Guide to the Device 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 toward developers and testers of BACnet Devices.

This guide was designed to point out small facts in the standard that are often missed by first time developers of a BACnet product. This focuses on the Device object only. Please refer to other guides for other objects or service information.

2. The Device object

The following guidelines apply to all BACnet devices.

2.1. All BACnet devices shall contain a Device object

All BACnet devices with an application layer shall contain a Device object, even BACnet clients. This is required by the BACnet standard See Standard 135, Clause 22.1.5 Minimum Device Requirements and Clause 12.11 Device Object Type.

2.2. All Device objects shall contain a non-empty Object_List property

All Device objects shall contain an Object_List property, and this property shall include at least the Device object and the Network Port object (PR >= 17). This is required by the BACnet standard.

2.3. Be prepared to read the Object_List array element by element

Some small devices that do not support segmentation have Object_List properties that are too large to transmit unsegmented. If a device needs to read another's Object_List property, be prepared to read it array element by array element.

2.4. The Device instance shall be configurable

Device instances are required to be configurable to allow for an internetwork-wide identity across the entire valid range of 0 to 4194302.

2.5. Client devices should expect to see Device instances across the entire range of 0 to 4194302

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2.6. Device instance number 4194303

Device instance number 4194303 can be used as a "wildcard" value for reading a Device object's Object_Identifier property (to determine its Device instance). If a ReadProperty or ReadPropertyMultiple

request is received for the Object_Identifier property of Device 4194303, the response shall convey the responding device's correct Device object instance. See Standard 135, Clause 15.5.2 and Clause 15.7.2.

2.7. The length of Bit Strings might be different than expected

The length of the Device object's Bit String properties, in particular the Protocol_Services_Supported and Protocol_Object_Types_Supported properties will vary depending upon the protocol revision to which the device was implemented. Client devices should be prepared to accept Bit String values from servers with lengths longer or shorter than those defined for the Protocol_Revision value to which the client device was implemented.

The length of Protocol_Services_Supported property value (See Standard 135, Clause 21, **BACnetServicesSupported**).

Revision	Size	Notes
0	35	
1	37	Added ReadRange(35), UTCTimeSynchronization(36),
2 – 13	40	LifeSafetyOperation(37), SubscribeCOVProperty(38), GetEventInformation(39)
14 – 17	41	WriteGroup(40)
18 – 19	44	SubscribeCOVPropertyMultiple(41), ConfirmedCOVNotificationMultiple(42), UnconfirmedCOVNotificationMultiple(43)
20 - 21	47	ConfirmedAuditNotification(44), AuditLogQuery(45), UnconfirmedAuditNotification(46)
22-28	49	WhoAmI(47), YouAre(48)
29-30	50	AuthRequest(49)
31	51	DirectoryQuery (50)

The length of Protocol_Object_Types_Supported property value (See Standard 135, Clause 21, **BACnetObjectTypeSupported**):

Revision	Size	Notes
0	18	
1	21	Added Averaging(18), Multi-state Value(19), Trend Log(20)
2 - 3	23	Added Life Safety Point(21) and Life Safety Zone(22)
4	25	Added Accumulator(23) and Pulse Converter(24)
5	30	Added Structured View(29), and reserved bits for several other objects in review.
6	31	Added Load Control(28), Access Door(30)
7 - 8	31	Added Event Log(25) and Trend Log Multiple(27), and reserved bit for Global Group(26) object in review
9	38	Added Access Credential(32), Access Point(33), Access Rights(34), Access User(35), Access Zone(36), Credential Data Input(37), and reserved bit for a future object type
10	51	Added BitString Value(39), CharacterString Value(40), Date Pattern Value(41), Date Value(42), DateTime Pattern Value(43), DateTime Value(44), Integer Value(45), Large Analog Value(46), OctetString Value(47), Positive Integer Value(48), Time Pattern Value(49), Time Value(50), and reserved bit for object Network Security(38) in review
11 - 12	51	Added Global Group(26) and Network Security(38)
13	53	Added Notification Forwarder(51) and Alert Enrollment(52)
14 - 15	55	Added Channel(53) and Lighting Output(54)
16	56	Added Binary Lighting Output(55)
17	57	Added Timer(31) and Network Port(56)
18 - 19	60	Added Elevator Group(57), Escalator(58), and Lift(59)
20	63	Added Staging (60), Audit Log (61), Audit Reporter (62)
24-30	65	Added Color (63), Color Temperature (64)
31	66	Added Directory (65)

2.8. The Protocol_Services_Supported property identifies only executable services

Only bits representing services that are executable by the device shall be set to '1' in the Protocol_Services_Supported property. Bits representing services that are initiated by the device but not executed shall be set to '0'.

This property is a means for a device to advertise to other devices which services may be sent to the device with an expectation that they will be accepted and executed.