Guide to the Network Port Object

Although significant effort has been made to ensure the accuracy of this guide, any discrepancies between this guide and the ASHRAE Standard 135-2020 or 135-2024, the standard shall take precedence.

1. Introduction

This guide is targeted at developers and testers of BACnet devices.

This guide discusses the differences between hierarchical and non-hierarchical Network Port objects and the benefits of each. It dives into the changes to the Network Port object when Standard 135-2020, Addendum cc (Protocol_Revision 24) was published and the consequences of choosing between pre and post Addendum cc Network Port objects. Finally, this guide provides a detailed list of the required properties and required to be writable properties for each data link and what level each required property exists within a hierarchical chain of Network Port objects.

Many of the clauses in the guide include one or more notes which contain important requirements or facts relevant to the topics in the clause.

2. Background

The Network Port object was added to the standard in December 2014, has gone through two major functional changes and has had two new data links added. This object has also had eight different formal Interpretations and 17 different errata.

Addenda history:

- 135-2012 Addendum ai (Protocol_Revision 17) introduced the Network Port object.
- 135-2012 Addendum aj (Protocol_Revision 18) added the BACnet/IPv6 data link and updated the Network Port object to include BACnet/IPv6.
- 135-2012 Addendum bf (Protocol_Revision 18) significantly changed the requirements for the Network Port object.
- 135-2020 Addendum cc (Protocol_Revsion 24) added the BACnet Secure Connect data link and updated the Network Port object to include BACnet Secure Connect. Made significant changes to the Network Port object.

3. Definitions and Acronyms

NPO: Network Port object as defined in Standard 135.

PR: The Protocol_Revision property defined in Standard 135-2024, Clause 12.11.13.

Topmost NPO: The Network Port object with Protocol_Level equal to BACNET_APPLICATION or NON_BACNET_APPLICATION in a hierarchical chain of Network Port objects.

Lower level NPO: The Network Port object with Protocol_Level equal to PROTOCOL or PHYSICAL in a hierarchical chain of Network Port objects.

4. Referenced Standards

For devices claiming PR 18 through 23, this document references 135-2020 along with any interpretations and errata for that standard that may apply.

For devices claiming PR 24 or greater, this document references 135-2024 along with any interpretations and errata for that standard that may apply.

If the referenced clause or table is the same in both 135-2020 and 135-2024 only the 135-2024 Clause will the referenced.

5. Choosing a Protocol_Revision

Choosing the Protocol_Revision for your device depends on several factors and dependencies.

- A derivative device where the parent device claims PR 18 through 23 may want to remain at a lower PR to reduce the time to market.
- If the BACnet Secure Connect data link is being added to a device that has already been BACnet tested, claiming a PR less than 24 is allowed and may reduce the time to market.
- If a device supports the BACnet Secure Connect data link and the Secure Connect NPO, PR 24 or greater must be claimed.
- New devices should consider claiming PR 24 or greater to avoid additional development in the future.

5.1. Protocol_Revision 17

135-2012 Addendum ai (PR 17) added support for the NPO. Slightly over a year later, 135-2012, Addendum bf (PR 18) significantly changed the functionality of an NPO and resolved several fundamental issues found in the original PR 17 version of the NPO.

NOTE: PR 17 is not recommended in any existing or new products.

5.2. Protocol_Revision 18 and 24 Differences

Addendum cc to 135-2020 (PR 24) added the Secure Connect NPO and changed several requirements that affect all NPOs. The below clauses describe the differences between a device claiming PR 18 through 23 and PR 24 or greater.

5.2.1. Property Inheritance (Hierarchical NPOs)

5.2.1.1. Protocol_Revision 18 through 23

For devices claiming PR 18 through 23 that contain hierarchical NPOs, property inheritance is required. Property inheritance requires the topmost NPO to contain all properties from its lower level NPOs and any changes to a property at one level must be reflected in the topmost level.

Property inheritance has the benefit of allowing clients to read and write all network port settings by accessing just the topmost NPO in a hierarchy of NPOs.

Writable properties, including inherited properties, must be writable in the topmost NPO. These inherited writable properties can be, but are not required to be, writable in the lower level source NPO.

If a property is writable in a lower level NPO it must be writable in the topmost NPO.

When inherited properties are written, in either the lower level or the inheriting NPO, the values must be written through to the other NPO.

NOTE: If a property is specified in multiple NPOs in the hierarchy chain, the property's value in the NPO nearest to the top of the chain is the value reflected in the topmost NPO. See 135-2020, Clause 12.56.10.1.1.

NOTE: NPOs at Protocol_Level equal to PROTOCOL cannot inherit any properties from referenced NPOs. See 135-2020, Clause 12.56.10.1.1.

5.2.1.2. Protocol_Revision 24

As of PR 24 a device is not allowed to support property inheritance so the topmost NPO cannot contain any properties from its lower level NPOs. See 135-2024, Clause 12.56.1.1.

5.2.2. Link_Speed Property

5.2.2.1. Protocol_Revision 18 through 23

For devices claiming PR 18 through 23 the Link_Speed property is required in all NPOs with Protocol_Level equal to PHYSICAL. See 135-2020, Table 12-73.

NOTE: The Link_Speed property is required in a non-hierarchical NPO where the Network_Type supports a Protocol_Level is equal to PHYSICAL as specified in 135-2020, Table 12-73. Because of property inheritance, the equivalent topmost NPO is also required to support the Link_Speed property.

NOTE: The Link_Speed property is required in a non-hierarchical NPO with Network_Type equal to MSTP. See 135-2020, Table 12-73.

NOTE: Interpretation IC-135-2020-5 clarified that the Link_Speed property is not required in every NPO.

5.2.2.2. Protocol_Revision 24

As of PR 24, the Link_Speed property is only required in NPOs with Protocol_Level equal to PHYSICAL and Network_Type equal to SERIAL. See 135-2024, Table 12-71.9.

NOTE: The Link_Speed property is required in a non-hierarchical NPO with Network_Type equal to MSTP.

5.2.3. Allowed Properties

5.2.3.1. Protocol_Revision 18 through 23

For devices claiming PR 18 through 23, an NPO is allowed to contain properties that are not part of its Network_Type. For example, an NPO with Network_Type equal to MSTP could contain the IP_Subnet_Mask property. See 135-2020, Clause 12.56.

5.2.3.2. Protocol_Revision 24

As of PR 24, NPOs cannot contain any properties from any other Network_Type. A hierarchical NPO can only contain properties specified in its protocol level. See 135-2024, Clause 12.56.1.1.

5.2.4. Reference_Port Property

5.2.4.1. Protocol_Revision 18 through 23

For devices claiming PR 18 through 23, the Reference_Port property is allowed to be absent or equal to 4194303 to indicate an NPO at Protocol_Level equal to BACNET_APPLICATION or NON_BACNET_APPLICATION is a non-hierarchical NPO.

5.2.4.2. Protocol_Revision 24

As of PR 24, the Reference_Port must be absent to indicate an NPO at Protocol_Level equal to BACNET_APPLICATION or NON_BACNET_APPLICATION is non-hierarchical.

NOTE: If the Reference_Port is equal to 4194303, it is considered an unconfigured hierarchical NPO.

5.2.5. Additional_Reference_Ports Property (Hierarchical NPOs)

The Additional_Reference_Ports property was added in Addendum cc to allow an NPO to reference more than one lower level NPO. A device must claim PR 24 or greater to support this property.

6. Choosing Hierarchical or Non-hierarchical NPOs

Hierarchical NPOs are beneficial in devices that contain multiple logical or physical ports such as routers or gateways or devices that support multiple data links. They may also be useful when a higher level NPO references the same lower level NPO.

A non-hierarchical NPO represents the entire data link in a single object. This is beneficial in devices that support a single data link. They are also beneficial when a device supports a single physical layer interface per data link.

Choosing hierarchical or non-hierarchical NPOs is up to the developers of the product.

NOTE: A device is allowed to contain non-hierarchical NPOs, hierarchical NPOs, or both.

6.1. Non-Hierarchical NPO

The definition of a non-hierarchical NPO is one where its Protocol_Level is equal to BACNET_APPLICATION or NON_BACNET_APPLICATION and the NPO does not reference a lower level NPO.

6.1.1. Protocol_Revision 18 through 23

The Reference_Port of a non-hierarchical NPO must be absent or equal to 4194303.

A non-hierarchical NPO must contain all required properties specified in Table 12-71 and all required properties specified in Table 12-72 and 12-73 for its Network_Type.

NOTE: If a property is specified in multiple protocol levels, the property's value used will be from the NPO at the highest protocol level. For example, an IPv4 NPO's MAC_Address is the six octet B/IP address at the BACNET_APPLICATION level and not the Ethernet MAC Address from the PHYSICAL level.

6.1.2. Protocol_Revision 24

The Reference_Port of a non-hierarchical NPO must be absent.

In most cases, a non-hierarchical NPO contains only the required and optional properties in Table 12-71 and the properties specified at all protocol levels in the sub-table for the NPO's data link. Some standard data links such as MS/TP require additional properties. See the specific requirements in the descriptions of the data links.

6.2. Hierarchical NPOs

The definition of a hierarchical NPO is one where its Protocol_Level is equal to BACNET_APPLICATION or NON_BACNET_APPLICATION and its Reference_Port exists and is not equal to 4194303. All NPOs with a Protocol_Level equal to PROTOCOL or PHYSICAL are hierarchical NPOs.

Each hierarchical chain of NPOs, starts with an NPO with Protocol_Level equal to BACNET_APPLICATION or NON_BACNET_APPLICATION followed by zero or more NPOs with Protocol_Level equal to PROTOCOL and zero or one NPOs with Protocol_Level equal to PHYSICAL.

Generally speaking, an NPO:

- with Protocol_Level equal to BACNET_APPLICATION or NON_BACNET_APPLICATION, its Reference_Port must reference at least one NPO with Protocol_Level equal to PROTOCOL or PHYSICAL.
- with Protocol_Level equal to PROTOCOL, its Reference_Port will equal 4194303 or reference another NPO with Protocol_Level equal to PROTOCOL or PHYSICAL.
- with Protocol_Level equal to PHYSICAL, the Reference_Port must equal 4194303.

Each data link has specific protocol level requirements See the requirements in the descriptions of the data link.

NOTE: NPOs with Protocol_Level equal to BACNET_APPLICATION, NON_BACNET_APPLICATION, or PHYSICAL cannot be in the middle of a hierarchical chain.

NOTE: A device may contain an unconfigured or unreferenced hierarchical NPO. These NPOs are not referenced by other NPOs and are at Protocol_Level equal to PROTOCOL or PHYSICAL.

6.2.1. Protocol_Revision 18 through 23

Because property inheritance is required, the topmost NPO will contain all the properties that are present in the lower level NPOs. This NPO will contain the same properties and values as the non-hierarchical version of the NPO except for the Reference_Port.

6.2.2. Protocol_Revision 24

For each data link, the sub-tables specified in 135-2024, Clause 12.56 provide the required and optional properties for each NPO in a hierarchical chain of NPOs. Some standard data links such as MS/TP require additional NPOs. See the specific requirements in the descriptions of the data link.

Addendum cc added the Additional_Reference_Ports property to the NPO. This property allows hierarchical NPOs to reference more than one lower level NPO. A possible application of this is a hierarchical BACnet Secure Connect NPO that references IPv4 and IPv6 NPOs at Protocol_Level equal to PROTOCOL.

NOTE: The Reference_Port property must be present and reference a lower level NPO before the Additional_Reference_Ports property can contain a reference.

7. Data Link Specific Requirements

7.1. General

As of PR 18, an NPO is required for each BACnet data link supported in a device.

Each NPO in a device must contain the required properties specified in 135-2024, Table 12-71.

For a device claiming PR 18 through 23, the required and optional properties for each of the data links is specified in 135-2020, tables 12-72, 12-73 and 12-74.

For a device claiming PR 24, 135-2024, Clause 12.56 contains Table 12-71, that contains the required and optional properties for all NPOs and a series of sub-tables that contain the required and optional properties for each data link. The sub-tables are further divided into protocol levels to document the required and optional properties for each level.

NOTE: If a property is required in a hierarchical chain of NPOs, it is also required in a non-hierarchical NPO.

NOTE: A device that supports gateway functionality using a virtual BACnet network requires a Virtual NPO. See 135-2024, Clauses H.1.1.1 and H.1.1.2

NOTE: For non-BACnet data links, a proprietary NPO can be used to represent the port, but it is not required.

The below tables contain the required (R), conditional required (O), required writable (W), and required configurable (C) properties for each type of NPO. The Protocol_Level is provided to indicate where, in the hierarchical chain of NPOs, each property is required to be present. When a hierarchical NPO can or must reference a lower level NPO with a different Network_Type, the table includes the Network_Type property.

7.2. ARCNET

This table is valid for devices that claim PR 18 or greater.

Property Identifier	Protocol_Level	Conformance
Network_Number	BACNET_APPLICATION	R, W[1]
Network_Number_Quality	BACNET_APPLICATION	R
APDU_Length	BACNET_APPLICATION	R
MAC_Address	PHYSICAL	R, C[2]
Link_Speed	PHYSICAL	O[3]

1 Required to be writable if a device is a BACnet Router.
2 Required to be configurable. See 135-2024, Table 12-71.1.
3 Required to be present if PR >= 18 and <= 23.

7.3. Ethernet

This table is valid for devices that claim PR 18 or greater.

Property Identifier	Protocol_Level	Conformance
Network_Number	BACNET_APPLICATION	R, W[1]
Network_Number_Quality	BACNET_APPLICATION	R
APDU_Length	BACNET_APPLICATION	R
MAC_Address	PHYSICAL	R
Link_Speed	PHYSICAL	O[2]

1 Required to be writable if a device is a BACnet Router.
2 Required to be present if PR >= 18 and <= 23.

7.4. IPv4

This table is valid for devices that claim PR 18 or greater.

Property Identifier	Protocol_Level	Network_Type	Conformance
Network_Number	BACNET_APPLICATION	IPV4	R, W[1]
Network_Number_Quality	BACNET_APPLICATION	IPV4	R
APDU_Length	BACNET_APPLICATION	IPV4	R
MAC_Address	BACNET_APPLICATION	IPV4	R
BACnet_IP_Mode	BACNET_APPLICATION	IPV4	R, C[2]
BACnet_IP_UDP_Port	BACNET_APPLICATION	IPV4	R
BBMD_Broadcast_Distribution_Table	BACNET_APPLICATION	IPV4	O[3], W[5]
BBMD_Accept_FD_Registrations	BACNET_APPLICATION	IPV4	O[3], W[5]

BBMD_Foreign_Device_Table	BACNET_APPLICATION	IPV4	O[3]
FD_BBMD_Address	BACNET_APPLICATION	IPV4	O[4], W[5,6]
FD_Subscription_Lifetime	BACNET_APPLICATION	IPV4	O[4], W[5]
IP_Address	PROTOCOL	IPV4	R
IP_Subnet_Mask	PROTOCOL	IPV4	R
IP_Default_Gateway	PROTOCOL	IPV4	R
IP_DNS_Server	PROTOCOL	IPV4	R
MAC_Address	PHYSICAL	ETHERNET	O[7]

1 Required to be writable if a device is a BACnet Router.
2 Required to be configurable if a device is capable of functioning as a foreign device. See 135-2024, Clause J.4.3.
3 Required to be present if a device is capable of functioning as a BBMD. See 135-2024, Clause 12.56.38 and 12.56.39.
4 Required to be present if a device is capable of functioning as a foreign device. See 135-2024, Clause 12.56.41 and 12.56.42.
5 Required to be writable if present.
6 Required to support the 'ip-address' and 'name' (host name) forms in BACnetHostAddress. See 135-2024, Clause J.1.2.1.
7 Required to be present and contain the Ethernet MAC address if the Protocol_Level is equal to PHYSICAL and Network_Type is equal to ETHERNET.

For NPOs at Protocol_Level equal to BACNET_APPLICATION and PROTOCOL, the Network_Type is equal to IPV4. An IPv4 NPO at Protocol_Level equal to PROTOCOL can:

- reference an Ethernet NPO at Protocol_Level equal to PHYSICAL and Network_Type is equal to ETHERNET,
- reference other BACnet or non-BACnet NPOs at Protocol_Level equal to PROTOCOL,
- not reference any lower level NPOs and contain a Reference_Port equal to 4194303.

NOTE: An IPv4 NPO must support NORMAL and FOREIGN modes or BBMD mode or all three modes. See 135-2024, Clause J.4.3.

NOTE: The BBMD_Broadcast_Distribution_Table must always contain the address of the BBMD for the local IP subnet. See 135-2024, Clause J.4.3.2.

7.5. IPv6

This table is valid for devices that claim PR 18 or greater.

Property Identifier	**Protocol_Level**	**Network_Type**	**Conformance**
Network_Number	BACNET_APPLICATION	IPV6	R, W[1]
Network_Number_Quality	BACNET_APPLICATION	IPV6	R
APDU_Length	BACNET_APPLICATION	IPV6	R
MAC_Address	BACNET_APPLICATION	IPV6	R
Virtual_MAC_Address_Table	BACNET_APPLICATION	IPV6	R
BACnet_IPv6_Mode	BACNET_APPLICATION	IPV6	R, C[2]
BACnet_IPv6_UDP_Port	BACNET_APPLICATION	IPV6	R
BACnet_IPv6_Multicast_Address	BACNET_APPLICATION	IPV6	R
BBMD_Broadcast_Distribution_Table	BACNET_APPLICATION	IPV6	O[3], W[5]
BBMD_Accept_FD_Registrations	BACNET_APPLICATION	IPV6	O[3], W[5]
BBMD_Foreign_Device_Table	BACNET_APPLICATION	IPV6	O[3]
FD_BBMD_Address	BACNET_APPLICATION	IPV6	O[4], W[5]
FD_Subscription_Lifetime	BACNET_APPLICATION	IPV6	O[4], W[5]
IPv6_Address	PROTOCOL	IPV6	R
IPv6_Prefix_Length	PROTOCOL	IPV6	R
IPv6_Default_Gateway	PROTOCOL	IPV6	R
IPv6_DNS_Server	PROTOCOL	IPV6	R
MAC_Address	PHYSICAL	ETHERNET	O[6]

1 Required to be writable if a device is a BACnet Router.
2 Required to be configurable if a device is capable of functioning as a foreign device. See 135-2024, Clause U.4.2.
3 Required to be present if a device is capable of functioning as a BBMD. See 135-2024, Clause 12.56.38 and 12.56.39.
4 Required to be present if a device is capable of functioning as a foreign device. See 135-2024, Clause 12.56.41 and 12.56.42.
5 Required to be writable if present.
6 Required to be present and contain the Ethernet MAC address if the Protocol_Level is equal to PHYSICAL and Network_Type is equal to ETHERNET.

For NPOs at Protocol_Level equal to BACNET_APPLICATION and PROTOCOL, the Network_Type is equal to IPV6. An IPv6 NPO at Protocol_Level equal to PROTOCOL can:

- reference an Ethernet NPO at Protocol_Level equal to PHYSICAL and Network_Type is equal to ETHERNET,
- reference other BACnet or non-BACnet NPOs at Protocol_Level equal to PROTOCOL,
- not reference any lower level NPOs and contain a Reference_Port equal to 4194303.

NOTE: An IPv6 NPO must support NORMAL and FOREIGN modes or BBMD mode or all three modes. See 135-2024, Clause U.4.2.

NOTE: The BBMD_Broadcast_Distribution_Table must not contain an entry for the BBMD in which the BDT resides. See 135-2024, Clause U.4.2.2.

7.6. LonTalk

This table is valid for devices that claim PR 18 or greater.

Property Identifier	Protocol_Level	Conformance
Network_Number	BACNET_APPLICATION	R, W[1]
Network_Number_Quality	BACNET_APPLICATION	R
APDU_Length	BACNET_APPLICATION	R
MAC_Address	PHYSICAL	R, C[2]
Link_Speed	PHYSICAL	O[3]

1 Required to be writable if a device is a BACnet Router.
2 Required to be configurable. See 135-2024, Table 12-71.1.
3 Required to be present if PR >= 18 and <= 23.

7.7. MS/TP

This table is valid for devices that claim PR 18 or greater.

Property Identifier	Protocol_Level	Network_Type	Conformance
Network_Number	BACNET_APPLICATION	MSTP	R[1]
Network_Number_Quality	BACNET_APPLICATION	MSTP	R
APDU_Length	BACNET_APPLICATION	MSTP	R
MAC_Address	PROTOCOL	MSTP	R, C[2]
Max_Manager	PROTOCOL	MSTP	O[3], W[4]
Max_Info_Frames	PROTOCOL	MSTP	O[3], W[4]
Link_Speed	PHYSICAL	SERIAL	R

1 Required to be writable if a device is a BACnet Router.
2 Required to be configurable. See 135-2024, Table 12-71.6. All devices shall be able to be set to any valid unicast address (MS/TP Managers is 0 to 127, MS/TP Subordinates is 0 to 254). See 135-2024, Clause 9.3.
3 Required if a device is a MS/TP manager.

4 Required to be writable if a device is a MS/TP manager and supports the WriteProperty service. See 135-2020, Clauses 12.56.51 and 12.56.52 or 135-2024, Clauses 12.56.55 and 12.56.56.

NOTE: A device that claims PR 17 or greater and supports DS-WP-B must support writable Max_Manager and Max_Info_Frames properties. Since the device must support DS-WP-B it must also support receiving a ReinitializeDevice service with WARMSTART or ACTVATE_CHANGES and must claim DM-RD-B.

For MS/TP NPOs at Protocol_Level equal to BACNET_APPLICATION and PROTOCOL, the Network_Type is equal to MSTP. For MS/TP NPOs at Protocol_Level equal to PHYSICAL, the Network_Type is equal to SERIAL. This means a non-hierarchical MS/TP NPO must contain the required properties from 135-2020:

- Table 12-72, Network_Type equal to MSTP,
- Table 12-73 for Network_Type equal to MSTP and Protocol_Level equal to PROTOCOL,
- Table 12-73 for Network_Type equal to SERIAL, and Protocol_Level equal to PHYSICAL.

For 135-2024, Table 12-71.6 and Table 12-71.9.

7.7.1. Device Object

If a device is a MS/TP Manager and supports an NPO with Network_Type equal to MSTP and Protocol_Level equal to BACNET_APPLICATION or PROTOCOL, the Device object must contain the Max_Manager and Max_Info_Frames properties. The values of these properties reflect the values of the properties in the lowest object instance of the NPO that contains a Network_Type equal to MSTP. If either of the Device object properties are writable, writing to these properties will cause the new value to take effect immediately, bypassing the activation functionality of the NPO. See 135-2024, Clauses 12.11.32 and 12.11.33.

NOTE: The Device object's Max_Manager and/or the Max_Info_Frames properties can be read-only.

7.8. Secure Connect

This table is valid for devices that claim PR 24 or greater.

Property Identifier	Protocol_Level	Conformance
Network_Number	BACNET_APPLICATION	R, W[1]
Network_Number_Quality	BACNET_APPLICATION	R
APDU_Length	BACNET_APPLICATION	R
MAC_Address	BACNET_APPLICATION	R
Max_BVLC_Length_Accepted	BACNET_APPLICATION	R
Max_NPDU_Length_Accepted	BACNET_APPLICATION	R
SC_Primary_Hub_URI	BACNET_APPLICATION	R, C[2]
SC_Failover_Hub_URI	BACNET_APPLICATION	R, C[2]
SC_Minimum_Reconnect_Time	BACNET_APPLICATION	R, C[2]
SC_Maximum_Reconnect_Time	BACNET_APPLICATION	R, C[2]
SC_Connect_Wait_Timeout	BACNET_APPLICATION	R, C[2]
SC_Disconnect_Wait_Timeout	BACNET_APPLICATION	R, C[2]
SC_Heartbeat_Timeout	BACNET_APPLICATION	R, C[2]
SC_Hub_Connector_State	BACNET_APPLICATION	R
Operational_Certificate_File	BACNET_APPLICATION	R
Issuer_Certificate_Files	BACNET_APPLICATION	R, W[3]
Certificate_Signing_Request_File	BACNET_APPLICATION	R, W[3]

1 Required to be writable if a device is a BACnet Router.
2 Required to be configurable.
3 The file data in the referenced File objects is required to be writable.

Since the BACnet Secure Connect data link contains only properties at Protocol_Level equal to BACNET_APPLICATION, a hierarchical chain of NPOs for this data link will reference other BACnet or proprietary NPOs at Protocol_Level equal to PROTOCOL or PHYSICAL.

NOTE: A device claiming PR 18 through 23 that supports the BACnet Secure Connect data link requires an NPO with Protocol_Level equal to BACNET_APPLICATION and Network_Type of any proprietary value. A device claiming PR 24 or greater requires an NPO with Protocol_Level of BACNET_APPLICATION and Network_Type of SECURE_CONNECT.

7.9. Virtual

This table is valid for devices that claim PR 18 or greater.

Property Identifier	Protocol_Level	Conformance
Network_Number	BACNET_APPLICATION	R, W[1]
Network_Number_Quality	BACNET_APPLICATION	R
APDU_Length	BACNET_APPLICATION	R
MAC_Address		R[2]
Link_Speed	PHYSICAL	O[3]

1 Required to be writable.
2 Required to be present in any one protocol level.
3 Required to be present if PR >= 18 and <= 23.

A Virtual NPO represents a non-BACnet network of non-BACnet devices as a virtual BACnet network.

NOTE: The device is a BACnet router between one or more BACnet networks and one or more virtual BACnet network. See 135-2024, Clauses H.1.1.1 and H.1.1.2.

7.10. ZigBee

This table is valid for devices that claim PR 18 or greater.

Property Identifier	Protocol_Level	Conformance
Network_Number	BACNET_APPLICATION	R, W[1]
Network_Number_Quality	BACNET_APPLICATION	R
APDU_Length	BACNET_APPLICATION	R
MAC_Address	PHYSICAL	R
Link_Speed	PHYSICAL	O[2]

1 Required to be writable if a device is a BACnet Router.
2 Required to be present if PR >= 18 and <= 23.

7.11. Proprietary

This table is valid for devices that claim PR 18 or greater.

Property Identifier	Protocol_Level	Conformance
Network_Number	BACNET_APPLICATION	R
Network_Number_Quality	BACNET_APPLICATION	R
APDU_Length	BACNET_APPLICATION	R
MAC_Address		R[1]
Link_Speed	PHYSICAL	O[2]

1 Required to be present in any one protocol level.
2 Required to be present if PR >= 18 and <= 23.

A proprietary NPO represents a non-BACnet network supported by a device. The topmost Protocol_Level must be NON_BACNET_APPLICATION.

A proprietary NPO presents a non-BACnet network as an object that contains properties that can be read or written using BACnet services. This NPO cannot represent a BACnet network and cannot be part of a BACnet internetwork.

NOTE: Any standard NPO property may be present in the object. If the presence or capability of one of these properties requires other properties to be present, then the other properties must also be present.

8. History

Version	**Change**
1	Initial Release
2 (this version)	Added Clause 7.7.1. Device object requirements for MS/TP Network Port objects.