FieldServer Webinar Series
Why and When to Use BACnet Routing
By Richard Theron, Product Manager
Agenda

• Introduction
• Brief History of BACnet
• Why and When to Use a BACnet Router
• “How To” Problem Solving
• Configuration
• Diagnostics
• Summary
Introduction

- Founded in 1979
- Listed on US Stock Exchange - SRMC
- HQ in Milpitas, Silicon Valley
- ~$20M Revenue and 65+ employees
- Sales offices around the world

SMC addresses the industrial and commercial facilities management market with Industrial Internet of Things (IIoT) solutions that connect and protect high-value infrastructure assets.
FieldServer’s Experience

• 150,000+ FieldServer protocol gateways installed worldwide
• 140 protocols supported
• Applications
  ▪ Building Automation
  ▪ Industrial Automation
  ▪ Energy Management
  ▪ Remote Monitoring
• Examples
  ▪ Empire State Building
    • Energy management
    • Tennant metering into cloud
  ▪ Levi’s Stadium
    • Fume hood integration
    • Water reticulation integration
History of BACnet

- 1987 first meeting
- 1995 ASHRAE/ANSI Standard
- 2000 BTL formed
- 2003 Conformance Standards published
- Ongoing working groups
- The BACnet protocol defines a number of services that are used to communicate between devices
- A Gateway moves messages between application layers, while a **Router** moves messages between Network layers
Why and When to Use a BACnet Router

• Why
  ▪ To reduce installation costs
  ▪ To reduce MS/TP latency
  ▪ To have a transparent BACnet network from a single work station

• When
  ▪ Cost of installation is an issue
    • Installation time and cabling
    • Additional Controllers
  ▪ Current BACnet/IP infrastructure is installed
  ▪ Ethernet drops are available
How To: Connect a Slower MS/TP Device

• Problem
  - My MS/TP trunk runs at 38,400, but I want to connect a device that only runs at 19,200
    - 38,400 is very common
    - But several devices use 9,600, 19,200 or 76,800

• Solution
  - Use a FieldServer BACnet Router with two RS-485 ports
  - The low-speed device needs to be a Master that responds to Who Is
How To: Connect Remote MS/TP Trunks

• Problem
  - I have a long distance between RS-485 trunks on my campus
  - Costly alternatives
    - Cost of line drivers and cabling – if using RS-485 to interconnect
    - Cost of adding controller at each site – if using IP to interconnect

• Solution
  - Use two back to back FieldServer BACnet Routers over the LAN or WAN
  - BACnet/IP runs seamlessly over the LAN/WAN
• **Problem**
  - I need to keep my costs down and have a good response time from 64 MS/TP devices

• **Solution**
  - Install a FieldServer BACnet Router with 2 x RS-485 ports
  - Response time is halved when the MS/TP network is split by two RS-485 ports

How To: Connect 64 Devices to My Network
How To: Connect Legacy Ethernet Devices

• Problem
  ▪ I don’t want to replace my BACnet Ethernet controllers, but I need them on my BACnet/IP network
  ▪ BACnet Ethernet does not support BBMD
  ▪ BACnet Ethernet does not go through
    • Routers
    • Firewalls

• Solution
  ▪ Install a FieldServer BACnet Router
How To: Manage Multi-Trunk MS/TP Network

• Problem
  ▪ I need to have visibility and control of all devices from my front end system
  ▪ The MS/TP devices are in different buildings behind firewalls
  ▪ My manager told me to keep my costs as low as possible without compromising network reliability or security
  ▪ Adding and installing BBMD-capable controllers to each MS/TP trunk is a costly solution

• Solution
  ▪ Connect BACnet MS/TP trunks with a FieldServer BACnet Router to the BACnet/IP network
  ▪ BACnet BBMD works well with Firewalls and IP Routers by distributing BACnet broadcasts
How To: Manage a Multi-Site Network

• Problem
  ▪ I need to have visibility and control of all devices from my front end system
  ▪ I don’t have BBMD on all my existing devices

• Solution
  ▪ Install a FieldServer BACnet Router with BBMD
  ▪ MDIX ensures seamless integration
• Problem
  ▪ I have to install a BACnet router and then prove that all BACnet devices on the network are communicating, in order to get a sign off on my project

• Solution
  ▪ Install a FieldServer BACnet Router
  ▪ Use the DeviceFind™ feature to discover and list communicating BACnet devices
  ▪ Click a button to export a CSV file that lists all installed and discovered BACnet devices
## Diagnostics

### DeviceFind™

- **Network**: Green
- **Low Device Instance**: 
- **High Device Instance**: 

**Discovery process received 3 responses**

The device list treats BACnet IP Primary as the local segment (Network 0)

<table>
<thead>
<tr>
<th>Device</th>
<th>Vendor ID</th>
<th>Organization</th>
<th>Network</th>
<th>Address</th>
<th>Router Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>37</td>
<td>Sierra Monitor Corporation/FieldServer Technologies</td>
<td>0</td>
<td>192.168.3.12:47808</td>
<td>BACnet IP Primary</td>
</tr>
<tr>
<td>11</td>
<td>37</td>
<td>Sierra Monitor Corporation/FieldServer Technologies</td>
<td>0</td>
<td>192.168.3.230:47808</td>
<td>BACnet IP Primary</td>
</tr>
<tr>
<td>1000</td>
<td>37</td>
<td>Sierra Monitor Corporation/FieldServer Technologies</td>
<td>0</td>
<td>192.168.3.100:47808</td>
<td>BACnet IP Primary</td>
</tr>
</tbody>
</table>

### BACnet IP Primary

- **Network Number**: 1
- **Info Statistics**: 
  - Messages Received: 2666
  - Messages Sent: 239

**Routing Table**

<table>
<thead>
<tr>
<th>Device</th>
<th>MAC Address</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>192.168.3.230:47808</td>
<td>Available</td>
</tr>
<tr>
<td>50</td>
<td>192.168.3.101:47808</td>
<td>Available</td>
</tr>
</tbody>
</table>
BACnet Router Review

Multiple BACnet Routing Options

- BACnet/IP ↔ BACnet MS/TP
- BACnet MS/TP ↔ BACnet Ethernet
- BACnet MS/TP ↔ BACnet MS/TP
- BACnet/IP ↔ BACnet MS/TP
- BACnet/IP ↔ BACnet Ethernet

Ease of Use

- Web-based configuration – one easy to use page
- DeviceFind™ – find all the devices connected to the BACnet Router and export this list for site verification, all from the simple web interface
- BACnet Broadcast Management Device (BBMD) routing between different networks
- NAT support with secondary BACnet/IP connection for routing between public and private IP networks

Performance

- With 2 x RS-485 ports, the polling rate of MS/TP devices can be halved compared to a Router with only one RS-485 port
Thank You

Call 408 262-2299 or e-mail sales@sierramonitor.com for additional application questions or visit www.sierramonitor.com

To learn about the BACnet router use cases, visit http://www.sierramonitor.com/connect/all-protocol-gateway-products/fieldserver-bacnet-router