

# TRIDIUM NIAGARA<sup>AX</sup> 3.6 BACNET PICS

## BACnet Protocol Implementation Conformance Statement

**Date:** June 14, 2012

**Vendor Name:** Tridium

**Product Name:** Niagara AX BACnet Integration

**Product Model Number:** Tridium JACE models T-J-NXS-AX-x, T-NXT-xx

**Application Software Version:** 3.6.47 or higher

**Firmware Revision:** 3.6.47 or higher

**BACnet Protocol Revision:** 7

### Product Description:

Niagara AX provides the ability to view, monitor, and control BACnet devices over IP, raw Ethernet, or MS/TP media. Devices, points, schedules, alarms, and logs can be learned and managed from Niagara AX. In addition, Niagara points, schedules, histories, and alarming can be exposed to BACnet for monitor and control by foreign BACnet clients.

### BACnet Standardized Device Profile (Annex L):

- BACnet Advanced Operator Workstation (B-AWS)
- BACnet Operator Workstation (B-OWS)
- BACnet Operator Display (B-OD)
- BACnet Building Controller (B-BC)
- BACnet Advanced Application Controller (B-AAC)
- BACnet Application Specific Controller (B-ASC)
- BACnet Smart Sensor (B-SS)
- BACnet Smart Actuator (B-SA)

### Additional BACnet Interoperability Building Blocks Supported (Annex K):

| Data Sharing | Device & Network Management |
|--------------|-----------------------------|
| DS-RP-A, B   | DM-DDB-A, B                 |
| DS-RPM-A, B  | DM-DOB-A, B                 |
| DS-WP-A, B   | DM-DCC-B                    |
| DS-WPM-A, B  | DM-RD-B                     |
| DS-COV-A, B  | DM-TS-B                     |
| DS-COVU-A, B | DM-UTC-B                    |
| DS-V-A       | DM-LM-A, B                  |
| DS-M-A       | DM-BR-B                     |
| DS-COVP-B    | DM-ANM-A                    |
|              | DM-ADM-A                    |
|              | DM-ATS-A                    |
|              | DM-MTS-A                    |

|   |   |
|---|---|
| <b>Alarm &amp; Event Management</b><br>AE-N-A, -I-B<br>AE-ACK-A, B<br>AE-ASUM-B<br>AE-ESUM-B<br>AE-INFO-B<br>AE-VN-A<br>AE-VM-A | <b>Trending</b><br>T-VMT-I-B, -E-B<br>T-ATR-A, B<br>T-V-A |
| <b>Scheduling</b><br>SCHED-I-B, -E-B<br>SCHED-VM-A  | <b>Network Management</b><br>NM-CE-A                      |

### Segmentation Capability:

| Feature                     | Supported | Window size |
|-----------------------------|-----------|-------------|
| Transmit Segmented Messages | yes       | 10          |
| Receive Segmented Messages  | yes       | any         |

### Standard Object Types Supported:

- The CreateObject and DeleteObject services are not supported, so no objects are dynamically creatable or deletable through BACnet service requests, although these objects are dynamically creatable and deletable through Niagara.
- No general range restrictions exist; however, certain specific applications may have specific range restrictions.
- All potentially available properties are listed for each object type.
- Optional properties are listed in *italics*. Not all instances support all optional properties.
- Writable properties are listed in **bold**. Any range limitations are expressed in parentheses following the property name.

### Notes from Table

1. The File\_Size property of File objects is only writable if the underlying system file is changeable.
2. The Setpoint property of Loop objects is writable only if the setpoint is not linked from within Niagara.
3. The Recipient\_List property of the Notification Class object will maintain entries that are internally configured within Niagara.
4. The List\_Of\_Object\_Property\_References property of the Schedule object will maintain entries that are internally configured within Niagara.
5. The Priority\_For\_Writing property of Schedule objects is not important for internal Niagara operation, as the priority at which a point is commanded is determined by the input to which the Schedule output is linked.
6. These Trend Log object properties are not writable if the backing history for the exported Trend Log is a Niagara-generated history. If the history is created as a BACnet Trend Log, then they are writable.

| Object Type   | Properties  |
|---------------|---|
| Analog Input  | <p>Object_Identifier<br/> <b>Object_Name</b><br/> Object_Type<br/> Present_Value<br/> <b>Description</b><br/> Device_Type<br/> Status_Flags<br/> Event_State<br/> Reliability<br/> <b>Out_Of_Service</b><br/> Units<br/> Min_Pres_Value<br/> Max_Pres_Value</p> <p><i>Resolution</i><br/> <b>COV_Increment</b><br/> <b>Time_Delay</b><br/> <b>Notification_Class</b><br/> <b>High_Limit</b><br/> <b>Low_Limit</b><br/> <b>Deadband</b><br/> <b>Limit_Enable</b><br/> Event_Enable<br/> Acked_Transitions<br/> <b>Notify_Type</b><br/> Event_Time_Stamps</p>   |
| Analog Output | <p>Object_Identifier<br/> <b>Object_Name</b><br/> Object_Type<br/> Present_Value<br/> <b>Description</b><br/> Device_Type<br/> Status_Flags<br/> Event_State<br/> Reliability<br/> <b>Out_Of_Service</b><br/> Units<br/> Min_Pres_Value<br/> Max_Pres_Value<br/> Resolution</p> <p>Priority_Array<br/> <b>Relinquish_Default</b><br/> <b>COV_Increment</b><br/> <b>Time_Delay</b><br/> <b>Notification_Class</b><br/> <b>High_Limit</b><br/> <b>Low_Limit</b><br/> <b>Deadband</b><br/> <b>Limit_Enable</b><br/> Event_Enable<br/> Acked_Transitions<br/> <b>Notify_Type</b><br/> Event_Time_Stamps</p> |
| Analog Value  | <p>Object_Identifier<br/> <b>Object_Name</b><br/> Object_Type<br/> Present_Value<br/> <b>Description</b><br/> Status_Flags<br/> Event_State<br/> Reliability<br/> <b>Out_Of_Service</b><br/> Units<br/> Priority_Array<br/> <b>Relinquish_Default</b></p> <p><b>COV_Increment</b><br/> <b>Time_Delay</b><br/> <b>Notification_Class</b><br/> <b>High_Limit</b><br/> <b>Low_Limit</b><br/> <b>Deadband</b><br/> <b>Limit_Enable</b><br/> Event_Enable<br/> Acked_Transitions<br/> <b>Notify_Type</b><br/> Event_Time_Stamps</p>  |

| Object Type   | Properties  |
|---------------|---|
| Binary Input  | <p>Object_Identifier<br/> <b>Object_Name</b><br/> Object_Type<br/> Present_Value<br/> <b>Description</b><br/> Device_Type<br/> Status_Flags<br/> Event_State<br/> Reliability<br/> <b>Out_Of_Service</b><br/> Polarity<br/> <b>Inactive_Text</b><br/> <b>Active_Text</b></p> <p><i>Change_Of_State_Time</i><br/> <b>Change_Of_State_Count (0)</b><br/> <i>Time_Of_State_Count_Reset</i><br/> <b>Elapsed_Active_Time (0)</b><br/> <i>Time_Of_Active_Time_Reset</i><br/> <b>Time_Delay</b><br/> <b>Notification_Class</b><br/> <b>Alarm_Value</b><br/> Event_Enable<br/> Acked_Transitions<br/> <b>Notify_Type</b><br/> Event_Time_Stamps</p>   |
| Binary Output | <p>Object_Identifier<br/> <b>Object_Name</b><br/> Object_Type<br/> Present_Value<br/> <b>Description</b><br/> Device_Type<br/> Status_Flags<br/> Event_State<br/> Reliability<br/> <b>Out_Of_Service</b><br/> Polarity<br/> <b>Inactive_Text</b><br/> <b>Active_Text</b></p> <p><i>Time_Of_State_Count_Reset</i><br/> <b>Elapsed_Active_Time (0)</b><br/> <i>Time_Of_Active_Time_Reset</i><br/> <b>Minimum_Off_Time</b><br/> <b>Minimum_On_Time</b><br/> Priority_Array<br/> <b>Relinquish_Default</b><br/> <b>Time_Delay</b><br/> <b>Notification_Class</b><br/> Feedback_Value<br/> Event_Enable<br/> Acked_Transitions<br/> <b>Notify_Type</b><br/> Event_Time_Stamps</p> <p><i>Change_Of_State_Time</i><br/> <b>Change_Of_State_Count (0)</b></p> |
| Binary Value  | <p>Object_Identifier<br/> <b>Object_Name</b><br/> Object_Type<br/> Present_Value<br/> <b>Description</b><br/> Status_Flags<br/> Event_State<br/> Reliability<br/> <b>Out_Of_Service</b><br/> <b>Inactive_Text</b><br/> <b>Active_Text</b></p> <p><i>Change_Of_State_Time</i><br/> <b>Change_Of_State_Count (0)</b><br/> <i>Time_Of_State_Count_Reset</i></p> <p><b>Elapsed_Active_Time (0)</b><br/> <i>Time_Of_Active_Time_Reset</i><br/> <b>Minimum_Off_Time</b><br/> <b>Minimum_On_Time</b><br/> Priority_Array<br/> <b>Relinquish_Default</b><br/> <b>Time_Delay</b><br/> <b>Notification_Class</b><br/> <b>Alarm_Value</b><br/> Event_Enable<br/> Acked_Transitions<br/> <b>Notify_Type</b><br/> Event_Time_Stamps</p>                            |
| Calendar      | <p>Object_Identifier<br/> <b>Object_Name</b><br/> Object_Type</p> <p><b>Description</b><br/> Present_Value<br/> <b>Date_List</b></p>  |

| Object Type                  | Properties  |   |
|------------------------------|---|---|
| Device                       | Object_Identifier<br>Object_Name<br>Object_Type<br>System_Status<br>Vendor_Name<br>Vendor_Identifier<br>Model_Name<br>Firmware_Revision<br>Application_Software_Revision<br><b>Location</b><br><b>Description</b><br>Protocol_Version<br>Protocol_Revision<br>Protocol_Services_Supported<br>Protocol_Object_Types_Supported<br>Object_List<br>Max_APDU_Length_Accepted<br>Segmentation_Supported<br><i>Max_Segments_Accepted</i><br><i>Local_Time</i><br>Local_Date<br><i>UTC_Offset</i> | <i>Daylight_Savings_Status</i><br><i>APDU_Segment_Timeout</i><br>APDU_Timeout<br>Number_Of_APDU_Retries<br><b>Time_Synchronization_Recipients</b><br><i>Max_Master</i><br><i>Max_Info_Frames</i><br>Device_Address_Binding<br>Database_Revision<br><i>Configuration_Files</i><br><i>Last_Restore_Time</i><br><b>Backup_Failure_Timeout</b><br><i>Active_COV_Subscriptions</i><br><b>UTC_Time_Synchronization_Recipients</b><br><b>Time_Synchronization_Interval</b><br><b>Align_Intervals</b><br><b>Interval_Offset</b><br><i>proprietary-1338</i><br><i>proprietary-1339</i><br><i>proprietary-1340</i><br><i>proprietary-1341</i> |
| File<br>(Stream Access Only) | Object_Identifier<br><b>Object_Name</b><br>Object_Type<br><b>Description</b><br>File_Type   | <b>File_Size</b> <sup>1</sup><br>Modification_Date<br><b>Archive</b><br>Read_Only<br>File_Access_Method   |
| Loop                         | Object_Identifier<br><b>Object_Name</b><br>Object_Type<br>Present_Value<br><b>Description</b><br>Status_Flags<br>Event_State<br><i>Reliability</i><br><b>Out_Of_Service</b><br>Output_Units<br>Manipulated_Variable_Reference<br>Controlled_Variable_Reference<br>Controlled_Variable_Value<br>Controlled_Variable_Units<br>Setpoint_Reference<br><b>Setpoint</b> <sup>2</sup><br>Action<br><b>Proportional_Constant</b>  | <i>Proportional_Constant_Units</i><br><b>Integral_Constant</b><br><i>Integral_Constant_Units</i><br><b>Derivative_Constant</b><br><i>Derivative_Constant_Units</i><br><b>Bias</b><br><b>Maximum_Output</b><br><b>Minimum_Output</b><br>Priority_For_Writing<br><b>COV_Increment</b><br><b>Time_Delay</b><br><i>Notification_Class</i><br><b>Error_Limit</b><br><b>Deadband</b><br><i>Event_Enable</i><br><i>Acked_Transitions</i><br><i>Notify_Type</i><br><i>Event_Time_Stamps</i>   |

| Object Type        | Properties   |  |
|--------------------|--|--|
| Multi-state Input  | Object_Identifier<br><b>Object_Name</b><br>Object_Type<br>Present_Value<br><b>Description</b><br><i>Device_Type</i><br>Status_Flags<br>Event_State<br><i>Reliability</i><br><b>Out_Of_Service</b>                            | Number_Of_States<br><b>State_Text</b><br><b>Time_Delay</b><br><b>Notification_Class</b><br><b>Alarm_Values</b><br><i>Fault_Values</i><br><i>Event_Enable</i><br><i>Acked_Transitions</i><br><b>Notify_Type</b><br><i>Event_Time_Stamps</i>                                   |
| Multi-state Output | Object_Identifier<br><b>Object_Name</b><br>Object_Type<br><b>Present_Value</b><br><b>Description</b><br><i>Device_Type</i><br>Status_Flags<br>Event_State<br><i>Reliability</i><br><b>Out_Of_Service</b><br>Number_Of_States | <b>State_Text</b><br><i>Priority_Array</i><br><b>Relinquish_Default</b><br><b>Time_Delay</b><br><b>Notification_Class</b><br><i>Feedback_Value</i><br><i>Event_Enable</i><br><i>Acked_Transitions</i><br><b>Notify_Type</b><br><i>Event_Time_Stamps</i>                      |
| Multi-state Value  | Object_Identifier<br><b>Object_Name</b><br>Object_Type<br><b>Present_Value</b><br><b>Description</b><br>Status_Flags<br>Event_State<br><i>Reliability</i><br><b>Out_Of_Service</b><br>Number_Of_States                       | <b>State_Text</b><br><i>Priority_Array</i><br><b>Relinquish_Default</b><br><b>Time_Delay</b><br><b>Notification_Class</b><br><b>Alarm_Values</b><br><i>Fault_Values</i><br><i>Event_Enable</i><br><i>Acked_Transitions</i><br><b>Notify_Type</b><br><i>Event_Time_Stamps</i> |
| Notification Class | Object_Identifier<br><b>Object_Name</b><br>Object_Type<br><b>Description</b>   | Notification_Class<br><b>Priority</b><br><b>Ack_Required</b><br><b>Recipient_List</b> <sup>3</sup>   |
| Schedule           | Object_Identifier<br><b>Object_Name</b><br>Object_Type<br>Present_Value<br><b>Description</b><br><b>Effective_Period</b><br><i>Weekly_Schedule</i>   | <b>Exception_Schedule</b><br><b>Schedule_Default</b><br><b>List_Of_Object_Property_References</b> <sup>4</sup><br><b>Priority_For_Writing</b> <sup>5</sup><br>Status_Flags<br>Reliability<br><b>Out_Of_Service</b>   |

| Object Type     | Properties  |  |
|-----------------|---|--|
| Trend Log       | Object_Identifier<br><b>Object_Name</b><br>Object_Type<br><b>Description</b><br><b>Log_Enable</b> <sup>6</sup><br><b>Start_Time</b><br><b>Stop_Time</b><br><i>Log_DeviceObjectProperty</i><br><i>Log_Interval</i> <sup>6</sup><br>Stop_When_Full<br>Buffer_Size<br>Log_Buffer<br><b>Record_Count (0)</b> <sup>6</sup> | Total_Record_Count<br><i>Notification_Threshold</i><br><i>Records_Since_Notification</i><br><i>Last_Notify_Record</i><br>Event_State<br><b>Notification_Class</b><br><i>Event_Enable</i><br><i>Acked_Transitions</i><br><b>Notify_Type</b><br><i>Event_Time_Stamps</i><br>Logging_Type<br>Status_Flags |
| Structured View | Object_Identifier<br><b>Object_Name</b><br>Object_Type<br><b>Description</b>  | Node_Type<br><i>Node_Subtype</i><br>Subordinate_List<br><i>Subordinate_Annotations</i>   |

**Data Link Layer Options:**

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) \_\_\_\_\_
- MS/TP master (Clause 9), baud rate(s): \_\_\_\_\_
- MS/TP slave (Clause 9), baud rate(s): \_\_\_\_\_
- Point-To-Point, EIA 232 (Clause 10), baud rate(s): \_\_\_\_\_
- Point-To-Point, modem, (Clause 10), baud rate(s): \_\_\_\_\_
- LonTalk, (Clause 11), medium: \_\_\_\_\_
- Other:

**Device Address Binding:**

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.)  Yes  No

**Networking Options:**

- Router, Clause 6 – Routing configurations: Ethernet-IP
- Annex H, BACnet Tunneling Router over IP
- BACnet/IP Broadcast Management Device (BBMD)  
 Does the BBMD support registrations by Foreign Devices?  Yes  No

**Character Sets Supported:**

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- |   |   |  |
|---|---|--|
| <input checked="" type="checkbox"/> ANSI X3.4         | <input type="checkbox"/> IBM™/Microsoft™ DBCS | <input checked="" type="checkbox"/> ISO 8859-1 |
| <input checked="" type="checkbox"/> ISO 10646 (UCS-2) | <input type="checkbox"/> ISO 10646 (UCS-4)    | <input type="checkbox"/> JIS C 6226            |



**If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports:**

This product supports communications between BACnet and any third-party system to which Niagara can connect. Contact Tridium for a list of supported protocols.

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