



Connect

Identifying Devices with
BACnet issues



Make sure that an Agent Tag exists and is selected

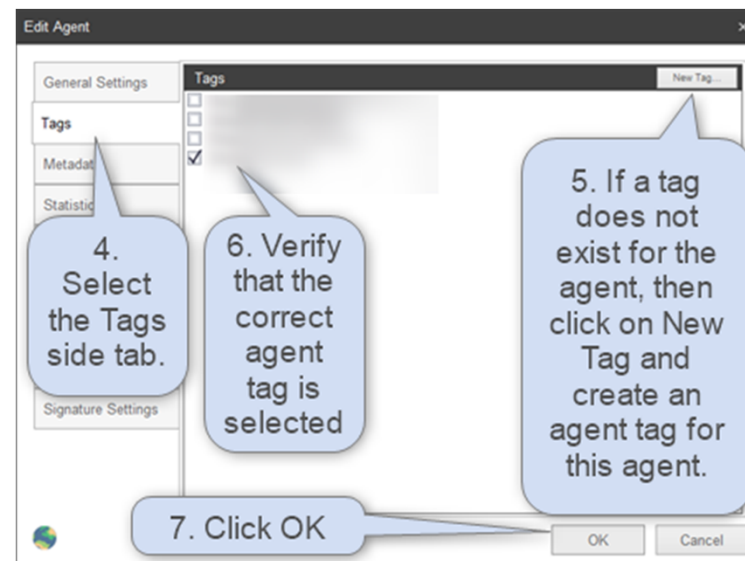
Open the properties window for the desired agent.

The screenshot shows the Connect 2018 software interface. The main window is titled "Connect 2018" and has a menu bar with "New Device", "Properties", "Delete", "Refresh", "Scan", and "Export List". Below the menu bar is a tree view of devices. A callout box labeled "1. Select Configuration Explore" points to the "Configuration Explore" icon in the menu bar. A second callout box labeled "2. Select the desired agent." points to a row in the device list with ID "2118021". A third callout box labeled "3. Select Properties" points to the "Properties" button in the right-hand pane. The right-hand pane shows the "General Settings" dialog box for the selected agent. The dialog box has a "Name" field, a "Connection" dropdown menu set to "BACnetIP", and a "Disable Logging" checkbox. The "OK" and "Cancel" buttons are at the bottom right of the dialog box.



Make sure that an Agent Tag exists and is selected

Verify or add an agent tag in the desired agent.





Setting the Agent filter in Dynamic View

Verify or add an agent tag in the desired agent. This will prevent the Show All/List tool from scanning objects in other agents.

The screenshot shows the Connect 2018 software interface with five numbered callouts indicating the steps to set an agent filter:

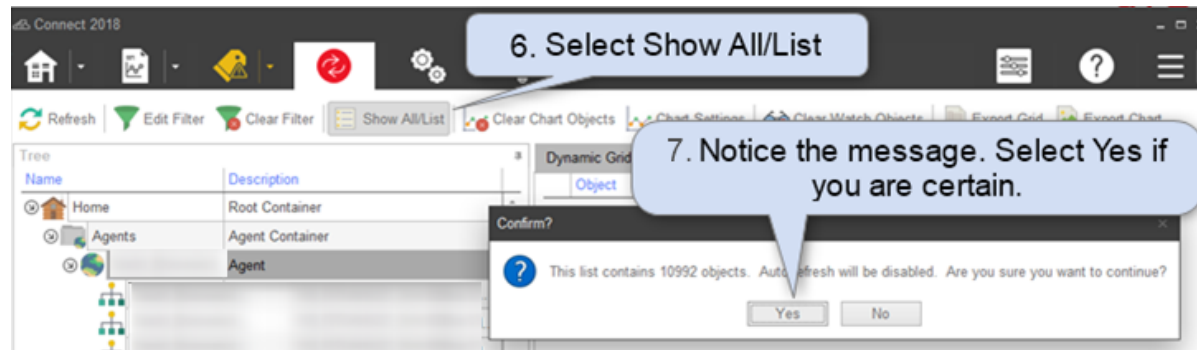
1. Select Dynamic View: A callout points to the Dynamic View icon in the top toolbar.
2. Verify the correct agent is selected: A callout points to the 'Agents' folder in the left-hand tree view.
3. Select Edit Filter: A callout points to the 'Edit Filter' button in the top toolbar.
4. Select the desired agent tag: A callout points to a checked checkbox in the 'Agent Tags' list within the 'Agent Filters' dialog box.
5. Click Ok: A callout points to the 'OK' button at the bottom of the 'Agent Filters' dialog box.

The 'Agent Filters' dialog box also shows 'Match Any' selected under the 'Match' options at the bottom.



Using Show All/List in Dynamic View

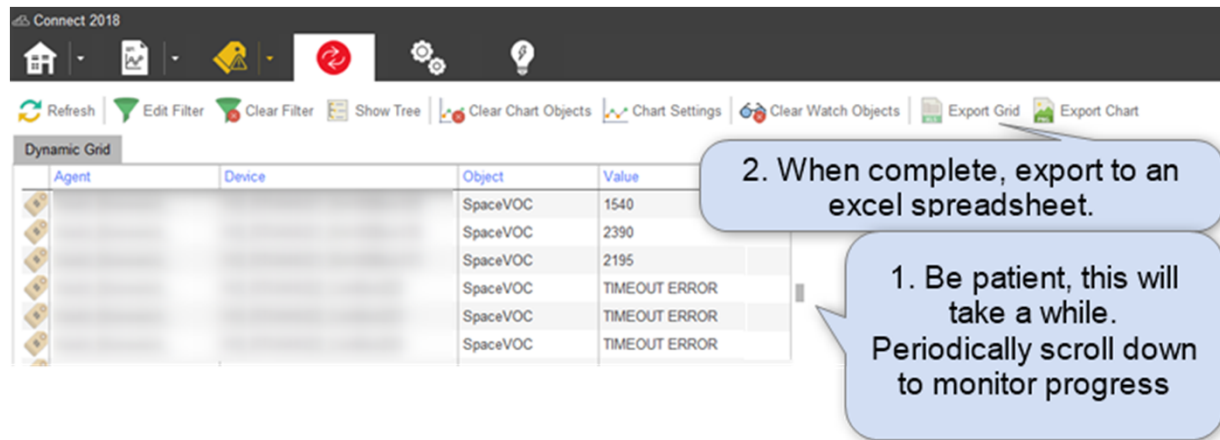
This will poll every single object in every single device in the filtered list. Make sure that this is applied to ONE agent at a time. This will poll each object ONE time only. This will take a few minutes to complete when the object list is large.





Using Show All/List in Dynamic View

Once the list is complete and all objects have returned a value, then export the list to an excel spreadsheet



Dynamic Grid

Agent	Device	Object	Value
		SpaceVOC	1540
		SpaceVOC	2390
		SpaceVOC	2195
		SpaceVOC	TIMEOUT ERROR
		SpaceVOC	TIMEOUT ERROR
		SpaceVOC	TIMEOUT ERROR

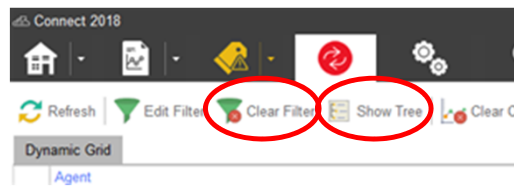
2. When complete, export to an excel spreadsheet.

1. Be patient, this will take a while. Periodically scroll down to monitor progress



Important!! -- Show All/List and Filtering is sticky in Dynamic View

Once the grid is exported to an excel spreadsheet. Always select Show Tree and Clear Filter. These settings are sticky and will not clear automatically.



Don't forget!



Using Excel to sort and filter to find object timeouts.

Once the list has been exported to an excel spreadsheet. Using excel filtering and sorting to identify the objects and devices with issues.

Sort by device

Agent	Device	Object	Value
	RTU_01_Flr_1	AirFlwSw	1
	RTU_01_Flr_1	AirFlwWrSw	1
	RTU_01_Flr_1	ControlTemp	70 9913
	RTU_01_Flr_1	DAClgSetpt	TIMEOUT ERROR
	RTU_01_Flr_1	DischAirTemp	TIMEOUT ERROR
	RTU_01_Flr_1	DuctStaticSP	TIMEOUT ERROR
	RTU_01_Flr_1	DuctStatPress	TIMEOUT ERROR
	RTU_01_Flr_1	EconoStatus	TIMEOUT ERROR
	RTU_01_Flr_1	FltOccup	TIMEOUT ERROR
	RTU_01_Flr_1		TIMEOUT ERROR
	RTU_01_Flr_1		100
	RTU_01_Flr_1	mp	TIMEOUT ERROR
	RTU_01_Flr_1	nceTmp	TIMEOUT ERROR
	RTU_01_Flr_1	McQuayStatus	0
	RTU_01_Flr_1	OccCoolSP	72
	RTU_01_Flr_1	OccHeatSP	70
	RTU_01_Flr_1	OutdoorTemp	TIMEOUT ERROR
	RTU_01_Flr_1	RATemp	70 9913
	RTU_01_Flr_1	SpaceTemp	72 25024
	RTU_01_Flr_1	UnoccCoolSetpt	78
	RTU_01_Flr_1	UnoccHeatSetpt	60

One device

Some objects return values and some objects do not in the time allowed. There may be a BACnet communication issue or these objects may not exist and contain valid values in this device.

In this image we can see that in this device some object values are taking too long to return a value. Rediscover the objects in this device to verify that they do exist and contain valid values. If they do exist and have valid values, then the BACnet network is suspect. APDU timeouts could be extended but this will lead to increasing the overall site scan time. No point in increasing the timeout for objects that do not exist and therefore will never return a value.



Using Excel to sort and filter to find device timeouts.

Once the list is complete and all objects have returned a value, then export the list to an excel spreadsheet. Using excel filtering and sorting to identify the objects and devices with issues.

1	Agent	Device	Object	Value
10961		5-ACUNIT	temperature	Device Timeout
10962		5-ACUNIT	ISSI	Device Timeout
10963		5-ACUNIT	PowerMeasurement	Device Timeout
10964		5-ACUNIT	voltageMeasurement	Device Timeout
10965		5-ACUNIT	currentMeasurement	Device Timeout
10966		5-ACUNIT	reliabilityCountDownlasttimecommunicated15	Device Timeout
10967		5-ACUNIT	temperatureMeasurementEnabled	Device Timeout
10968		5-ACUNIT	relayState	Device Timeout
10969		5-ACUNIT	CommandedRelayState	Device Timeout
10970		5-ACUNIT	HardwareSwitchDisable	Device Timeout
10971		5-ACUNIT	ToggleviaSwitchEnable	Device Timeout

In this image we can see that the device is not responding at all. This is a device timeout. Something has changed in the BACnet network. The BACnet network must be examined to determine why the MiniAgent can no longer communicate with this device.



Using Excel to sort and filter to find incorrect profile application.

Once the list is complete and all objects have returned a value, then export the list to an excel spreadsheet. Using excel filtering and sorting to identify the objects and devices with issues.

Agent	Device	Object	Value
401	03_Gym	SpaceH	58.0174
402	03_Gym	SPACEPcalc	72.9
403	03_Gym	SpaceT	70.14706
404	03_Gym	SUMMER	OBJECT - UNKNOWN_OBJECT
405	03_Gym	VOC	5000
406	03_Gym	VOCSp	2800
407	03_Gym	ZNOCC	OBJECT - UNKNOWN_OBJECT
408	04_Gym	ChWV	0
409	04_Gym	ChWVfdbk	0
410	04_Gym	DASP	65
411	04_Gym	DAT	76.08823

One device

These objects do not exist in this device and should be removed. This device may require a different or new profile.

In this image we can see that the device responds OBJECT-UNKNOWN_OBJECT when it is polled for an object name/object ID value that does not exist in this device. Usually this indicates that a profile was incorrectly applied to this device. The profile object set does not match this device object set.



About BACnet Advanced Settings – Read Multiple

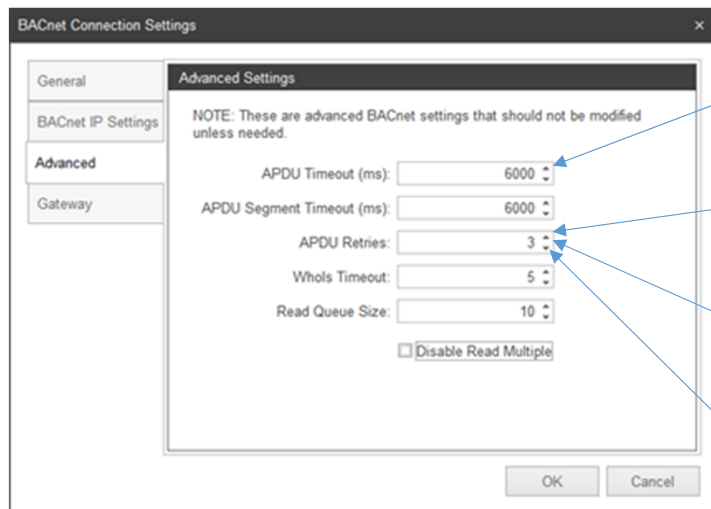
“Read Multiple” literally means more than one object value at a time can be requested in a single packet. Some devices support this, other devices do not. If any device in the network does not support “Read Multiple” then “Read Multiple” must be disabled.

The screenshot shows the 'BACnet Connection Settings' dialog box with the 'Advanced Settings' tab selected. The 'Advanced' tab is highlighted in the left sidebar. The main area contains a note: 'NOTE: These are advanced BACnet settings that should not be modified unless needed.' Below the note are several settings with dropdown menus: 'APDU Timeout (ms): 6000', 'APDU Segment Timeout (ms): 6000', 'APDU Retries: 3', 'Whols Timeout: 5', and 'Read Queue Size: 10'. At the bottom of the settings area, the checkbox 'Disable Read Multiple' is checked and circled in red. 'OK' and 'Cancel' buttons are located at the bottom right of the dialog box.



About BACnet Advanced Settings – Application Packet Data Unit

The IP packet mentioned in the previous slides can be thought of as the APDU – Application Packet Data Unit. When a request for BACnet data is sent by the MiniAgent, a timer is engaged. That is the APDU Timeout. If a response is not returned within the time allowed. The MiniAgent will retry “resend”. This process will continue until either a response is received, or all retries have executed.



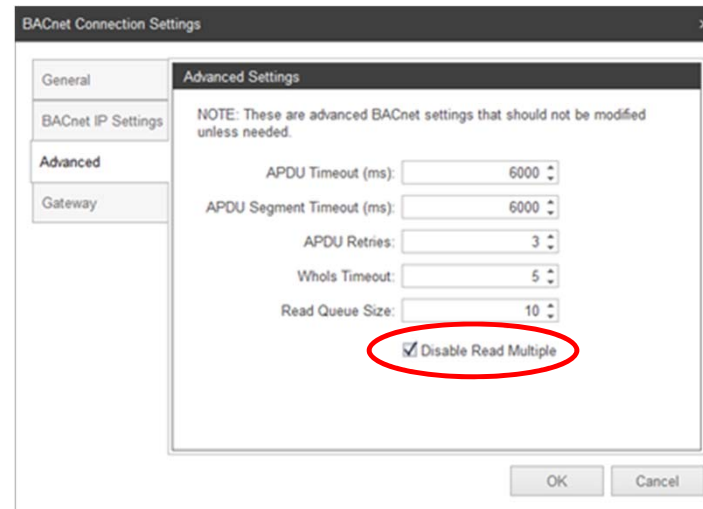
1. Send a BACnet message, Wait 6 seconds for a response.
2. Retry 1 – Repeat the BACnet message, Wait 6 seconds for a response.
3. Retry 2- Repeat the BACnet message, Wait 6 seconds for a response.
4. Retry 3- Repeat the BACnet message, Wait 6 seconds for a response.

Consider how incorrect profiles which poll for objects that do not exist and will never respond, have a detrimental affect on overall scan times. Leading to increased %Load and possible loss of real data.



About BACnet Advanced Settings – Segmentation

“Segmentation” is needed when a single bacnet message contains more data than one single IP packet can hold, then the message can be segmented into multiple IP packets by the source device that supports segmentation and the receiving device that also support segmentation can recombine the segmented IP packets into one BACnet message. If any device in the network does not support “Segmentation” then “Read Multiple” must be disabled.

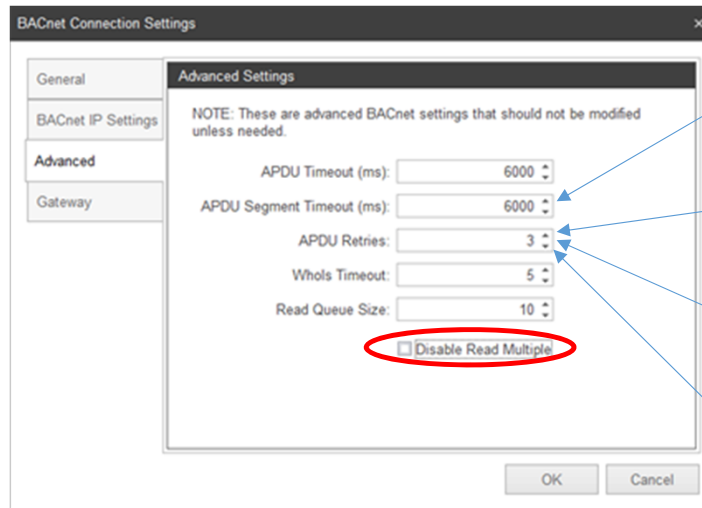


BACnet devices are supposed to negotiate segmentation between each other automatically. Different devices may also have different APDU packet size capabilities and as a result different segmentation capabilities. Sometimes things go wrong.



About BACnet Advanced Settings – Segmentation

When a segmented request for BACnet data is sent by the MiniAgent, a timer is engaged. That is the APDU Segment Timeout. If a response is not returned within the time allowed. The MiniAgent will retry “resend”. This process will continue until either a response is received, or all retries have executed.



1. Send a Segmented BACnet message, Wait 6 seconds for a Segmented response.
2. Retry 1 - Repeat the Segmented BACnet message, Wait 6 seconds for a Segmented response.
3. Retry 2- Repeat the Segmented BACnet message, Wait 6 seconds for a Segmented response.
4. Retry 3- Repeat the Segmented BACnet message, Wait 6 seconds for a Segmented response.

If the site contains missed samples or high percent load. Examine the overall poll scan time for the last hour or so. Then select the Disable Read Multiple check box. If performance improves, it is possible some devices either do not support segmentation or have a small packet size limitation.



THANK YOU