Understanding BACnet Virtual Device Addressing

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1   Introduction

This Document Applies to the Following Products:

Any MSA FieldServer product that implements multiple BACnet server nodes on a single physical device.

1.1   Explanation of BACnet Virtual Device Addressing

Annex H.2 of the BACnet specification defines a mechanism by which a physical device with a single MAC address can be configured with multiple BACnet device objects. This is achieved by configuring the device to act as a router to a "virtual network" that is internal to the device. A BACnet Network Number (DNET) is assigned to this virtual network, and each BACnet device is associated with a unique virtual MAC address on this virtual network (this is its DADR), so that it appears on the BACnet network with a unique DNET/DADR pair, i.e. a unique BACnet address.

The MAC addresses generated by this internal virtual network are neither BACnet MS/TP nor IP MAC addresses. They are only used as virtual MAC addresses on the internal virtual network, which knows how to interpret them. They do not ever appear on any external physical network as MAC addresses. Everywhere else in the BACnet network they appear as network addresses (DNET or SNET), which are independent of the physical medium.

The FieldServer's internal virtual network uses 6-byte MAC addresses which are the same size as Ethernet addresses, which are also possible in BACnet networks, and which would appear as network addresses on the other side of a router in exactly the same way.

Any external BACnet device that needs to communicate with a virtual device would do so via the virtual router, which is reachable on the external MAC address of the device, and would specify the DNET/DADR BACnet address of the device as part of the Network Protocol Control Information (NPCI) header of the BACnet message.

This implementation of virtual networks has been tested and approved by the BACnet Testing Laboratories (BTL).