



IP Broadcasts are not routed...

One of the stated design goals is that **a BACnet network can be composed of more than one IP subnet** so that large campus-like installations don't consume a multitude of network numbers. As the Internet grew beyond a trivial number of nodes, one of the first things done to trim traffic was to ensure that **broadcasts are not routed**. Many of BACnet's capabilities, such as dynamic name binding and unsolicited change-of-value notification, stem from the use of broadcast messages, so there needs to be a way to support them in a distributed network

This problem has come up before on the Internet, so one of our first thoughts was to search for an existing standard. The Internet Group Membership Protocol (IGMP) is specifically designed for multipoint multicast communications. Its design is based on work on the Multicast backBONE (MBONE) used to distribute audio and video teleconferencing.

The basic idea behind IGMP is that devices not only have a class A, B, or C address, but also respond to class D addresses. Class D addresses, where the upper bits of the IP address are '1.1.1.1.0...', are managed by routers similar to other IP addresses, except that a packet may be forwarded to more than one destination, possibly on different subnets.

There are a number of advantages to using IGMP:

- the engineering work has already been done
- support is available in commercial routers
- software for adding IGMP to an existing network is free and available over the Internet.

As usual, there are also a number of disadvantages:

- the throughput considerations are for real-time audio and video teleconferencing, overkill for BACnet applications
- additional software for IGMP support in routers (where it is available) is expensive
- the free software is for UNIX-based machines, not likely to be used for BACnet applications
- there is no support for SLIP or PPP nodes unless the entire subnet is enabled for IGMP

...so enter the BACnet Broadcast Management Device (BBMD)!

Given the low-volume considerations and non-ubiquitous availability of IGMP, we decided that although BACnet/IP should support the use of multicast as an option, another simpler mechanism was needed. To this end, a new device was created, coined a "**BACnet Broadcast Management Device**" (**BBMD**) by Jim Butler, which

receives broadcast messages on one subnet and forwards them to another subnet.
But how should be BBMDs be networked?