White Paper: What is a B-AWS and Why is it Important?

In 2001 the BACnet® committee published profiles for a number of different kinds of BACnet devices, from simple "Smart Sensors" to complex "Building Controllers" and "Operator Workstations." These device profiles spell out the minimum BACnet capabilities required of a device to claim conformance.

With the experience gained over subsequent years, and through seeing ever more varied BACnet workstation implementations, it became clear that having a single device profile for workstations was no longer sufficient for the market. In 2009 the BACnet committee published two new workstation profiles in "Addendum l"[1] to BACnet-2008. The three resulting profiles, the profile name by which they are known, and the preface of their descriptions in Addendum l are presented below in Table 1.

Table 1. The three BACnet Workstation profiles

Name	Profile	Extract from Addendum l Description
BACnet Advanced Workstation	B-AWS	"The B-AWS is the advanced operator's window into a BACnet system."
BACnet Operator Workstation	B-OWS	"The B-OWS is an operator interface with limited capabilities relative to a B-AWS."
BACnet Operator Display	B-OD	"The B-OD is a basic operator interface with limited capabilities relative to a B-OWS."

As Addendum l suggests, the B-OD is generally intended for wall-mounted displays, hand-held terminals and very simple user interfaces. The B-OWS is a more sophisticated operator interface in a BACnet system that is used for daily monitoring, basic control and simple modification of a system, but it is not required to support configuration activities or to provide advanced troubleshooting capabilities. The B-AWS profile establishes a minimum level of capability to support advanced operations; as Addendum l notes, it "may be used for configuration activities that are beyond the scope of this standard."

The specific requirements that differentiate the three profiles are lengthy and complex. However, the B-OD display profile is significantly different from the two workstation profiles, so this paper will focus on the essential elements that differentiate the B-AWS from the B-OWS, summarizing them and their importance to simplify the job of specifying BACnet workstations.

Addendum l organizes the workstation requirements into several "interoperability areas" defined in Clause 22 of the BACnet standard: data sharing, alarm and event management, scheduling, trending and device management. For simplicity, this paper uses the same organization.

Data Sharing

"Data sharing" is defined as the exchange of information between BACnet devices. For workstations there are two functions that distinguish the B-AWS from the B-OWS: retrieving values from devices and presenting them to the operator, and modifying settings presented in standard BACnet properties.

Addendum l defines a basic set of properties from each of the standard object types that are required to be displayed by a B-OWS. These properties were chosen to reflect the object's core functionality. For example, a B-OWS is required to read and present an Analog Input's Object_Name (the name of the object, such as "Room 23 Temp"), Present_Value (temperature), Units and Status_Flags (its status).

A B-AWS, on the other hand, is required to read and present all standard properties of all standard objects except Life Safety and Access Control objects. Additional requirements for presenting minimum ranges for numeric values and sizes for character strings are also placed on the B-AWS; these are not defined for the B-OWS.

Similar requirements are made for modifying values. A B-OWS has a very limited set of properties defined for each object it is required to write, thus modifying the value; it has defined ranges and sizes of values it must write. As stated above, a B-AWS is required to read and present all standard properties of all standard objects except Life Safety and Access Control objects.

Alarm and Event Management

In BACnet "alarms" and events" are identical except that notifications for alarms have a flag that says the notification will be considered an alarm instead of an event. In "alarm and event management," the B-AWS and B-OWS have different requirements for receiving and displaying alarm and event notifications, and for configuring objects that generate alarms and events. For simplicity, this paper will subsequently use "alarms" to refer to both alarms and events.

When presenting alarm notifications to the user, the B-OWS is only required to identify the object that caused the

1 Officially "ANSI/ASHRAE Addendum l to ANSI/ASHRAE Standard 135-2008," downloadable from http://www.ashrae.org/technology/page/20.

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notification, plus the time and the first 32 characters of the text message, if any, conveyed in the notification. The B-AWS is required to present many more parameters conveyed in the notification, such as the object's new state—normal, offnormal or fault—and property values that resulted in the alarm, such as the reading from a temperature sensor, plus up to 255 characters of the text message.

In modifying alarm configurations, there are a few specific properties of several specified objects that a B-OWS is required to present to the operator and to be able to modify; for example, it must be able to adjust the high and low alarm limits of an Analog Input object. It is also allowed to restrict the kinds of alarms it can configure to those related to analog values as opposed to on/off or multiple-state values.

The B-AWS has many more requirements placed on it, including the ability to create and delete alarm-related objects in other devices, a much larger set of objects and properties for which presentation and modification is required, and all standard alarm types intended for operator notification.

Finally, the B-AWS is required to support Event Log objects—objects that record alarm histories—in other devices. This support includes the ability to display the objects' alarm histories and to modify the Event Log collection parameters.

Scheduling

In BACnet scheduling is done using Calendar and Schedule objects. A Calendar object simply indicates whether today's date is in a list of dates within the object; for example, company holidays. A Schedule object maintains a repeating weekly schedule, with "exception schedules" that can override a day's schedule in part or completely; for example, scheduling a conference room to be in "occupied" mode for the duration of a scheduled meeting. Changes in the scheduled status are written to pre-defined properties within the device or to other devices.

The B-OWS device is required to present and modify the core properties of Calendar and Schedule objects, in particular weekly schedules, exception schedules and lists of dates. It is only required to support three data types including analog and multistate values.

The B-AWS devices has additional requirements—including the ability to create and delete Calendar and Schedule objects—and a much larger set of properties for which presentation and modification are required.

Trending

In BACnet trending, or trend-logging, is performed by two objects: the Trend Log object and the Trend Log Multiple object. Both objects collect time-stamped data, either periodically or from change-of-value notifications, but the Trend Log object collects data from one property of one object, in one device, somewhere in the system. The Trend Log Multiple object can collect data from multiple properties, from multiple objects and from multiple devices in the system.

The B-OWS is only required to collect and present trend data from Trend Log and Trend Log Multiple[2] objects.

The B-AWS has a much more comprehensive set of requirements, including the ability to create and delete Trend Log, Trend Log Multiple and Event Enrollment[3] objects, and to adjust a number of data collection parameters in Trend Log and Trend Log Multiple objects.

Device and Network Management

The BACnet standard defines the Device and Network Management interoperability area as "the exchange of data between BACnet devices concerning the operation and status of [the] devices." This includes a number of different types of operations. Although there are some common requirements for both the B-OWS and B-AWS, all the requirements mentioned here apply only to the B-AWS; they are not required of the B-OWS.

The first requirement of the B-AWS is that it be able to find and present a list of all BACnet devices—at least those that support BACnet's Who-Is/I-Am device locator capability[4]—currently connected to the BACnet system.

The next requirement is that the B-AWS must be able to present a list of all objects in a particular device.

The third requirement of the B-AWS is that it be able to send a message called "DeviceCommunicationsControl" to another device, instructing the latter device to stop sending messages for a specified time or to restart sending them earlier. Password support may be required for this operation.

2 Trend Log Multiple only if the B-OWS conforms to the BACnet standard as of October 2008, when the Trend Log Multiple object was added. This conformance is designated "Protocol_Revision ≥ 7."

3 Some implementations may use Event Enrollment objects to send notifications that the log object's buffer is filling.

4 Which most BACnet devices do. This capability is specified as DM-DDB-B.

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The fourth requirement of the B-AWS appeared earlier in this paper: the ability to create and delete objects in other devices.

The fifth requirement is that the B-AWS must be able to instruct other devices to restart using BACnet's "ReinitializeDevice" command.

Finally, the B-AWS must be able to back up and restore the configuration of other devices using BACnet's "Backup and Restore" capability.

Summary

The B-OWS and B-AWS BACnet workstations offer relatively similar features. It is likely that B-OWS workstations will incorporate many of the features required of B-AWS workstations, though the range of requirements between the two types of workstations is not a small one. This requires some care when comparing the capabilities of B-OWS and B-AWS workstations, particularly in the areas noted above.

Bill Swan is Buildings Standards Initiatives Leader for Alerton in Redmond, Washington. He served as chairman of the BACnet Committee from 2004–2008, and continues to fill a variety of roles relating to ASHRAE and the BACnet standard.

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