figure 4-2. The application layer and a simple network layer are defined in the BACnet standard. BACnet provides the following options that correspond to the OSI data link and physical layers.

Ethernet (ISO 8802-3)	Clause 7
ARCNET (ATA 878.1)	Clause 8
MS/TP	Clause 9
PTP	Clause 10
LonTalk (ISO/IEC 14908.1)	Clause 11
BACnet/IP	Annex J
BACnet/IPv6	Annex U
ZigBee	Annex O
BACnet/SC	Annex AB

L

BACnet Application Layer									Application
BACnet Network Layer									Network
ISO 8802-2 (IEEE 802.3) Type 1		MS/TP	PTP	LonTalk	BVLL (Annex J)	BVLL (AnnexU)	BZLL	Secure Connect BVLL (Annex AB)	Data Link
ISO 8802-3 (IEEE 802.3)	ARCNET	EIA-485	EIA-232		IPv4	IPv6	Zigbee	WebSocket	Physical

Figure 4-2. BACnet collapsed architecture

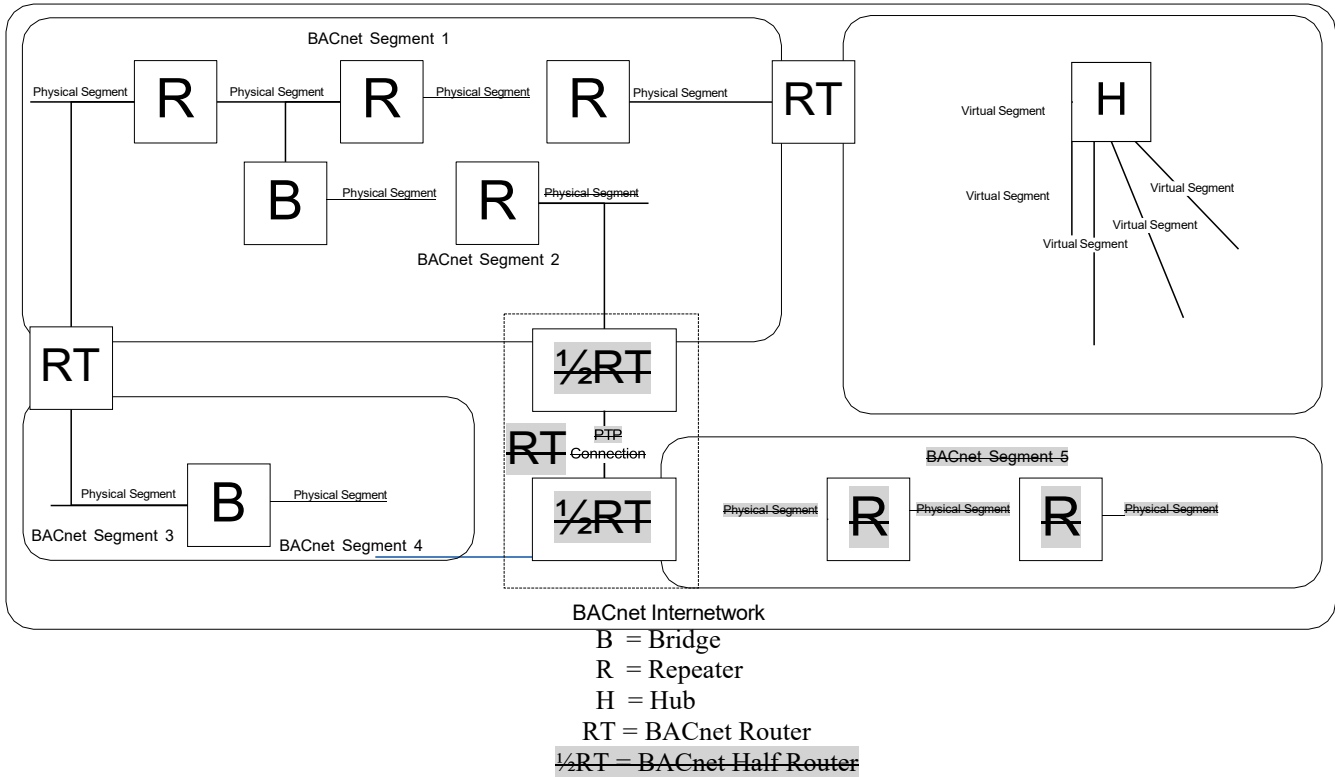


Figure 4-3. A BACnet internetwork illustrating the concepts of Physical Segments, Virtual Segments, Repeaters, Bridges, Hubs, BACnet Segments, BACnet Networks, ~~BACnet Half Routers~~, and BACnet Routers.

The following editing changes should be made in Clause 6:

6. THE NETWORK LAYER

...Devices that interconnect two ~~disparate~~ BACnet LANs, e.g. ~~Ethernet and ARCNET~~ BACnet/IP and MS/TP, and provide the relay function described in this clause are called "BACnet routers." ~~Devices that interconnect two disparate BACnet networks through a point-to-point (PTP) connection (see Clause 10) are also BACnet routers.~~ BACnet routers build and maintain their routing tables automatically using the network layer protocol messages defined in this clause. Network layer protocol messages facilitate both the auto-configuration of routers and the flow of messages to, and between, routers. BACnet routing capability may be implemented in stand-alone devices or, alternatively, in devices that carry out other building automation and control functions.

6.1

...
The 'destination_address' and 'source_address' parameters provide the logical concatenation of 1) an optional network number, 2) the MAC address appropriate to the underlying LAN technology, and the 3) the link service access point. A network number of X'FFFF' indicates that the message is to be broadcast "globally" to all devices on all ~~currently~~ reachable networks. ~~Currently reachable networks are those networks to which an active connection is already established within the BACnet internet. In particular, a global broadcast shall not trigger any attempts to establish PTP connections.~~ The 'data' parameter is the network service data unit (NSDU) passed down from the application layer and is composed of a fully encoded BACnet APDU. The 'network_priority' is a numeric value used by the network layer in BACnet routers to determine any possible deviations from a first-in-first-out approach to managing the queue of messages awaiting relay. The data_expecting_reply parameter indicates whether (TRUE) or not (FALSE) a reply data unit is expected for the data unit being transferred. The optional parameter 'data_attributes' contains extra information about the 'data' parameter and can include the optional 'security_parameters' information that contains the security information used to secure the request and context information required for security related N-REPORT.indication primitives to be related to application TSMs.

...

Table 6-1. NPDU Lengths of BACnet Data Link Layers

Data Link Technology	Maximum NPDU Length on Data Link	Minimum Routed NPDU Length
ARCNET (ATA 878.1), as defined in Clause 8	501 octets	501 octets
BACnet/IP, as defined in Annex J	1497 octets	1497 octets
BACnet/IPv6, as defined in Annex U	1497 octets	1497 octets
BACnet/SC, as defined in Annex AB ₁	61327 octets ₂	1497 octets
Ethernet (ISO 8802-3), as defined in Clause 7	1497 octets	1497 octets
LonTalk (ISO/IEC 14908.1), as defined in Clause 11	228 octets	228 octets
MS/TP, as defined in Clause 9	1497 octets	1497 octets
Point To Point, as defined in Clause 10	501 octets	501 octets
ZigBee, as defined in Annex O	501 octets	501 octets

6.2.2.2 DADR and SADR Encoding

Table 6-2. BACnet DADR and SADR Encoding Rules Based Upon Data Link Layer Technology

BACnet Data Link Layer	DLEN	SLLEN	Encoding Rules
ARCNET, as defined in Clause 8	1	1	Encoded as in their MAC layer representations
BACnet/IP, as defined in Annex J	6	6	Encoded as specified in Clause J.1.2
BACnet/IPv6, as defined in Annex U	3	3	Encoded as specified in Clause H.7.2
BACnet/SC, as defined in Annex AB	6	6	Encoded as specified in Clause H.7.3
Ethernet, as defined in Clause 7	6	6	Encoded as in their MAC layer representations
LonTalk domain wide broadcast	2	2	The encoding for the SADR is shown in Figure 6-3
LonTalk multicast	2	2	
LonTalk unicast	2	2	The encoding for the DADR is shown in Figure 6-4
LonTalk, unique Neuron_ID	7	2	
MS/TP, as defined in Clause 9	1	1	Encoded as in their MAC layer representations
ZigBee, as defined in Annex O	3	3	Encoded as specified in Clause H.7.2

6.2.4 Network Layer Message Type

...

X'00': Who-Is-Router-To-Network
X'01': I-Am-Router-To-Network
X'02': ~~I-Could-Be-Router-To-Network~~ removed
X'03': Reject-Message-To-Network
X'04': Router-Busy-To-Network
X'05': Router-Available-To-Network
X'06': Initialize-Routing-Table
X'07': Initialize-Routing-Table-Ack
X'08': ~~Establish-Connection-To-Network~~ removed
X'09': ~~Disconnect-Connection-To-Network~~ removed
X'0A': removed
X'0B': removed
X'0C': removed
X'0D': removed
X'0E': removed
X'0F': removed
X'10': removed
X'11': removed
X'12': What-Is-Network-Number
X'13': Network-Number-Is

Delete Figure 6-6 and 6-10

6.3.2 Broadcast Messages

Three forms of broadcast transmission are provided by BACnet: local, remote, and global. A local broadcast is received by all stations on the local network. A remote broadcast is received by all stations on a single remote network. A global broadcast is received by all stations on all networks comprising the BACnet internetwork.

A local broadcast makes use of the broadcast MAC address appropriate to the local network's LAN technology, i.e. X'FFFFFFFF' for Ethernet, X'00' for ARCNET, X'FF' for MS/TP, or X'00' in the DstSubnet field of Address Format 0 in LonTalk, X'FFFF' for ZigBee, and an IP address with all ones in the host portion for BACnet/IP.

...

~~If a router has one or more ports that represent PTP connections as defined in Clause 10, global broadcasts shall be processed as follows. If the PTP connection is currently established, that is, the Connection State Machine is in the Connected state (see Clause 10.4.9), then the global broadcast message shall be transmitted through the PTP connection. If the PTP connection is not currently established, then no action shall be taken by the router to transmit the broadcast message through the PTP connection.~~

6.4.3 ~~I-Could-Be-Router-To-Network~~ Deleted Clause

This clause has been removed.

6.4.7 Initialize-Routing-Table

This message is indicated by a Message Type of X'06'. It is used to initialize the routing table of a router or to query the contents of the current routing table.

The format of the data portion of the Initialize-Routing-Table message is shown in Figure 6-11.

The Number of Ports field of this NPDU indicates how many port mappings are being provided in this NPDU. This field permits routing tables to be incrementally updated as the network changes. Valid entries in this field are 0-255. Following this field are sets of data indicating the DNET directly connected to this port ~~or accessible through a dial-up PTP connection~~, Port ID, Port Info Length, and, in the case Port Info Length is non-zero, Port Info. If an Initialize-Routing-Table message is

sent with the Number of Ports equal to zero, the responding device shall return its complete routing table in an Initialize-Routing-Table-Ack message without updating its routing table. If the Port ID field has a value of zero, then all table entries for the specified DNET shall be purged from the table. If the Port ID field has a non-zero value, then the routing information for this DNET shall either replace any previous entry for this DNET in the routing table or, if no such entry exists, be appended to the routing table.

6.4.9 Establish Connection To Network Deleted Clause

This clause has been removed.

6.4.10 Disconnect Connection To Network Deleted Clause

This clause has been removed.

6.6.3.2 Who-Is-Router-To-Network

This message may be generated by a non-routing BACnet node or by a BACnet router. If the message is broadcast with a specific network number, one I-Am-Router-To-Network message should be returned at most, originating at the router on the local network that is the next router to the specified destination network. If the 2-octet network number is omitted, each responding router shall reply with an I-Am-Router-To-Network message containing all networks reachable through it, including those that may be temporarily unreachable due to the imposition of a congestion control restriction and excluding the networks reachable through the port from which the Who-Is-Router-To-Network message was received. Who-Is-Router-To-Network will generally be broadcast but may be directed to a specific router to learn the contents of its router table. In the event a router receives multiple I-Am-Router-To-Network messages pertaining to the same network, the router shall assume that each new I-Am-Router-To-Network message represents a modification in the system configuration and shall update its routing information. ~~If the router has an established PTP connection (see Clause 10) that conflicts with this new information, the PTP connection shall be terminated using the disconnect procedures defined in Clause 10.~~ Thus the last message received shall take precedence over all previous messages.

...

If the network number is not found in the routing table, the router shall attempt to discover the next router on the path to the indicated destination network by generating a Who-Is-Router-To-Network message containing the specified destination network number and broadcasting it out all its ports other than the one from which the Who-Is-Router-To-Network message arrived. Two cases are possible. In case one the received Who-Is-Router-To-Network message was from the originating device. For this case, the router shall add SNET and SADR fields before broadcasting the subsequent Who-Is-Router-To-Network. ~~This permits an I Could Be Router To Network message to be directed to the originating device.~~ The second case is that the received Who-Is-Router-To-Network message came from another router and it already contains SNET and SADR fields. For this case, the SNET and SADR shall be retained in the newly generated Who-Is-Router-To-Network message.

If the Who-Is-Router-To-Network message does not specify a particular destination network number, the router shall construct an I-Am-Router-To-Network message containing a list of all the networks it is able to reach through other than the port from which the Who-Is-Router-To-Network message was received and transmit it in the same manner as described above. The message shall list all networks not flagged as permanently unreachable, including those that are temporarily unreachable due to the imposition of congestion control restrictions. ~~Networks that may be reachable through a PTP connection shall be listed only if the connection is currently established.~~

6.6.3.3 I-Am-Router-To-Network

...

~~If one or more of the reachable networks listed in the I Am Router To Network message is reached through a directly connected PTP connection, transmitting the I Am Router To Network message shall start or restart a connection termination delay timer. The PTP connection shall not be terminated before this delay timer expires. The connection termination delay timer shall be configurable with a default value of sixty seconds.~~

6.6.3.4 I Could Be Router To Network Deleted Clause

This clause has been removed.

6.6.3.10 Establish Connection To Network Deleted Clause

This clause has been removed.

6.6.3.11 Disconnect Connection To Network Deleted Clause

This clause has been removed.

6.7 Point To Point Half Routers Deleted Clause

This clause has been removed.

Clause 10 PTP Deleted Clause

This clause has been removed.

Table 12-71. Properties of the Network Port Object Type

...
Required if the port is not a PTP link. Read-only if the port is a BACnet/IP port or if the network represented by this object requires VMAC addressing.

Table 12-73. Expected Properties of the Network Port Object Type by Network_Type and Protocol_Level.

...			
ARCNET	PHYSICAL	MAC_Address	R
ETHERNET		Link_Speed	R
LONTALK		Link_Speeds	R
VIRTUAL		Link Speed Autonegotiate	O
ZIGBEE		Network_Interface_Name	O
<proprietary values>			O
...			
PTP	PROTOCOL		

Table 12-74. Properties of the Network Port Object Type Only Used when Protocol Level is BACNET APPLICATION.

ETHERNET	
ARCNET	
LONTALK	
PTP	
VIRTUAL	
<proprietary values>	
ZIGBEE	Virtual MAC Address Table

...

12.56.8 Network_Type

This property, of type BACnetNetworkType, represents the type of network this Network Port object is representing. This property shall have one of the following values:

ARCNET	
IPV4	
IPV6	
ETHERNET	
LONTALK	
MSTP	MS/TP, as defined in Clause 9.
PTP	Point To Point, as defined in Clause 10.
SERIAL	A physical serial port.
ZIGBEE	ZigBee as defined in Annex O

...

12.56.11 Network_Number

This property, of type Unsigned16, represents the BACnet network number associated with this network.

The range for this property shall be 0 .. 65534. A Network_Number of 0 indicates that the Network_Number is not known or cannot be determined. Writing 0 to the Network_Number property shall force the value of the Network_Number_Quality property to UNKNOWN and allows the device to attempt to learn the network number, if possible. Writing a value other than 0 shall force the Network_Number_Quality property to CONFIGURED.

~~If the Network_Type is PTP, then this property shall be read-only and contain a value of 0.~~

...

12.56.12 Network_Number_Quality

This read-only property, of type BACnetNetworkNumberQuality, represents the current quality of the Network_Number property. ~~If the Network_Type is PTP, the Network_Number_Quality shall be CONFIGURED.~~

12.56.14 Command

...

DISCONNECT ~~This port shall terminate the network connection. If the value of Network_Type is not PTP, Writing this value shall result in the return of a Result(-) with an 'Error Class' of PROPERTY and an 'Error Code' of VALUE_OUT_OF_RANGE.~~

~~It is a local matter whether the value of this property remains at DISCONNECT until the disconnection has completed (whether in success or failure), and then returns to IDLE; or whether the property returns to IDLE once the disconnection process has been initiated and the object is prepared to accept another command.~~

~~Clause 17 VT Deleted Clause~~

This clause has been removed.

Clause 21

BACnetNetworkType ::= ENUMERATED {

ethernet (0),

arcnet (1),

mstp (2),

--formerly: ptp (3), removed in version 1 revision X

lontalk (4),

ipv4 (5),

zigbee (6),

virtual (7),

-- formerly: non-bacnet (8), removed in version 1 revision 18

ipv6 (9),

~~E.5 VT Deleted Clause~~

This clause has been removed.

~~F.5 VT Deleted Clause~~

This clause has been removed.

~~H.3 Using BACnet with the DARPA Internet Protocols Deleted Clause~~

This clause has been removed.

~~H.4 Using BACnet with the IPX Protocol Deleted Clause~~

This clause has been removed.

~~H.6 Using BACnet with the Former BACnet/WS Web Services Interface Defined by Annex N~~ Deleted Clause

This clause has been removed.

~~Annex N FORMER BACnet/WS WEB SERVICES INTERFACE (INFORMATIVE)~~ Deleted Clause

This clause has been removed.

~~Annex V MIGRATION FROM SOAP SERVICES (INFORMATIVE)~~ Deleted Clause

This clause has been removed.