ADDENDA

ANSI/ASHRAE Addendum bf to
ANSI/ASHRAE Standard 135-2012

Data Communication Protocol for Building Automation and Control Networks

Approved by ASHRAE on February 29, 2016, and by the American National Standards Institute on March 1, 2016.

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 ISSN 1041-2336

Approved American National Standard
ANSI
www.ansi.org

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[This foreword 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.

135-2012*bf*-1 Advanced Network Configuration, p. 2
135-2012*bf*-2 BVLL Responses for non-BBMD Devices, p. 14

In the following document, language to be added to existing clauses of ANSI/ASHRAE 135-2012 and Addenda is indicated through the use of *italics*, while deletions are indicated by ~~strikethrough~~. 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 addendum is provided for context only and is not open for public review comment except as it relates to the proposed changes.

135-2012*bf*-1 Advanced Network Configuration

Rationale

The Network Port object has a couple of limitations when applied to advanced network setups:

1) If the product has multiple IP addresses assigned to a single Ethernet card, it is not clear whether writing the BACnet_IP_Address property should select a different network card, or set the IP address. Likewise, it is not clear how to bind a Network Port object to the correct IP address in this case.

This problem will also be present with an MS/TP link used both by MS/TP and IPv6 or MS/TP.

2) If the product participates in multiple BACnet internetworks simultaneously, it is not clear how to represent the network ports from the other internetwork in Network Port objects. The existing Network Port object is required to be present for all ports, so just not including the port is not currently an option.

The proposed solution is to allow Network Port objects to represent each layer in the communication stack. A Network Port object then references another Network Port object which represents the next layer down the stack. When a Network Port object represents a layer other than the top layer (the logical BACnet network), it only uses the properties appropriate to that layer.

To support compatibility with the current version of the Network Port object, the top-most Network Port object (Protocol_Level == BACNET_APPLICATION) inherits all of the protocol and adapter related properties from all other Network Port objects in the hierarchy chain from the physical layer up to the application layer. This allows clients to be unaware of the Network Port hierarchy chain although the client might not be able to edit all of the properties in the topmost Network Port.

[Change **Clause 12**, p. 146]

...

Several object types defined in this clause have a property called "Reliability" that indicates the existence of fault conditions for the object. Reliability-evaluation is the process of determining the value of this property. The first stage of reliability-evaluation is internal to the object and is completely defined by the device's vendor. The second stage, which is only found in certain object types, is the application of a fault algorithm. See Clause 13.4 for fault algorithm definitions and see the object type definitions to determine the fault algorithm supported by any particular object type. The different values that the Reliability property can take on are described below. Note that not all values are applicable to all object types.

...	...
TRIPPED	The end device, such as an actuator, is not responding to commands, prevented by a tripped condition or by being mechanically held open.
REFERENCED_OBJECT_FAULT	*A referenced object is in fault, but the referencing object is otherwise not in fault.*

[Change **Clause 12.X** in **Addendum 135-2012*ai***, p. 2]

12.X Network Port Object

The Network Port object provides access to the configuration and properties of network ports of a device. All BACnet devices shall contain *at least* one Network Port object per *physical* port *which the device can be configured to communicate BACnet through (unless the port is currently for communications on a network other than the current BACnet internetwork and this use precludes its use for the current BACnet internetwork)*. It is a local matter whether or not the Network Port object is used for non-BACnet ports.

Verification and validation of property values within a Network Port object is a local matter.

Property values which are required to maintain proper operation of the network shall be retained across a device reset.

The Network Port object type can be implemented as a single interface through which all of the settings for a network port are accessed, or the Network Port objects can be organized in a hierarchy which separates the settings for each communication protocol level. See clause 12.X.Y2 for more details on hierarchical Network Port objects.

Network Port objects may optionally support intrinsic reporting to facilitate the reporting of fault conditions. Network Port objects that support intrinsic reporting shall apply the NONE event algorithm.

As specified in Table 12-X and the text below, some properties of the Network Port object are required if the object is used to represent a network of a given type. For example, a Network Port object whose Network_Type is MSTP must include the Max_Master property, and a Network Port object whose Network_Type is ~~BACNET_~~IPV4 must include the ~~BACnet_~~IP_Subnet_Mask property. Aside from the properties so required, it is a local matter whether a Network Port object contains properties that do not apply to its Network_Type. For example, a Network Port object whose Network_Type is MSTP may include the ~~BACnet_~~IP_Subnet_Mask property, although the value of this property would not be used by the network. Some vendors may find it convenient to have all of their Network Port objects support the same list of properties regardless of Network_Type. This is permitted, but not required.

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

Property Identifier	Property Datatype	Conformance Code
Object_Identifier	BACnetObjectIdentifier	R
Object_Name	CharacterString	R
Object_Type	BACnetObjectType	R
Description	CharacterString	O
Status_Flags	BACnetStatusFlags	R
Reliability	BACnetReliability	R
Out_Of_Service	BOOLEAN	R
Network_Type	BACnetNetworkType	R
Protocol_Level	*BACnetProtocolLevel*	*R*
Reference_Port	*Unsigned*	*O*
Network_Number	Unsigned16	R[1]
Network_Number_Quality	BACnetNetworkNumberQuality	R
Changes_Pending	BOOLEAN	R
Command	BACnetNetworkPortCommand	O[2]
MAC_Address	OCTET STRING	O[3]
APDU_Length	Unsigned	R
Link_Speed	REAL	R
Link_Speeds	BACnetARRAY[N] of REAL	O[4]
Link_Speed_Autonegotiate	BOOLEAN	O
Network_Interface_Name	CharacterString	O
BACnet_IP_Mode	BACnetIPMode	O[5]
~~BACnet_~~IP_Address	OCTET STRING	O[6]
BACnet_IP_UDP_Port	Unsigned16	O[5]
~~BACnet_~~IP_Subnet_Mask	OCTET STRING	O[6]
~~BACnet_~~IP_Default_Gateway	OCTET STRING	O[6]
BACnet_IP_Multicast_Address	OCTET STRING	O[7]
~~BACnet_~~IP_DNS_Server	BACnetARRAY[N] of OCTET STRING	O[6]
~~BACnet_~~IP_DHCP_Enable	BOOLEAN	O[8]
~~BACnet_~~IP_DHCP_Lease_Time	Unsigned	O
~~BACnet_~~IP_DHCP_Lease_Time_Remaining	Unsigned	O
~~BACnet_~~IP_DHCP_Server	OCTET STRING	O
BACnet_IP_NAT_Traversal	BOOLEAN	O[9]

BACnet_IP_Global_Address	BACnetHostNPort	O[10]
BBMD_Broadcast_Distribution_Table	BACnetLIST of BACnetBDTEntry	O[11]
BBMD_Accept_FD_Registrations	BOOLEAN	O[11]
BBMD_Foreign_Device_Table	BACnetLIST of BACnetFDTEntry	O[12]
FD_BBMD_Address	BACnetHostNPort	O[13]
FD_Subscription_Lifetime	Unsigned16	O[13]
Max_Master	Unsigned8	O[14]
Max_Info_Frames	Unsigned8	O[14]
Slave_Proxy_Enable	BOOLEAN	O[15]
Manual_Slave_Address_Binding	BACnetLIST of BACnetAddressBinding	O[15]
Auto_Slave_Discovery	BOOLEAN	O[16]
Slave_Address_Binding	BACnetLIST of BACnetAddressBinding	O[17]
Virtual_MAC_Address_Table	BACnetLIST of BACnetVMACEntry	O[18]
Routing_Table	BACnetLIST of BACnetRouterEntry	O
Event_Detection_Enable	BOOLEAN	O[19,20]
Notification_Class	Unsigned	O[19,20]
Event_Enable	BACnetEventTransitionBits	O[19,20]
Acked_Transitions	BACnetEventTransitionBits	O[19,20]
Notify_Type	BACnetNotifyType	O[19,20]
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O[19,20]
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O[20]
Event_Message_Texts_Config	BACnetARRAY[3] of CharacterString	O[20]
Event_State	BACnetEventState	O[19]
Reliability_Evaluation_Inhibit	BOOLEAN	O
Property_List	BACnetARRAY[N] of BACnetPropertyIdentifier	R
Profile_Name	CharacterString	O

[1] Required to be writable in routers, secure devices, and any other device that requires knowledge of the network number for proper operation.

[2] Shall be present if, and only if, the object supports execution of any of the values of the Command property. If present, this property shall be writable.

[3] 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.

[4] Required if Link_Speed is writable.

[5] Required to be present if the port is a BACnet/IP port.

[6] Required if the port is a BACnet/IP port. If the BACnet_IP_DHCP property is TRUE, and this property is configured by DHCP, this property shall be read-only.

[7] Required to be present if ~~the port is a BACnet/IP port~~ *Network_Type is IPV4, Protocol_Level is BACNET_APPLICATION* and *the port* supports multicast.

[8] Shall be present if, and only if, the *Network_Type is IPV4 and* the port can be configured by DHCP.

[9] Required to be present if ~~the port is a BACnet/IP port~~ *Network_Type is IPV4, Protocol_Level is BACNET_APPLICATION*, and the device is capable of communicating through a NAT router as described in J.7.8.

[10] Required ~~if the port is a BACnet/IP port~~ *Network_Type is IPV4, Protocol_Level is BACNET_APPLICATION*, and the device is configured to communicate through a NAT router as described in J.7.8

[11] Required to be present if ~~the port is a BACnet/IP or BACnet/IPv6 port~~ *Network_Type is IPV4 or IPV6* and the device is capable of functioning as a BBMD.

[12] Required if ~~the port is a BACnet/IP or BACnet/IPv6 port~~ *Network_Type is IPV4 or IPV6* and the device is capable of functioning as a BBMD.

[13] Required to be present if ~~the port is a BACnet/IP or BACnet/IPv6 port~~ *Network_Type is IPV4 or IPV6* and BACnet_IP_Mode or BACnet_IPv6_Mode respectively is set to FOREIGN.

[14] Required to be present and writable if ~~the port is an MS/TP port~~ *Network_Type is MSTP*, the device is an MS/TP master node, and the device supports the WriteProperty service.

[15] Required to be present and writable if ~~the port is an MS/TP port~~ *Network_Type is MSTP, Protocol_Level is BACNET_APPLICATION*, and the device is capable of being a Slave-Proxy device.

[16] Required if ~~the port is an MS/TP port~~ *Network_Type is MSTP, Protocol_Level is BACNET_APPLICATION*, and the device is capable of being a Slave-Proxy device that implements automatic discovery of slaves.

[17] Required if ~~the port is an MS/TP port~~, *Network_Type is MSTP, Protocol_Level is BACNET_APPLICATION*, and the

device is capable of being a Slave-Proxy device.

18 Required if the network represented by this object requires VMAC addressing.

19 These properties are required if the object supports intrinsic reporting.

20 These properties shall be present only if the object supports intrinsic reporting.

[Change **Table 12-Y** in **Addendum 135-2012*ai***, p. 5]

Table 12-Y. Required Properties of the Network Port Object Type Based on Network_Type
When Protocol_Level is BACNET_APPLICATION.

~~If the value of Network_Type is…~~ ***Network_Type***	~~… then these are the additional properties required of the corresponding Network Port Object.~~ ***Additional Required Properties***
ETHERNET	MAC_Address
MSTP	MAC_Address Max_Master Max_Info_Frames
MSTP (capable of Slave Proxy)	MAC_Address Max_Master Max_Info_Frames Slave_Proxy_Enable Manual_Slave_Address_Binding Auto_Slave_Discovery Slave_Address_Binding
~~BACNET_~~IPV4 (~~BACNET_IP_MODE~~ *BACnet_IP_Mode* is NORMAL)	MAC_Address BACnet_IP_Mode ~~BACnet_~~IP_Address BACnet_IP_UDP_Port ~~BACnet_~~IP_Subnet_Mask ~~BACnet_~~IP_Default_Gateway ~~BACnet_~~IP_DNS_Server
~~BACNET_~~IPV4 (~~BACNET_IP_MODE~~ *BACnet_IP_Mode* is FOREIGN)	MAC_Address BACnet_IP_Mode ~~BACnet_~~IP_Address BACnet_IP_UDP_Port ~~BACnet_~~IP_Subnet_Mask ~~BACnet_~~IP_Default_Gateway ~~BACnet_~~IP_DNS_Server FD_BBMD_Address FD_Subscription_Lifetime
~~BACNET_~~IPV4 (~~BACNET_IP_MODE~~ *BACnet_IP_Mode* is BBMD)	MAC_Address BACnet_IP_Mode ~~BACnet_~~IP_Address BACnet_IP_UDP_Port ~~BACnet_~~IP_Subnet_Mask ~~BACnet_~~IP_Default_Gateway ~~BACnet_~~IP_DNS_Server BBMD_Broadcast_Distribution_Table BBMD_Accept_FD_Registrations BBMD_Foreign_Device_Table

[Insert new **Table 12-Y2** and **Table 12-Y3** immediately after **Table 12-Y** in **Addendum 135-2012*ai***, p. 5]
[This change includes content that relies on Addendum 135-2012*aj*]

Table 12-Y2. Expected Properties of the Network Port Object Type by Network_Type and Protocol_Level.

Network_Type	Protocol_Level	Properties	Conformance
SERIAL	PHYSICAL	Link_Speed Link_Speeds Link_Speed_Autonegotiate Network_Interface_Name	R O O O
ETHERNET ARCNET LONTALK VIRTUAL ZIGBEE <proprietary values>	PHYSICAL	MAC_Address Link_Speed Link_Speeds Link_Speed_Autonegotiate Network_Interface_Name	R R O O O
MSTP	PROTOCOL	MAC_Address Max_Master Max_Info_Frames Zero_Configuration_Enable	R R R O
PTP	PROTOCOL		
IPV4	PROTOCOL	IP_Address IP_Subnet_Mask IP_Default_Gateway IP_DNS_Server IP_DHCP_Enable IP_DHCP_Lease_Time IP_DHCP_Lease_Time_Remaining IP_DHCP_Server	R R R R O O O O
IPV6	PROTOCOL	IPv6_Address IPv6_Prefix_Length IPv6_Default_Gateway IPv6_DNS_Server IPv6_Auto_Addressing_Enable IPv6_DHCP_Lease_Time IPv6_DHCP_Lease_Time_Remaining IPv6_DHCP_Server IPv6_Zone_Index	R R R R O O O O O
<proprietary values>	PROTOCOL		
<proprietary values>	NON_BACNET_ APPLICATION		
any (except SERIAL)	BACNET_APPLICATION	all properties	

Table 12-Y3. Properties of the Network Port Object Type Only Used when Protocol_Level is BACNET_APPLICATION.

Network_Type	Properties
ETHERNET ARCNET LONTALK PTP VIRTUAL <proprietary values>	
ZIGBEE	Virtual_MAC_Address_Table
MSTP	Slave_Proxy_Enable Manual_Slave_Address_Binding Auto_Slave_Discovery Slave_Address_Binding

IPV4	BACnet_IP_Mode BACnet_IP_UDP_Port BACnet_IP_Multicast_Address BACnet_IP_NAT_Traversal BACnet_IP_Global_Address BBMD_Broadcast_Distribution_Table BBMD_Accept_FD_Registrations BBMD_Foreign_Device_Table FD_BBMD_Address FD_Subscription_Lifetime
IPV6	BACnet_IPv6_Mode BACnet_IPv6_UDP_Port BACnet_IPv6_Multicast_Address BBMD_Broadcast_Distribution_Table BBMD_Accept_FD_Registrations BBMD_Foreign_Device_Table FD_BBMD_Address FD_Subscription_Lifetime
all	Network_Number Network_Number_Quality APDU_Length Routing_Table

[Change **Clause 12.X.1** in **Addendum 135-2012*ai***, p. 5]

12.X.1 Object_Identifier

This property, of type BACnetObjectIdentifier, is a numeric code that is used to identify the object. It shall be unique within the BACnet Device that maintains it. *When the Protocol_Level property has a value of BACNET_APPLICATION, the* ~~The~~ instance number (see Clause 20.2.14) shall correspond to the Port ID of the associated network as described in Clause 6.

It is suggested that instances greater than 255 be used for Network Port objects with a Protocol_Level of PHYSICAL or PROTOCOL.

[Change **Clause 12.X.6** in **Addendum 135-2012*ai***, p. 6]

12.X.6 Reliability

This property, of type BACnetReliability, provides an indication of whether the Network Port object, the network port, and the network connected to the port are "reliable" as far as the BACnet Device can determine and, if not, why.

Reliability of a Network Port object affects all Network Port objects that reference it directly or indirectly. If this Network Port object is otherwise not in fault, but its referenced Network Port object is, then the Reliability property shall have the value REFERENCED_OBJECT_FAULT.

[Change **Clause 12.X.7** in **Addendum 135-2012*ai***, p. 6]

12.X.7 Out_Of_Service

The Out_Of_Service property, of type BOOLEAN, is an indication whether (TRUE) or not (FALSE) the network port is out of service.

When a network port is Out_Of_Service, all ~~BACnet~~ communication, *of the protocol modeled by the object,* through that port shall be disabled. *For example, for Network Port objects with a Protocol_Level of BACNET_APPLICATION, only BACnet communications are stopped. In contrast, for Network Port objects with a Protocol_Level of PROTOCOL and Network_Type of IPV4, setting Out_Of_Service to TRUE stops all IPv4 communications through the port, including any BACnet/IP communications.*~~, and~~

When Out_Of_Service is TRUE, writing any value other than RESTART_PORT, DISCONNECT, and DISCARD_CHANGES to the Command property shall result in an error response with an 'Error Class' of PROPERTY and 'Error Code' of VALUE_OUT_OF_RANGE.

[Change **Clause 12.X.8** in **Addendum 135-2012*ai***, p. 6]

12.X.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:

[Note to reviewers: the following descriptions are re-ordered to be listed alphabetically. The reordering is not shown with change marking for clarity.]

ARCNET	~~ARCNET, as defined in Clause 8~~
ETHERNET	~~ISO 8802-3 ("Ethernet"), as defined in Clause 7~~
~~MSTP~~	~~MS/TP, as defined in Clause 9~~
~~BACNET_~~IPV4	~~BACnet/IP as defined in Annex J.~~
~~BACNET_~~IPV6	~~BACnet/IPv6 as defined in Annex ?.~~
LONTALK	
MSTP	MS/TP, as defined in Clause 9.
PTP	Point-To-Point, as defined in Clause 10.
SERIAL	*A physical serial port.*
VIRTUAL	Indicates that this port represents the configuration and properties of a virtual network as described in Annex H.2.
ZIGBEE	ZigBee as defined in Annex O.
<Proprietary Enum Values>	A vendor may use other proprietary enumeration values to indicate that this port represents the use of message structures, procedures, and medium access control techniques other than those contained in this standard. For proprietary extensions of this enumeration, see Clause 23.1 of this standard.

When the Protocol_Level is BACNET_APPLICATION, the Network_Type indicates the protocol over which BACnet is operating and implies that the requirements laid out in the appropriate clause are being met. For example, if the Network_Type is IPV4, then the port is operating as a BACnet/IP port as defined in Annex J.

[Change **Clause 12.X.13** in **Addendum 135-2012*ai***, p. 11]

12.X.13 MAC_Address

This property, of type OCTET STRING, contains the BACnet MAC address used on this network. The value of this property shall be conveyed with the most significant octet first. If Network_Type is ~~BACNET_~~IPV4 *and the Protocol_Level is BACNET_APPLICATION*, then the value of this property shall contain the six octet combination of the ~~BACnet_~~IP_Address and BACnet_IP_UDP_Port and shall be read-only. If the value of Network_Type is a value that represents a port that requires VMAC addressing, then the value of this property shall be read-only and contain the VMAC address.

If this property is writable, then a successful write to this property shall set the Changes_Pending property to TRUE. The value of this property shall become effective when the device receives a ReinitializeDevice service request with a 'Reinitialized State of Device' of ACTIVATE_CHANGES or WARMSTART.

[Change **Clause 12.X.18** in **Addendum 135-2012*ai***, p. 12]

12.X.18 Network_Interface_Name

This property, of type CharacterString, is used to identify the network interface hardware to which this network port is bound. For example, if Network_Type is ~~BACNET~~ IPV4, the value of this property identifies the Ethernet hardware interface that this network port is using to communicate.

This property shall be read-only if it is inherited from another Network Port object.

If this property is writable, then a successful write to this property shall set the Changes_Pending property to TRUE. A value written to this property shall become effective when the device receives a ReinitializeDevice service request with a 'Reinitialized State of Device' of ACTIVATE_CHANGES or WARMSTART.

[Add new **Clause 12.X.Y1** in **Addendum 135-2012*ai***, p. 18**]**

12.X.Y1 Protocol_Level

This property, of type BACnetProtocolLevel, indicates whether the object represents a physical network interface (PHYSICAL), a non-BACnet protocol (PROTOCOL), or the BACnet protocol (BACNET_APPLICATION).

[Add new **Clause 12.X.Y2** in **Addendum 135-2012*ai***, p. 18**]**

12.X.Y2 Reference_Port

This property, of type Unsigned, shall specify the instance of the Network Port object that this Network Port object uses as its lower protocol layer (i.e., transport, routing, datalink, etc). This property allows the Network Port objects in the device to describe the hierarchy of protocols and physical ports in order to support complex network configuration required by some advanced BACnet products.

If this property is absent and the Protocol_Level is BACNET_APPLICATION, then it represents all protocol layers in a single object.

If this property has a value of 4194303, then this object has not been assigned a lower protocol layer. If the object is capable of representing all protocol layers in a single object, then this is a valid configuration and the object shall behave as if this property were absent. If the object is not capable of representing all protocol layers in a single object, then this is an indication that the object is not yet configured.

Object_Identifier	Network Port, 4
Object_Name	BACnet/MSTP on USB1::COM1
Reference_Port	4194303
Protocol_Level	BACNET_APPLICATION
Network_Type	MSTP
Link_Speed	76800
Link_Speeds	9600,38400,76800
Link_Speed_Autonegotiate	FALSE
Network_Interface_Name	USB1::COM1
MAC_Address	1
Max_Master	12
Max_Info_Frames	3
Slave_Proxy_Enable	FALSE
Manual_Slave_Address_Binding	...
Auto_Slave_Discovery	FALSE
Slave_Address_Binding	...
Network_Number	40
Network_Number_Quality	CONFIGURED
APDU_Length	480
Routing_Table	...

Figure 12-X1. Example Network Port With No Hierarchy Chain

A Network Port object is misconfigured if the referenced Network Port object has a Protocol_Level of BACNET_APPLICATION, or the referenced Network Port object does not exist.

If this property is writable, then a successful write to this property shall set the Changes_Pending property to TRUE. A value written to this property shall become effective when the device receives a ReinitializeDevice service request with a 'Reinitialized State of Device' of ACTIVATE_CHANGES or WARMSTART.

12.X.Y2.1 Network Port Hierarchies

Support for Network Port object hierarchies is optional.

In the normal case, a single hierarchy chain consists of a Network Port object with a Protocol_Level of PHYSICAL at the bottom; one or more Network Port objects with their Protocol_Level set to PROTOCOL, and a Network Port object with a Protocol_Level of BACNET_APPLICATION at the top. Multiple Network Port objects can reference a PROTOCOL or PHYSICAL Network Port object.

A Network Port object with a Protocol_Level of BACNET_APPLICATION or PHYSICAL shall not be in the middle of a hierarchy chain.

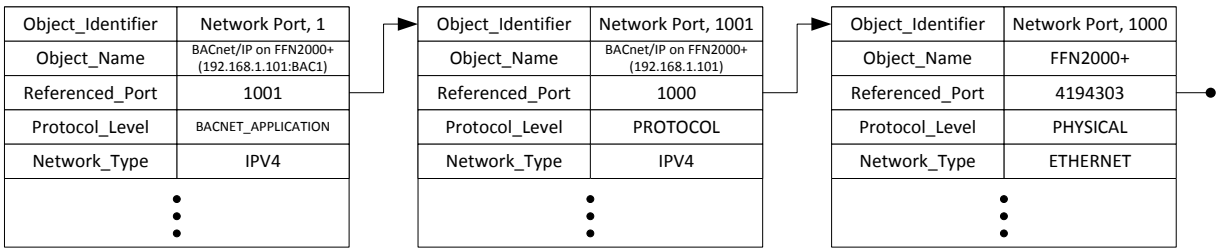

Figure 12-X2. Example Network Port Hierarchy Chain

12.X.Y2.1.1 Property Inheritance

In a hierarchy chain of Network Port objects, a Network Port object with a Protocol_Level of BACNET_APPLICATION shall inherit property values related to configuration of the protocol or physical port from all Network Port objects in the chain.

Where a property is specified in multiple Network Port objects in the hierarchy chain, the property's value in the Network Port object nearest to the top of the chain shall be the value reflected in the topmost Network Port object. For example, in a Network Port object with a Protocol_Level of BACNET_APPLICATION, the Network_Type property shall be the same as the Network_Type of the directly referenced Network Port object.

Network Port objects with a Protocol_Level of NON_BACNET_APPLICATION are allowed to inherit property values. Network Port objects with a Protocol_Level other than BACNET_APPLICATION or NON_BACNET_APPLICATION shall not inherit property values.

Property inheritance allows clients to read and write current network settings by accessing the topmost Network Port object. It is required that inherited properties which are writable in the source (lower) Network Port object be writable in the inheriting Network Port object. When inherited properties are written, in either the source or the inheriting object, the values shall be written through to the other Network Port object. It is acceptable to make inherited properties in the source object read only and the corresponding properties in the inheriting object be writable.

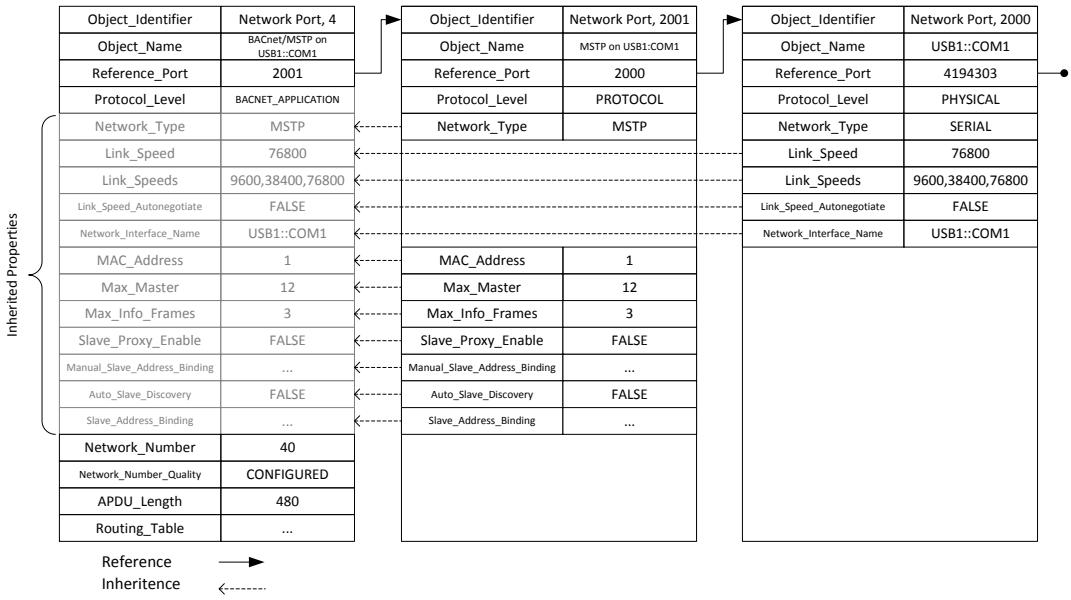

Figure 12-X3. Example Network Port Hierarchy Chain Showing Property Inheritance

12.X.Y2.1.2 Pending Changes

In a hierarchy of Network Port objects, changes to a Network Port object may result in pending changes to multiple Network Port objects due to the sharing of inherited property values.

When an inherited property is written, and writes to the property are controlled via the pending changes functionality, it is a local matter whether or not the new property value is reflected in all affected objects immediately, or only once the changes have been activated. If the property value shows up immediately in all affected objects, then the Changes_Pending property in each of those objects shall be set to TRUE.

[Change **Clause 21 Additions** in **Addendum 135-2012*ai***, p. 22]

BACnetNetworkType ::= ENUMERATED {

ethernet	(0),
arcnet	(1),
mstp	(2),
ptp	(3),
lontalk	(4),
~~bacnet-~~ipv4	(5),
zigbee	(6),
virtual	(7),
~~non-bacnet~~	~~(8),~~
-- *formerly: non-bacnet*	*(8), removed in version 1 revision 18*
~~bacnet-~~ipv6	(9),
serial	*(10),*
...	

}

-- Enumerated values 0-63 are reserved for definition by ASHRAE. Enumerated values
-- 64-255 may be used by others subject to the procedures and constraints described
-- in Clause 23.

[Note: the following change is shown as if **Addendum 135-2012*ai*** had been incorporated into the standard]

BACnetPropertyStates ::= CHOICE {

…	
network-number-quality	[48] BACnetNetworkNumberQuality,
protocol-level	*[58] BACnetProtocolLevel,*
...	

}

[Insert into **Clause 21 Additions** in **Addendum 135-2012*ai***, p. 22**]**

BACnetProtocolLevel ::= ENUMERATED {

physical	(0),
protocol	(1),
bacnet-application	(2),
non-bacnet-application	(3)

}

[Change **Clause 12 Additions** in **Addendum 135-2012*ai***, p. 22]

[Strike "BACnet_" from all occurrences of the terms:
BACnet_IP_Address,
BACnet_IP_Subnet_Mask,
BACnet_IP_Default_Gateway,
BACnet_IP_DNS_Server,
BACnet_IP_DHCP_Enable,
BACnet_IP_DHCP_Lease_Time,
BACnet_IP_DHCP_Lease_Time_Remaining,
BACnet_IP_DHCP_Server
]

[Strike "BACNET_" from all occurrences of the terms:
BACNET_IPV4
]

[Strike "bacnet-" from all occurrences of the terms:

bacnet-ipv4
]

[Change **Clause 21 Additions** in **Addendum 135-2012*ai***, p. 22]

[Strike "bacnet-" from all occurrences of the terms:
bacnet-ip-address,
bacnet-ip-subnet-mask,
bacnet-ip-default-gateway,
bacnet-ip-dns-server,
bacnet-ip-dhcp-enable,
bacnet-ip-dhcp-lease-time,
bacnet-ip-dhcp-lease-time-remaining,
bacnet-ip-dhcp-server
]

[Change **Clause 21**, p. 694]

BACnetPropertyIdentifier ::= ENUMERATED { -- see below for numerical order
...
proportional-constant-units (94),
protocol-level (482),
protocol-object-types-supported (96),
...
record-count (141),
reference-port (483),
reliability (103),
...
-- -numerical order reference
...
-- *see protocol-level (482),*
-- *see reference-port (483),*
...
}
-- The special property identifiers all, optional, and required are reserved for use in the
...

[Change **Clause 21**, p. 717]

BACnetReliability ::= ENUMERATED {
...
referenced-object-fault (24),
...
}
...

135-2012*bf*-2 BVLL Responses for non-BBMD Devices

Rationale

1) The standard is not clear enough about what a B/IP device should do with the contents of a Forwarded-NPDU 'B/IP Address of Originating Device' field.
2) The standard is not clear enough on how non-BBMD devices are to behave when they receive BVLL messages that are only applicable to BBMDs. Addendum 135-2012*ax*, Section 5 added a short specification: “All non-BBMD B/IP devices shall return the appropriate NAK.”, but that brief language does not cover all of the cases.

[Change Clause J.2.5, p. 861]

J.2.5 Forwarded-NPDU: Purpose

This BVLL message is used in broadcast messages from a BBMD, as well as in messages forwarded to registered foreign devices. It contains the source address of the original node, or if NAT is being used, the address with which the original node is accessed, as well as the original BACnet NPDU.

Upon receipt of a Forwarded-NPDU with a B/IP Address of Originating Device field whose B/IP address is different from the B/IP address of the sending node, the receiving node shall utilize the contents of that field as the source B/IP address of the sending node.

[Change **Clause J.4.4**, p 864]

J.4.4 BBMD Configuration

The configuration of the BACnet-related capability of a BBMD shall consist of supplying it with a BDT. The table ~~may be supplied by local means or by means of the BVLL Write-Broadcast-Distribution-Table message~~ *shall be supplied by writing to the BBMD_Broadcast_Distribution_Table property of the Network Port Object which represents this B/IP port.*

Two BVLL messages support the maintenance of BDTs and are described in J.4.4.1 and J.4.4.2.

J.4.4.1 Use of* the *BVLL Read-Broadcast-Distribution-Table Message

Upon receipt of a BVLL Read-Broadcast-Distribution-Table message, a BBMD shall load the contents of its BDT into a BVLL Read-Broadcast-Distribution-Table-Ack message and send it to the originating device. If a table entry contains a host name, then the corresponding entry in the Read-Broadcast-Distribution-Table-Ack message shall contain the B/IP address of the resolved host name or X'000000000000' to indicate that the host name has not been resolved. If the BBMD is unable to perform the read of its BDT, it shall return a BVLC-Result message to the originating device with a result code of X'0020' indicating that the read attempt has failed. A B/IP device which is not configured as a BBMD shall always return a BVLC-Result message to the originating device with a result code of X'0020' indicating that the Read-Broadcast-Distribution-Table BVLL message is not supported.

J.4.4.2 Use of the BVLL Write-Broadcast-Distribution-Table Message

Upon receipt of a BVLL Write-Broadcast-Distribution-Table message, B/IP devices shall always return a BVLC-Result message to the originating device with a result code of X'0010' indicating that the Write-Broadcast-Distribution BVLL message is not supported.

[Change **Clause J.4.5**, p 865]

J.4.5 BBMD Operation - Broadcast Distribution

~~Upon receipt of a BVLL Write-Broadcast-Distribution-Table message, a BBMD shall return a BVLC-Result message to the originating device with a result code of X'0010' indicating that the Write-Broadcast-Distribution-BVLL message is not supported.~~

~~Upon receipt of a BVLL Read-Broadcast-Distribution-Table message, a BBMD shall load the contents of its BDT into a BVLL Read-Broadcast-Distribution-Table-Ack message and send it to the originating device. If a table entry contains a host name, then the corresponding entry in the Read-Broadcast-Distribution-Table-Ack message shall contain the IP address of the resolved host name or X'000000000000' to indicate that the host name has not been resolved. If the BBMD is unable to perform the read of its BDT, it shall return a BVLC-Result message to the originating device with a result code of X'0020' indicating that the read attempt has failed.~~

...

[Change **Clause J.5.2.1.1,** p. 866]

J.5.2.1.1 Use of the BVLL Read-Foreign-Device-Table Message

Upon receipt of a BVLL Read-Foreign-Device-Table message, a BBMD shall load the contents of its FDT into a BVLL Read-Foreign-Device-Table-Ack message and send it to the originating device. If the BBMD is unable to perform the read of its FDT, it shall return a BVLC-Result message to the originating device with a result code of X'0040' indicating that the read attempt has failed. *A B/IP device which is not configured as a BBMD shall always return a BVLC-Result message to the originating device with a result code of X'0040' indicating that the Read-Foreign-Device-Table BVLL message is not supported.*

[Change **Clause J.5.2.1.2,** p. 866]

J.5.2.1.2 Use of the BVLL Delete-Foreign-Device-Table-Entry Message

Upon receipt of a BVLL Delete-Foreign-Device-Table-Entry message, a BBMD shall search its foreign device table for an entry corresponding to the B/IP address supplied in the message. If an entry is found, it shall be deleted and the BBMD shall return a BVLC-Result message to the originating device with a result code of X'0000'. Otherwise, the BBMD shall return a BVLC-Result message to the originating device with a result code of X'0050' indicating that the deletion attempt has failed. *A B/IP device which is not configured as a BBMD shall always return a BVLC-Result message to the originating device with a result code of X'0050' indicating that the Delete-Foreign-Device-Table-Entry BVLL message is not supported.*

[Change **Clause J.5.2.2,** p. 867]

J.5.2.2 Use of the BVLL Register-Foreign-Device Message

Upon receipt of a BVLL Register-Foreign-Device message, a BBMD capable of providing foreign device support and having available table entries, shall add an entry to its FDT as described in J.5.2.1 and reply with a BVLC-Result message containing a result code of X'0000' indicating the successful completion of the registration. A BBMD incapable of providing foreign device support shall return a BVLC-Result message containing a result code of X'0030' indicating that the registration has failed. *A B/IP device which is not configured as a BBMD shall always return a BVLC-Result message containing a result code of X'0030' indicating that the Register-Foreign-Device BVLL message is not supported.*

[Add a new entry to **History of Revisions**, p. 1027]

(This History of Revisions is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard.)

HISTORY OF REVISIONS

…	…	**…**
1	18	**Addendum bf to ANSI/ASHRAE 135-2012** Approved by ASHRAE on February 29, 2016, and by the American National Standards Institute March 1, 2016. 1. Advanced Network Configuration 2. BVLL Responses for non-BBMD Devices

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

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The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

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