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

First Public Review Draft

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

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

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FOREWORD
Add new options to the Logging_Type property which allows for the separation of record collection and the logging of records. This allows record collection to use the best or only available collection method.

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 cw to Standard 135-2024

Trend Log Enhancements

V17~~2~~

- Removed AUTO_TRIGGERED. In the real world, triggering means recording the latest value.
- Split AUTO into AUTO_COV and AUTO_POLLED. This change makes it easier to see the purpose of the option and allows the user to explicitly select the option that applies to the system.
- Added more explicit requirements for COV and POLLED Logging_Types.
- ~~Added Collection_Interval and Collection_Intervals.~~
- ~~Ensured that Interval_Offset, Align_Intervals, etc are used to log values not collect them.~~

Problems:

The user, when configuring a Trend Log to log external values, is required to know the capabilities of the external device.

As written, the Trend Log closely couples how an external value is obtained to when it is logged disallowing the use of other services to ~~affectively~~ effectively capture the required values.

Capturing the same external value in multiple logs requires multiple requests for that same value.

Proposed Solution:

Add new options to the Logging_Type property which allows for the separation of record collection and the logging of records. This allows record collection to use the best or only available collection method.

Changes to ASHRAE Standard 135: (reference: 135-2020)

[Change **12.25.9**, p. 315]

12.25 Trend Log Object Type

A Trend Log object monitors a property of a referenced object and, when predefined conditions are met, saves ("logs") the value of the property and a timestamp in an internal log buffer for subsequent retrieval. The data may be logged periodically, upon a change of value or when "triggered" by a write to the Trigger property. The Trigger property allows the acquisition of samples to be controlled by network write operations or internal processes. Errors that prevent the acquisition of the data, as well as changes in the status or operation of the logging process itself, are also recorded. Each timestamped buffer entry is called a "log record."

The referenced ~~object~~*property* may reside in the same device as the Trend Log object or in an external device. The referenced property's value may be *collected using COV subscriptions, periodic reading or when "triggered"* ~~recorded upon COV subscription or periodic poll~~. If the value of the monitored object's Status_Flags property is available, then it may optionally be *collected* ~~recorded~~ along with the value of the referenced property.

If the referenced property is external to the device and Logging_Type is AUTO_COV or AUTO_POLLED, the collection of the referenced property value can be separated from the logging of the record. This allows the Trend Log object to optimize the collection of the referenced property value based on the capabilities of the server device, the datatype of the value being collected, the fact the value is being collected by another entity in the device, and how the Trend Log object has been configured.

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Table 12-29. Properties of the Trend Log Object Type

Property Identifier	Property Datatype	Conformance Code
Object_Identifier	BACnetObjectIdentifier	R
Object_Name	CharacterString	R
Object_Type	BACnetObjectType	R
Description	CharacterString	O
Enable	BOOLEAN	W
Start_Time	BACnetDateTime	O[1,2]
Stop_Time	BACnetDateTime	O[1,2]
Log_DeviceObjectProperty	BACnetDeviceObjectPropertyReference	O[8]
Log_Interval	Unsigned	O[1,3]
COV_Resubscription_Interval	Unsigned	O
Client_COV_Increment	BACnetClientCOV	O
Stop_When_Full	BOOLEAN	R
Buffer_Size	Unsigned32	R
Log_Buffer	BACnetLIST of BACnetLogRecord	R
Record_Count	Unsigned32	W
Total_Record_Count	Unsigned32	R
Logging_Type	BACnetLoggingType	R
Align_Intervals	BOOLEAN	O[5]
Interval_Offset	Unsigned	O[5]
Trigger	BOOLEAN	O
Status_Flags	BACnetStatusFlags	R
Reliability	BACnetReliability	O
Notification_Threshold	Unsigned32	O[4,7]
Records_Since_Notification	Unsigned32	O[4,7]
Last_Notify_Record	Unsigned32	O[4,7]
Event_State	BACnetEventState	R
Notification_Class	Unsigned	O[4,7]
Event_Enable	BACnetEventTransitionBits	O[4,7]
Acked_Transitions	BACnetEventTransitionBits	O[4,7]
Notify_Type	BACnetNotifyType	O[4,7]
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O[4,7]
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O[7]
Event_Message_Texts_Config	BACnetARRAY[3] of CharacterString	O[7]
Event_Detection_Enable	BOOLEAN	O[4,7]
Event_Algorithm_Inhibit_Ref	BACnetObjectPropertyReference	O[7]
Event_Algorithm_Inhibit	BOOLEAN	O[7,9]
Reliability_Evaluation_Inhibit	BOOLEAN	O[10]
Collection_Interval	*Unsigned*	*O[2,x]*
Audit_Level	BACnetAuditLevel	O[11]
Auditable_Operations	BACnetAuditOperationFlags	O[11]
Property_List	BACnetARRAY[N] of BACnetPropertyIdentifier	R
Tags	BACnetARRAY[N] of BACnetNameValue	O
Profile_Location	CharacterString	O
Profile_Name	CharacterString	O

[1] These properties are required if the monitored property is a BACnet property.

[2] If present, these properties are required to be writable.

[3] If present, this property is required to be writable when Logging_Type has the value POLLED, ~~or the value~~ COV, ~~or~~ *AUTO_COV, or AUTO_POLLED*. Also, if present this property is required to be read-only if Logging_Type has the value TRIGGERED.

[4] These properties are required if the object supports intrinsic reporting.

[5] These properties are required if, and shall be present only if, the object supports clock-aligned logging.

[6] Footnote removed.
[7] These properties shall be present only if the object supports intrinsic reporting.
[8] This property is required if, and shall be present only if, the monitored property is a BACnet property.
[9] Event_Algorithm_Inhibit shall be present if Event_Algorithm_Inhibit_Ref is present.
[10] If this property is present, then the Reliability property shall be present.
[11] This property shall be present only if the device supports audit reporting.
[x] *This property is required if and shall be present only if Logging_Type supports AUTO_COV or AUTO_POLLED.*

[Change **12.25.8**, p. 317]

12.25.8 Log_DeviceObjectProperty

This property, of type BACnetDeviceObjectPropertyReference, specifies the Device Identifier, Object Identifier and Property Identifier of the property to be trend logged.

A change of the value of this property shall cause all records in the log buffer to be deleted and Records_Since_Notification to be reset to zero. Upon completion, this event shall be reported as a BUFFER_PURGED log-status log record in the log buffer as the initial entry regardless of the state of the log buffer before the change.

If this property is writable, it may be restricted to reference only objects inside the device containing the Trend Log object. If the property is restricted to referencing objects within the containing device, an attempt to write a reference to an object outside the containing device into this property shall cause a Result(-) *response to be issued, specifying an 'Error Class' of PROPERTY and 'Error Code' of OPTIONAL_FUNCTIONALITY_NOT_SUPPORTED* ~~to be returned~~.

[Change **12.25.9**, p. 317]

12.25.9 Log_Interval

This property, of type Unsigned, specifies the periodic interval in hundredths of seconds for which the referenced property is to be logged when Logging_Type has the value POLLED *or AUTO_POLLED*. If the *value of* Logging_Type ~~property has either of the values~~ *is* COV, ~~or~~ TRIGGERED*,* ~~*or AUTO_TRIGGERED*~~ *or AUTO_COV*, then the value of the Log_Interval property shall be zero and ignored.

To maintain compatibility with previous versions of the standard, devices supporting COV data collection shall support switching between COV and polled modes in response to writes to Log_Interval. If the Logging_Type property has the value POLLED *or AUTO_POLLED*, changing the Log_Interval property from a non-zero value to the value zero shall change the value of Logging_Type to COV, and shall cause the Trend Log object to issue COV subscriptions for the referenced property. If the Logging_Type property has the value COV *or AUTO_COV*, writing a non-zero value to the Log_Interval property shall change the value of Logging_Type to POLLED, and shall cause the Trend Log object to periodically poll the ~~monitored~~*referenced* property.

If present, this property shall be writable if Logging_Type has ~~either~~ the value POLLED ~~or the value~~, COV, *AUTO_COV, or AUTO_POLLED*. This property shall be read-only if Logging_Type has the value TRIGGERED.

[Change **12.25.11**, p. 318]

12.25.11 Client_COV_Increment

If the Trend Log is acquiring COV data, this property, of type BACnetClientCOV, specifies the increment to be used in determining that a change of value has occurred. If the referenced object and property supports COV reporting according to Clause 13.1, this property may have the value NULL; in this case change of value is determined by the criteria of Clause 13.1.

[Change **12.25.14**, p. 318]

12.25.14 Log_Buffer

This property, of type BACnetLIST of BACnetLogRecord, is a list of up to Buffer_Size timestamped log records of datatype BACnetLogRecord, each of which conveys a recorded data value, an error related to data-collection, or status changes in the Trend Log object. Each log record has data fields as follows:

Timestamp When Logging_Type is POLLED or TRIGGERED the timestamp shall be the *local* date and time the logging object attempts to acquire the record. When Logging_Type is COV, the timestamp shall be the *local* date and time included within the notification if supplied, otherwise the *local* date and time when the notification was received. *When Logging_Type is AUTO_COV or AUTO_POLLED the timestamp shall be the local date and time the logging object logs the record.*

LogDatum The data value read from the monitored object and property, an error encountered in an attempt to read a value, or a change in status or operation of the Trend Log object itself.

StatusFlags If this field is present in the log record, then it shall contain the value of the Status_Flags property of the monitored object. If the monitored object is in a different device than the Trend Log object, then it is recommended that the Status_Flags and the data value in the monitored object property be acquired together with a single service request, such as ReadPropertyMultiple or one of the COV notification services.

The choices available for the LogDatum are listed below:

log-status This choice represents a change in the status or operation of the Trend Log object. Whenever one of the events represented by the flags listed below occurs, a log record shall be appended to the log buffer.

LOG_DISABLED This flag is changed whenever collection of log records by the Trend Log object is enabled or disabled. It shall be TRUE if Enable is FALSE, or the local time is outside the range defined by Start_Time and Stop_Time, or the addition of this log record will cause the log buffer to be full and Stop_When_Full is TRUE; otherwise it shall be FALSE.

BUFFER_PURGED This flag shall be set to TRUE whenever the buffer is cleared by writing zero to the Record_Count property or by a change to the Log_DeviceObjectProperty property. After this value is recorded in the log buffer, the subsequent immediate change to FALSE shall not be recorded. A log record indicating the purging of the log buffer shall be placed into the log buffer even if logging is disabled, the local time is outside of the time range defined by the Start_Time and Stop_Time properties, or the log buffer was completely empty before the request for clearing.

LOG_INTERRUPTED	This flag indicates that the collection of log records by the Trend Log object was interrupted by a power failure, device reset, object reconfiguration or other such disruption, such that samples prior to this log record might have been missed.

boolean-value real-value enumerated-value unsigned-value integer-value bitstring-value null-value	These choices represent the data values and datatypes read from the monitored object and property.
failure	This choice represents an error encountered in an attempt to read a data value from the monitored object. If the error is conveyed by an error response from a remote device the Error Class and Error Code in the response shall be recorded. *If the monitored object is in an external device and an attempt to read a data value fails, an 'Error Class' and 'Error Code' from Clause 18.7 shall be recorded.*
time-change	This choice represents a change in the clock setting in the device; it records the number of seconds and fraction of a second by which the clock changed. If, and only if, the number is not known, such as when the clock is initialized for the first time, the value recorded shall be 0.0. This log record shall be recorded after changing the local time of the device and the timestamp shall reflect the new local time of the device.
any-value	This choice represents the data values and datatypes read from the monitored object and property that are not specifically listed in LogDatum.

Also associated with each log record is an implied log record number, the value of which is equal to Total_Record_Count at the point where the log record has been added into the log buffer and Total_Record_Count has been adjusted accordingly. All clients shall be able to correctly handle the case where the Trend Log object is reset such that its Total_Record_Count is returned to zero and also the case where Total_Record_Count has wrapped back to one.

The log buffer is not network accessible except through the use of the ReadRange service, in order to avoid problems with record sequencing when segmentation is required.

If the object supports event reporting, then a reference to this property shall be the pLogBuffer parameter for the object's event algorithm. See Clause 13.3 for event algorithm parameter descriptions.

[Change **12.25.26**, p. 321]

12.25.26 Logging_Type

This property, of type BACnetLoggingType, specifies *the mechanism* ~~whether~~ the Trend Log object *uses to collect and log its records* ~~collects log records using polling, COV or triggered acquisition~~.

If this property is writable, an attempt to write a value not supported by the object into this property shall cause a Result(-) response to be issued, specifying an 'Error Class' of PROPERTY and 'Error Code' of OPTIONAL_FUNCTIONALITY_NOT_SUPPORTED.

12.25.26.1 COV

If this property has the value COV *and Log_DeviceObjectProperty references a property external to the device*, then the Trend Log shall issue COV subscriptions for the referenced property and shall *collect and* log the COV notifications if they indicate a changed value. *If Log_DeviceObjectProperty references a property internal to the device, then the Trend Log shall log the referenced property on a change of value.*

If the value COV is written to this property when Log_Interval has a non-zero value, then the Log_Interval property shall be updated with the value zero.

12.25.26.2 POLLED

If this property has the value POLLED *and Log_DeviceObjectProperty references a property external to the device*, then the Trend Log shall periodically *collect and log* ~~poll~~ *the value of the referenced* ~~monitored~~ property on the interval defined by the Log_Interval, Align_Intervals, and Interval_Offset properties. *If Log_DeviceObjectProperty references a property internal to the device then the Trend Log shall periodically log the newest value of the referenced property on the interval defined by the Log_Interval, Align_Intervals, and Interval_Offset properties.*

If the value POLLED is written to this property when the value of Log_Interval is zero, then the Log_Interval property shall be updated with an appropriate default polling interval. Determination of the appropriate default polling interval is a local matter.

12.25.26.3 TRIGGERED

If this property has the value TRIGGERED, then the Trend Log shall collect and log records as described in Clause 12.25.29.

If ~~either of the values COV or~~ *the value* TRIGGERED is written to this property when Log_Interval has a non-zero value, then the Log_Interval property shall be updated with the value zero.

12.25.26.4 AUTO_COV

If this property has the value AUTO_COV, then the Trend Log shall log the value of the referenced property as specified in Table 12-x. If the Log_DeviceObjectProperty references a property external to the device, the Trend Log shall optimize the collection of the value of the referenced property based on the Collection_Interval property as specified in Clause 12.25.x1.

If the value AUTO_COV is written to this property when Log_Interval has a non-zero value, then the Log_Interval property shall be updated with the value zero.

If the Client_COV_Increment property is not present, a log record shall be added to the Log_Buffer on every change of value.

***Table 12-x.** Logging*

Datatype	*Client_COV_Increment*	*Logging*
boolean-value *enumerated-value* *bitstring-value* *null-value*	*Not Applicable*	*Log on every change of value.*
real-value *unsigned-value* *integer-value*	*>0.0*	*Log when value changes by Client_COV_Increment.*
	=0.0 or NULL	*Log on every change of value.*

12.25.26.5 AUTO_POLLED

If this property has the value AUTO_POLLED, then the Trend Log shall periodically log the value of the referenced property on the interval defined by the Log_Interval, Align_Intervals, and Interval_Offset properties. If the Log_DeviceObjectProperty references a property external to the device, the Trend Log shall optimize the collection of the value of the referenced property based on the Collection_Interval property as specified in Clause 12.25.x1.

If the value AUTO_POLLED is written to this property when the value of Log_Interval is zero, then the Log_Interval property shall be updated with an appropriate default polling interval. Determination of the appropriate default polling interval is a local matter.

[Change **12.25.27**, p. 321]

12.25.27 Align_Intervals

This property, of type BOOLEAN, specifies whether (TRUE) or not (FALSE) clock-aligned periodic logging is enabled. If clock-aligned periodic logging is enabled and the value of Log_Interval is a factor of (i.e. it divides into without a remainder) a second, minute, hour or day, then the beginning of the period specified for logging shall be aligned to the second, minute, hour or day, respectively.

This property has no effect on the behavior of the Trend Log object if the *value of the Log_Interval property is zero*~~Logging_Type property has a value other than POLLED~~.

[Change **12.25.29**, p. 321]

12.25.29 Trigger

This property, of type BOOLEAN, shall cause the Trend Log object to *log a record*.

If the Logging_Type property is TRIGGERED, the Trend Log object shall collect ~~acquire~~ a log record whenever the value of this property is changed from FALSE to TRUE. It shall remain TRUE while the Trend Log object is *collecting* ~~acquiring~~ the data items for a log record. When all data items have been collected or it has been determined that all outstanding data requests will not be fulfilled, the Trend Log object shall reset the value to FALSE.

If the value of the Logging_Type property is not TRIGGERED and an attempt is made to write the value TRUE to the Trigger property, it is left as a local matter whether to execute the logging operation or not. For devices that choose not to execute triggered logging when Logging_Type is not equal to TRIGGERED, attempts to write the value TRUE to this property when Logging_Type has a value other than TRIGGERED shall cause a Result(-) response to be issued, specifying an 'Error Class' of PROPERTY and an 'Error Code' of NOT_CONFIGURED_FOR_TRIGGERED_LOGGING.

Writing to the Trigger property is not restricted to network-visible write operations; internal processes may control the acquisition of samples by writing to this property.

~~[Insert into production BACnetLoggingType in Clause 21, p. 834]~~

~~BACnetLoggingType ::= ENUMERATED {~~
~~polled (0),~~
~~cov (1),~~
~~triggered (2),~~
~~auto (3),~~
~~auto-triggered (4),~~
~~...~~
~~}~~
~~-- 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.~~

[Add **12.25.x1**, p. ???]

12.25.x1 Collection_Interval

This property, of type Unsigned, specifies the periodic interval in hundredths of seconds for which the value of an externally referenced property is collected when Logging_Type has the value AUTO_COV or AUTO_POLLED.

If Logging_Type has the value AUTO_COV or AUTO_POLLED and the value of Collection_Interval is greater than zero, the value of the referenced property shall be collected using polling at the interval specified by the Collection_Interval property. If the value of Collection_Interval is zero, it is a local matter how, when, and how often the value of the referenced property is collected but could include polling, or a COV subscription.

If Logging_Type is COV, POLLED, or TRIGGERED, this property shall be ignored.

If Log_DeviceObjectProperty references a property internal to the device, this property shall be ignored.

[Change **12.30**, p. 356]

12.30 Trend Log Multiple Object Type

A Trend Log Multiple object monitors one or more properties of one or more referenced ~~objects~~*properties*, either in the same device as the Trend Log Multiple object or in an external device. When predefined conditions are met, the object saves ("logs") the value of the properties and a timestamp into an internal log buffer for subsequent retrieval. The data may be logged periodically or when "triggered" by a write to the Trigger property. Errors that prevent the acquisition of the data, as well as changes in the status or operation of the logging process itself, are also recorded. Each timestamped log buffer entry is called a "log record".

The Log_DeviceObjectProperty array holds the list of properties to be monitored and logged. If an element of the Log_DeviceObjectProperty array has an object or device instance number equal to 4194303, this indicates that the element is 'empty' or 'uninitialized'. For empty or uninitialized elements, an indication that no property was specified shall be written to the corresponding entry in each log record.

If an entry in the Log_DeviceObjectProperty property is external to the device and Logging_Type is AUTO_POLLED, the collection of the entries value can be separated from the logging of the record. This allows the Trend Log Multiple object to optimize the collection of the entries value based on the capabilities of the server device, the datatype of the value being collected, the fact the value is being collected by another entity in the device, and how the Trend Log Multiple object has been configured.

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Table 12-35. Properties of the Trend Log Multiple 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

Event_State	BACnetEventState	R
Reliability	BACnetReliability	O
Enable	BOOLEAN	W
Start_Time	BACnetDateTime	O[1]
Stop_Time	BACnetDateTime	O[1]
Log_DeviceObjectProperty	BACnetARRAY[N] of BACnetDeviceObjectPropertyReference	R
Logging_Type	BACnetLoggingType	R
Log_Interval	Unsigned	R[2]
Collection_Intervals	*BACnetARRAY[N] of Unsigned*	*O[1,x]*
Align_Intervals	BOOLEAN	O[3]
Interval_Offset	Unsigned	O[3]
Trigger	BOOLEAN	O
Stop_When_Full	BOOLEAN	R
Buffer_Size	Unsigned32	R
Log_Buffer	BACnetLIST of BACnetLogMultipleRecord	R
Record_Count	Unsigned32	W
Total_Record_Count	Unsigned32	R
Notification_Threshold	Unsigned32	O[4,6]
Records_Since_Notification	Unsigned32	O[4,6]
Last_Notify_Record	Unsigned32	O[4,6]
Notification_Class	Unsigned	O[4,6]
Event_Enable	BACnetEventTransitionBits	O[4,6]
Acked_Transitions	BACnetEventTransitionBits	O[4,6]
Notify_Type	BACnetNotifyType	O[4,6]
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O[4,6]
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O[6]
Event_Message_Texts_Config	BACnetARRAY[3] of CharacterString	O[6]
Event_Detection_Enable	BOOLEAN	O[4,6]
Event_Algorithm_Inhibit_Ref	BACnetObjectPropertyReference	O[6]
Event_Algorithm_Inhibit	BOOLEAN	O[6,7]
Reliability_Evaluation_Inhibit	BOOLEAN	O[8]
Property_List	BACnetARRAY[N] of BACnetPropertyIdentifier	R
Audit_Level	BACnetAuditLevel	O[9]
Auditable_Operations	BACnetAuditOperationFlags	O[9]
Tags	BACnetARRAY[N] of BACnetNameValue	O
Profile_Location	CharacterString	O
Profile_Name	CharacterString	O

[1] If present, these properties are required to be writable.
[2] This property is required to be writable when Logging_Type has the value POLLED *or AUTO_POLLED* and is required to be read-only when Logging_Type has the value TRIGGERED.
[3] These properties are required if, and shall be present only if, the object supports clock-aligned logging.
[4] These properties are required if the object supports intrinsic reporting.
[5] Footnote removed.
[6] These properties shall be present only if the object supports intrinsic reporting.
[7] Event_Algorithm_Inhibit shall be present if Event_Algorithm_Inhibit_Ref is present.
[8] If this property is present, then the Reliability property shall be present.
[9] This property shall be present only if the device supports audit reporting.
[x] *This property is required if and shall be present only if Logging_Type supports AUTO_POLLED.*

[Change **12.30.11**, p. 359]

12.30.11 Log_DeviceObjectProperty

This property, of type BACnetARRAY of BACnetDeviceObjectPropertyReference, specifies the properties to be logged.

If this property is writable, it may be restricted to reference-only objects inside the device containing the Trend Log Multiple object. If the property is restricted to referencing objects within the containing device, an attempt to write a reference to an object outside the containing device into this property shall cause a Result(-) response to be issued, specifying an 'Error Class' of PROPERTY and an 'Error Code' of OPTIONAL_FUNCTIONALITY_NOT_SUPPORTED.

Elements of the Log_DeviceObjectProperty array containing object or device instance numbers equal to 4194303 are considered to be 'empty' or 'uninitialized'. An error shall be written to log record entries corresponding to these empty or uninitialized array elements, specifying an 'Error Class' of PROPERTY and an 'Error Code' of NO_PROPERTY_SPECIFIED.

If the size of the Collection_Intervals array is changed, the size of this property shall also be changed to the same size and any uninitialized array elements shall be given the object or device instance numbers equal to 4194303.

If this property is changed, one of the following actions shall be taken:

Either the log buffer shall be purged, Records_Since_Notification shall be reset to zero, and a BUFFER_PURGED log-status log record shall be recorded as the initial entry regardless of the state of the log buffer before the change, or

Log data values corresponding to changed elements of the Log_DeviceObjectProperty array shall be purged by replacing the relevant log data values in each log record with errors, specifying an 'Error Class' of PROPERTY and an 'Error Code' of LOGGED_VALUE_PURGED.

The selection of which action to take is a local matter.

[Change **12.30.12**, p. 359]

12.30.12 Logging_Type

This property, of type BACnetLoggingType, specifies *the mechanism* ~~whether~~ the Trend Log Multiple object *uses to collect and log its records*~~collects log records using polling or triggered acquisition~~.

12.30.12.1 COV

COV logging is not allowed for a Trend Log Multiple object. If this property is writable, an attempt to write the value COV into this property shall cause a Result(-) response to be issued, specifying an 'Error Class' of PROPERTY and an 'Error Code' of VALUE_OUT_OF_RANGE.

12.30.12.2 POLLED

If this property has the value POLLED, and Log_DeviceObjectProperty references properties external to the device then the Trend Log Multiple shall periodically collect and log the referenced properties on the interval defined by the Log_Interval, Align_Intervals, and Interval_Offset properties and log the results. If Log_DeviceObjectProperty references a properties internal to the device then the Trend Log Multiple shall periodically log the newest values of the referenced properties on the interval defined by the Log_Interval, Align_Intervals, and Interval_Offset properties.

If the value POLLED is written to this property when the value of Log_Interval is zero, the Log_Interval property shall be updated with an appropriate default polling interval. Determination of the appropriate default polling interval is a local matter.

12.30.12.3 TRIGGERED

If this property has the value TRIGGERED, then the Trend Log shall collect and log records as described in Clause 12.30.16.

If the value TRIGGERED is written to this property when Log_Interval has a non-zero value, the Log_Interval property shall be updated with the value zero.

12.30.12.4 AUTO_COV
AUTO_COV logging is not allowed for a Trend Log Multiple object. If this property is writable, an attempt to write the value AUTO_COV into this property shall cause a Result(-) response to be issued, specifying an 'Error Class' of PROPERTY and an 'Error Code' of VALUE_OUT_OF_RANGE.

12.30.12.5 AUTO_POLLED
If this property has the value AUTO_POLLED, then the Trend Log Multiple shall periodically log the values of the referenced properties on the interval defined by the Log_Interval, Align_Intervals, and Interval_Offset properties. If the Log_DeviceObjectProperty references a property external to the device, the Trend Log multiple shall optimize the collection of the value of the referenced property based on the Collection_Intervals property as specified in Clause 12.30.x1.

If the value AUTO_POLLED is written to this property when the value of Log_Interval is zero, the Log_Interval property shall be updated with an appropriate default polling interval. Determination of the appropriate default polling interval is a local matter.

[Change **12.30.13**, p. 359]

12.30.13 Log_Interval
This property, of type Unsigned, specifies the periodic interval in hundredths of seconds for which the referenced properties are to be logged when Logging_Type has the value POLLED *or AUTO_POLLED*. If Logging_Type has the value TRIGGERED, then the value of this property shall be zero and ignored.

This property shall be writable if Logging_Type has the value POLLED *or AUTO_POLLED* and shall be read-only if Logging_Type has the value TRIGGERED.

[Change **12.30.14**, p. 359]

12.30.14 Align_Intervals

This property, of type BOOLEAN, specifies whether (TRUE) or not (FALSE) clock-aligned periodic logging is enabled. If clock-aligned periodic logging is enabled and the value of Log_Interval is a factor of (i.e. it divides into without a remainder) a second, minute, hour or day, then the beginning of the period specified for logging shall be aligned to the second, minute, hour or day, respectively.

This property has no effect on the behavior of the Trend Log Multiple object if the *value of the Log_Interval property is zero*~~Logging_Type property has a value other than POLLED~~.

[Change **12.30.16**, p. 360]

12.30.16 Trigger

This property, of type BOOLEAN, shall cause the Trend Log Multiple object to *log a record*.

If the Logging_Type property is TRIGGERED, the Trend Log Multiple object shall collect ~~acquire~~ a log record whenever the value of this property is changed from FALSE to TRUE. It shall remain TRUE while the Trend Log Multiple object is *collecting* ~~acquiring~~ the data items for a log record. When all log data items have been collected or it has been determined that all outstanding data requests will not be fulfilled, the Trend Log Multiple object shall reset the value to FALSE.

If the value of the Logging_Type property is not TRIGGERED and an attempt is made to write the value TRUE to the Trigger property, it is left as a local matter whether to execute the logging operation or not. For devices that choose not to execute triggered logging when Logging_Type is not equal to TRIGGERED, attempts to write the value TRUE to this property when Logging_Type has a value other than TRIGGERED shall cause a Result(-) response to be issued, specifying an 'Error Class' of PROPERTY and an 'Error Code' of NOT_CONFIGURED_FOR_TRIGGERED_LOGGING.

Writing to the Trigger property is not restricted to network visible write operations; internal processes may control the acquisition of samples by writing to this property.

[Change **12.30.19**, p. 360]

12.30.19 Log_Buffer

This property, of type BACnetLIST of BACnetLogMultipleRecord, is a list of log records where each log record conveys either a set of recorded data values or errors related to data-collection, a status change in the Trend Log Multiple object, or an indication that the time and/or date was changed in the device hosting the Trend Log Multiple object.

Each log record has data fields as follows:

Timestamp *When Logging_Type is AUTO_POLLED the timestamp shall be the local date and time the logging object logs the record otherwise the timestamp shall be the* ~~The~~ local date and time when the logging object attempts to *acquire* ~~aquire~~ the record.

LogData A set of recorded data values or errors related to data-collection, a status change in the Trend Log Multiple object itself, or an indication that the time and/or date was changed in the device hosting the Trend Log Multiple object.

The choices available for LogData are listed below:

log-status This choice represents a change in the status or operation of the Trend Log Multiple object. Whenever one of the events represented by the flags listed below occurs, a log record shall be appended to the log buffer.

LOG_DISABLED This flag is changed whenever collection of log records by the Trend Log Multiple object is enabled or disabled. It shall be TRUE if Enable is FALSE, or the local time is outside the range defined by Start_Time and Stop_Time, or the addition of this log record will cause the log buffer to be full and Stop_When_Full is TRUE; otherwise it shall be FALSE.

BUFFER_PURGED — This flag shall be set to TRUE whenever the log buffer is cleared by writing zero to the Record_Count property, or due to a change to the Log_DeviceObjectProperty property. After this value is recorded in the Log buffer, the subsequent immediate change to FALSE shall not be recorded. A log record indicating the purging of the log buffer shall be placed into the log buffer even if logging is disabled, the local time is outside of the time range defined by the Start_Time and Stop_Time properties, or the log buffer was completely empty before the request for clearing.

LOG_INTERRUPTED — This flag indicates that the collection of log records by the Trend Log Multiple object was interrupted by a power failure, device reset, object reconfiguration or other such disruption, such that samples prior to this log record might have been missed.

log-data — The set of logged values. The order of logged values shall correspond to the order of the Log_DeviceObjectProperty array.

boolean-value
real-value
enumerated-value
unsigned-value
integer-value
bitstring-value
null-value — These choices represent the data values and datatypes read from the monitored object and property.

any-value — This choice represents the data values and datatypes read from the monitored object and property that are not specifically listed in LogDatum.

failure — This choice indicates either that an entry in the Log_DeviceObjectProperty array contains an object or device instance equal to 4194303, that a previously logged value was purged, or that an error was encountered in an attempt to read a data value from the monitored object. If the error is conveyed by an error response from a remote device, the Error Class and Error Code in the response shall be recorded. *If the monitored object is in an external device and an attempt to read a data value fails, an 'Error Class' and 'Error Code' from Clause 18.7 shall be recorded.*

time-change — This choice represents a change in the clock setting in the device; it records the number of seconds and fraction of a second by which the clock changed. If, and only if, the number is not known, such as when the clock is initialized for the first time, the value recorded shall be zero. This record shall be recorded after changing the local time of the device and the timestamp shall reflect the new local time of the device.

Also associated with each log record is an implied log record number, the value of which is equal to Total_Record_Count at the point where the log record has been added into the log buffer and Total_Record_Count has been adjusted accordingly. All clients shall be able to correctly handle the case where the log buffer is reset such that its Total_Record_Count is returned to zero and also the case where Total_Record_Count has wrapped back to one.

The log buffer is not network accessible except through the use of the ReadRange service, in order to avoid problems with record sequencing when segmentation is required.

If the object supports event reporting, then a reference to this property shall be the pLogBuffer parameter for the object's event algorithm. See Clause 13.3 for event algorithm parameter descriptions.

[Add **12.30.x1**, p. ???]

12.30.x1 Collection_Intervals

This property, of type BACnetARRAY of Unsigned, specifies the periodic intervals in hundredths of seconds for which the values of externally referenced properties are collected when Logging_Type has the value AUTO_POLLED.

If Logging_Type has the value AUTO_POLLED, each value in the array element of the Collection_Intervals array is the collection interval for the corresponding array element of the Log_DeviceObjectProperty. If the collection interval is greater than zero, the value of the referenced property shall be collected using polling at the interval specified by the collection interval. If the collection interval is zero, it is a local matter how, when, and how often the value of the referenced property is collected but could include polling, or COV subscriptions.

If the size of the Log_DeviceObjectProperty array is changed, the size of this property, if present, shall also be changed to the same size and any uninitialized array elements shall be given the value zero.

If Logging_Type is not AUTO_POLLED, this property shall be ignored.

If Log_DeviceObjectProperty references a property internal to the device, the corresponding entry in this property shall be ignored.

*[Insert into production **BACnetLoggingType** in **Clause 21**, p. 834]*

```
BACnetLoggingType ::= ENUMERATED {
        polled (0),
        cov (1),
        triggered (2),
        auto-cov (x),
        auto-polled (x+1),
        ...
}
-- 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.
```

[Change 21.6, p. 925]

BACnetPropertyIdentifier ::= ENUMERATED { -- see below for numerical order

```
        …
        collection-interval         (x),
        collection-intervals        (x+1),
        …
-- -numerical order reference
        …
        -- see collection-interval   (x),
        -- see collection-intervals  (x+1),
…
```