

BACnet/IP in Detail

- BACnet/IP Overview
- Essential Packet Types
- Foreign Device Registration
- BACnet Broadcast Management Device
- NAT and IPv6

BACnet/IP Overview

- UDP/IP on port 47808 (0xBAC0)
- NDPDU, APDU same as others
- MAC address is IP Address, Port Number
- Unicast, Broadcast
- BACnet Ethernet, BACnet/IP Share Wire

BACnet/IP Packet

0x81	BVLC Type	1 octet
BVLC Function		1 octet
Length (inclusive)		2 octets, most significant octet first, includes BVLC Type and Function.
Optional BVLC data		} Varies depending on the BVLC Function
Optional NPDU		
Optional APDU		

Essential Packet Types

- Original-Unicast-NPDU (0x0A)
- Original-Broadcast-NPDU (0x0B)
- Forwarded-NPDU (0x04)

Original-Unicast-NPDU

0x81	BVLC Type	1 octet
0x0A	BVLC Function	1 octet
Length (inclusive)		2 octets, most significant octet first, includes BVLC Type and Function.
NPDU		} Variable Length
APDU		

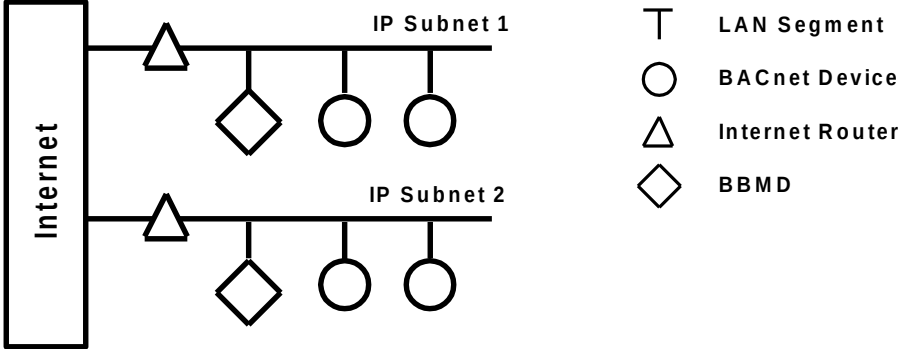
Original-Broadcast-NPDU

0x81	BVLC Type	1 octet
0x0B	BVLC Function	1 octet
Length (inclusive)		2 octets, most significant octet first, includes BVLC Type and Function.
NPDU		} Variable Length
APDU		

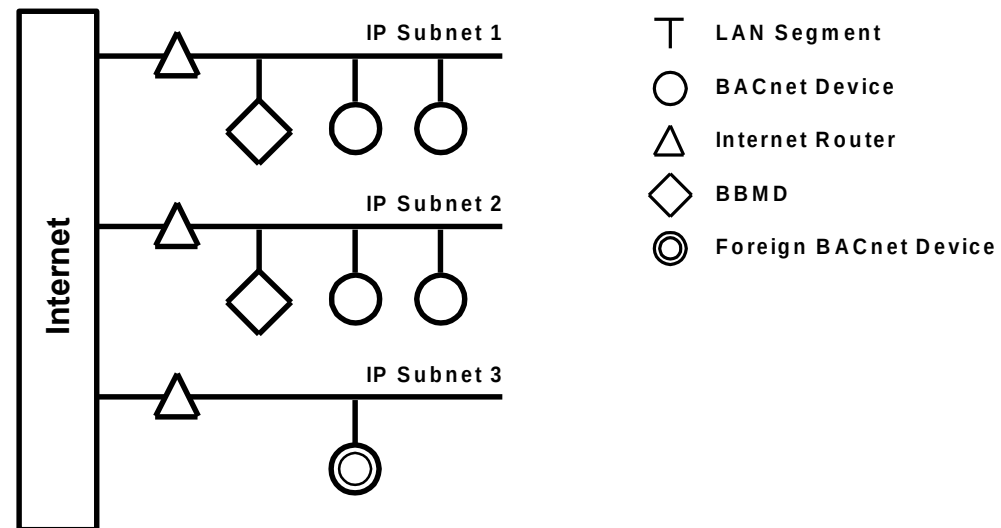
Forwarded-NPDU

0x81	BVLC Type	1 octet
0x04	BVLC Function	1 octet
Length (inclusive)		2 octets, most significant octet first, includes BVLC Type and Function.
BACnet/IP Address of Originating Device		4 octets
0xBA	IP Port Number of Originating Device	2 octets (port number may vary)
0xC0		
NPDU		} Variable Length
APDU		

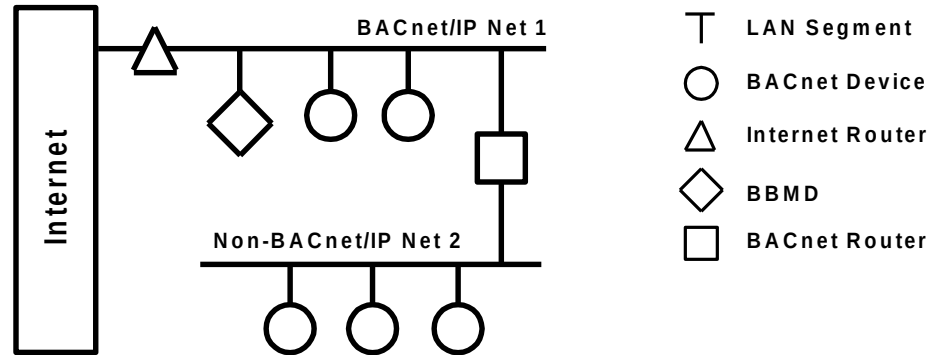
Broadcast Management



Foreign Device Registration

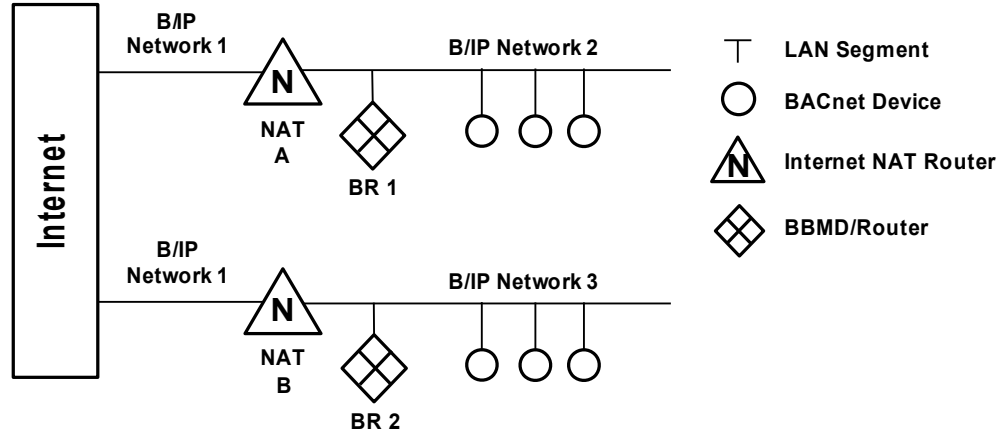


BACnet/IP Routing



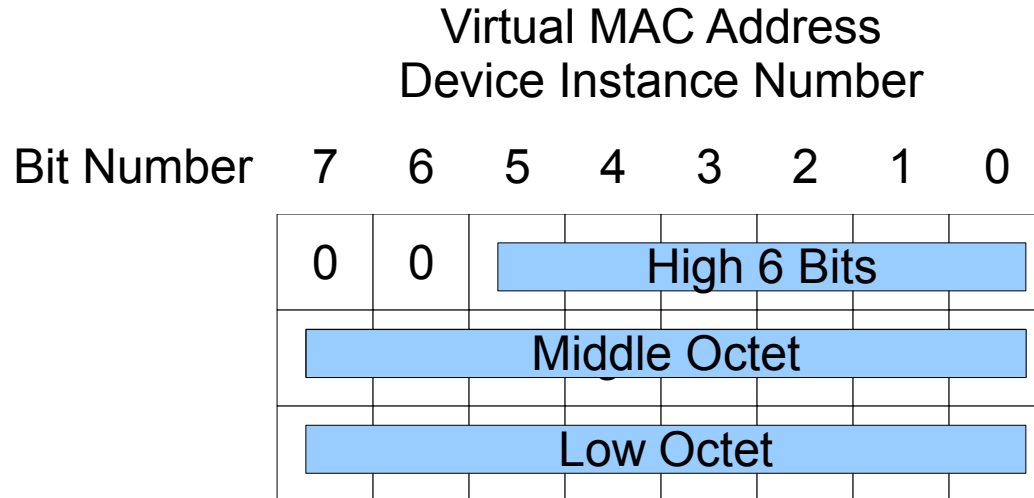
BACnet/IP and NAT

135-2004 Addendum o
Accommodates remote operator access via Annex J
BACnet/IP through NAT firewalls.



BACnet/IPv6

135-2004 Addendum q
Define virtual addressing for data links with MAC
addresses longer than 6 octets



Default UDP port:
47808 (X'BAC0')
Configurable:
47808-47832, 49152-65535

BACnet/IPv6

135-2012 Addendum aj
Define BVLC for IPv6
VMAC additions

Address	Scope	Purpose
FF00::BAC0	Reserved	Do not use.
FF01::BAC0	Interface-local/Node-local	Packets with this destination address may not be sent over any network link, but must remain within the current node; this is the multicast equivalent of the unicast loopback address.
FF02::BAC0	Link-local	Used to reach all B/IPv6 devices on the directly attached link. This scope is not routable by IPv6 routers.
FF03::BAC0	Reserved	Do not use.
FF04::BAC0	Admin-local	The smallest scope that must be administratively configured.
FF05::BAC0	Site-local	Restricted to the local physical network. Used to reach all B/IPv6 devices at the same site.
FF08::BAC0	Organization-local	Intended to span multiple sites belonging to a single organization.
FF0E::BAC0	Global	Intended to be routed over the public Internet.

BACnet/IPv6

B/IPv6 BVLL Messages

BVLC	Function
X'00'	BVLC-Result
X'01'	Original-Unicast-NPDU
X'02'	Original-Broadcast-NPDU
X'03'	Address-Resolution
X'04'	Forwarded-Address-Resolution
X'05'	Address-Resolution-ACK
X'06'	Virtual-Address-Resolution
X'07'	Virtual-Address-Resolution-ACK
X'08'	Forwarded-NPDU
X'09'	Register-Foreign-Device
X'0A'	Delete-Foreign-Device-Table-Entry
X'0B'	Secure-BVLL
X'0C'	Distribute-Broadcast-To-Network

BACnet/IPv6 Packet

0x82	BVLC Type	1 octet
BVLC Function		1 octet
Length (inclusive)		2 octets, most significant octet first, includes BVLC Type and Function.
Optional BVLC data		} Varies depending on the BVLC Function
Optional NPDU		
Optional APDU		