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

First Public Review Draft

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

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(Draft shows Proposed Changes to Current Standard)

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FOREWORD
This addendum resolves issues around the initial values of the value properties.

Note: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and strikethrough (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.

Addendum dc to Standard 135-2024

Value Source Improvements

History of Revisions

V1	2024-06-01	Initial draft.
V2	2024-06-23	Changes based on IR answers.

Problem

This proposal resolves issues around the initial values of the value properties.

Proposed Solution

[Change Clause 12.x.x Value_Source_Array]

12.x.x Value_Source_Array

This read-only property, of type BACnetARRAY[16] of BACnetValueSource, indicates the source of the last command at each priority. See Clause 19.5 for a description of the value source mechanism.

~~If no commands have been received at a particular priority, the associated entry in the array shall have the value 'None'~~

[Change Clause 19.5, p. 815]

19.5 Value Source Mechanism

In building control systems, an object may be manipulated by a number of entities, and it may be important to know which entity is the current source of the current Present_Value (or Mode in the case of Life Safety objects). The priority at which an object is commanded indicates the general process that is controlling it (scheduling, manual override, etc.), the value source mechanism allows for an object to indicate the device, and/or object that was the source of the command or write operation.

The rest of this clause refers to the Present_Value property when describing the value source mechanism. This is done for clarity of the specification. When considering the mechanism for objects which apply it to a different property (such as Mode in the case of Life Safety objects), references to Present_Value are to be understood as references to the property that the mechanism is actually applied to.

The Channel object is a commandable object type but instead of having a Priority_Array, it just passes the priority through when writing to target properties. As such, it behaves like a non-commandable object when considering the value source mechanism. When the Channel object writes or commands objects, the value source for the operation is the Channel object.

By default, the value source mechanism only identifies the device that was the source of the write or command operation. The mechanism does allow, but does not require, client devices to update the value source information to accurately identify the object that is the true source of the operation.

19.5.1 Value Source Properties

For commandable Present_Value properties, the value source mechanism works in conjunction with command prioritization to identify which device or object has commanded, or relinquished, a value at each of the priority levels.

For non-commandable Present_Value properties, the value source mechanism identifies the source of the last write operation.

19.5.1.1 Present_Value, Priority_Array, Relinquish_Default

See Clause 19.2 for a description of command prioritization.

19.5.1.2 Value_Source

The Value_Source property indicates the source of the current Present_Value. The value indicates either the device or the object that provided the current value of the Present_Value property.

[Note to reviewer: The next four paragraphs Moved from 19.5.1.3]
When Present_Value is written or commanded, the value source information is set to the source device's Device object, if known, or the source device's network address if the device instance is not known.

When Present_Value is written or commanded by the local device, the value source information shall be updated. If the operation was initiated by a local object, then that object shall be identified in the value source information.

After commanding or writing the Present_Value of an object, the device, and only the device which wrote or commanded the value, may update the value source information to set the source device instance or to indicate the object that initiated the operation. The writing or commanding device accomplishes this by writing to the Value_Source property at the same priority that the Present_Value was written or commanded at.

Writing to the Value_Source property may be requested by a subsequent WriteProperty request. A WritePropertyMultiple request may also be used with the write or command to the Present_Value followed by a write to the Value_Source property.

Attempts to write to the Value_Source property by a device other than the device that wrote the property or commanded the property at a particular priority shall cause an error of 'Error Class' PROPERTY and 'Error Code' WRITE_ACCESS_DENIED to be returned and the write to Value_Source shall not be performed.

19.5.1.2.1 Commandable Object

~~For commandable Present_Value properties, the~~*The* value of the property is taken from the entry of the Value_Source_Array which is related to the Priority_Array entry which provided the current Present_Value. For example, if the Present_Value is from index 8 of the Priority_Array, then the Value_Source property shall have the value from index 8 of the Value_Source_Array.

If there is no active value source, i.e. *all entries in the Priority_Array are NULL,*~~the Present_Value has taken on the value of Relinquish_Default, then~~ the Value_Source property shall have the value 'None'.

19.5.1.2.2 Non-Commandable Object

~~For non-commandable Present_Value properties, the~~*The* Value_Source is ~~either~~ the value that is set when the Present_Value was last written, ~~or is~~ the value provided by the source device after the Present_Value was last written*, or 'None' if the Present_Value has not been written. See Clause 19.5.X.2*. ~~In objects with a non-commandable Present_Value property, there will be no Value_Source_Array property.~~

19.5.1.3 Value_Source_Array

The Value_Source_Array property holds the last value source for each priority. When the Present_Value is commanded, the Value_Source_Array is updated to indicate where the command originated. *The Value_Source_Array shall only be present in objects that contain the Priority_Array property.*

~~When a property is written or commanded, the value source information is set to the source device's Device object, if known, or the source device's network address if the device instance is not known.~~

~~When Present_Value is commanded or written by the local device, the value source information shall be updated. If the operation was initiated by a local object, then that object shall be identified in the value source information.~~

When minimum on / off control takes effect, or relinquishes, the value source used for priority 6 is the commanded object (i.e. the object which contains the Value_Source_Array property.)

~~After commanding or writing the Present_Value of an object, the device, and only the device which wrote or commanded the value, may update the value source information, at the same priority as the command in case of commanding, to set the source device instance or to indicate the object that initiated the operation. The writing or commanding device accomplishes this by writing to the Value_Source property at the same priority that the Present_Value was written or commanded at. Writing to the Value_Source property may be requested by a subsequent WriteProperty request or, when WritePropertyMultiple is used, by a respective property value subsequent to the property value written or commanded. Attempts to write to the Value_Source property by a device other than the device that wrote the property or commanded the property at a particular priority shall cause an error being returned and the write to Value_Source shall not be performed.~~

~~For commandable objects, when~~ *When* the Value_Source is written, the value is placed into *the* Value_Source_Array at the entry that corresponds to the priority it was written and the Value_Source property will be updated only if that is the current command priority.

19.5.1.4 Last_Command_Time

Last_Command_Time indicates the time at which the Present_Value, Current_Command_Priority, or Value_Source last changed due to a command ~~or write~~ of Present_Value. The Last_Command_Time is not updated when Value_Source is written directly. The Last_Command_Time shall only be present in ~~commandable~~ objects that contain the Priority_Array property. ~~It shall not be present in commandable objects without Priority_Arrays or that pass-through priority such as Channel objects.~~

Note that when Present_Value changes due to a relinquish command, the Last_Command_Time indicates the time at which the relinquish command was received and not the earlier time at which the now current priority command was provided.

19.5.1.5 Command_Time_Array

The Command_Time_Array property records the Last_Command_Time for each incoming priority *command*~~write~~. The Command_Time_Array shall only be present in ~~commandable~~ objects that contain the Priority_Array property. ~~It shall not be present in commandable objects without Priority_Arrays or that pass-through priority such as Channel objects.~~

19.5.2 Change of Value Reporting With Value Source Information

To allow reporting of value source information along with the value of the property, COV subscriptions for the Value_Source property are handled differently than for other properties.

When Value_Source is subscribed to, via SubscribeCOVProperty, COV notifications will be sent under the same circumstances as COV for the Present_Value of the object, and whenever the value of Value_Source changes. See Table 13-1a-2 for more information on COV reporting for the Value_Source property.

It is a local matter whether 1 or 2 notifications are generated in the case where the Value_Source property is written directly with updated information. In the case where a single notification is generated, that notification shall include the updated value source.

[Add Clause 19.5.X, p. 816]

19.5.X Initial Values

19.5.X.1 Commandable Object

The default value of each entry in the Value_Source_Array shall be 'None'.
The default value of each entry in the Command_Time_Array shall be the unspecified datetime.

The default value of the Last_Command_Time shall be the unspecified datetime.

If the initial value of the object's Priority_Array property contains all NULL values, the value of the Value_Source property shall be 'None'.

If the initial value of the object's Priority_Array property contains non-NULL values, including objects created through the Create-Object service, the following properties shall be initialized.

1. *For each entry in the Priority_Array that contains a non-NULL value, the corresponding entry in the Command_Time_Array shall contain a valid BACnetTimeStamp.*
2. *For each entry in the Priority_Array that contains a non-NULL value, the corresponding entry in the Value_Source_Array shall not contain the value of 'None'.*
3. *The Last_Command_Time shall contain a valid BACnetTimeStamp.*
4. The value of the Value_Source property shall be the value of the highest priority, non-NULL entry in the Value_Source_Array.

19.5.X.2 Non-Commandable Object

The initial value of the Value_Source property for an object shall be 'None'.