

# FieldServer Webinar Series

## Why and When to Use BACnet Routing

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# 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

## CONNECT Protocol Gateways



## PROTECT Fire & Gas Detection Solutions



**SentryIT**

# FieldServer's Experience

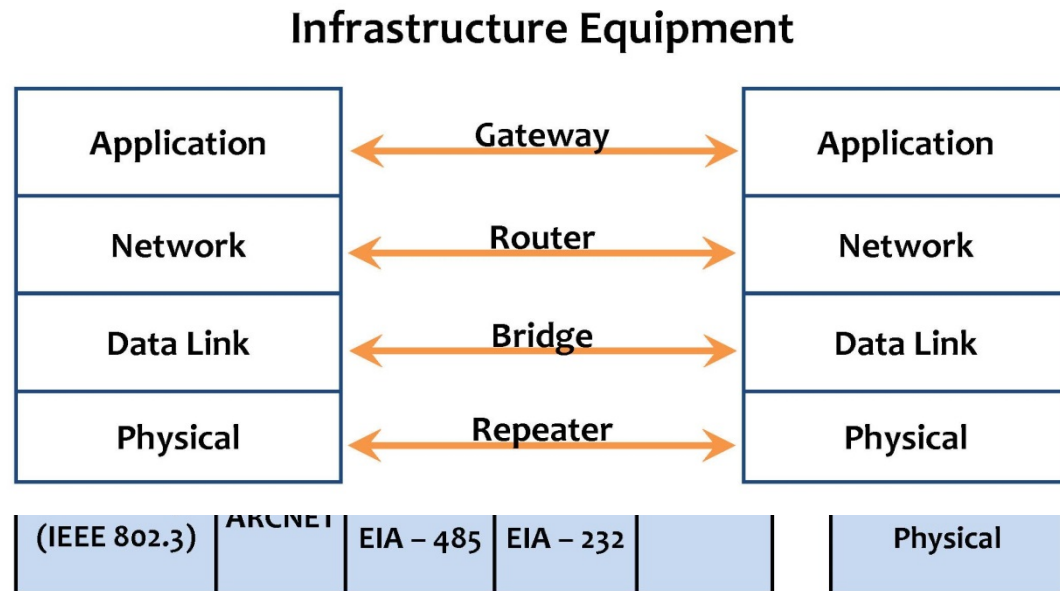
- 150,000+ FieldServer protocol gateways installed worldwide
- 140 protocols supported
- Applications
  - Building Automation
  - Industrial Automation
  - Energy Management
  - Remote Monitoring
- Examples
  - Empire State Building
    - Energy management
    - Tenant metering into cloud
  - Levi's 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

## BACnet Collapsed Architecture



# 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

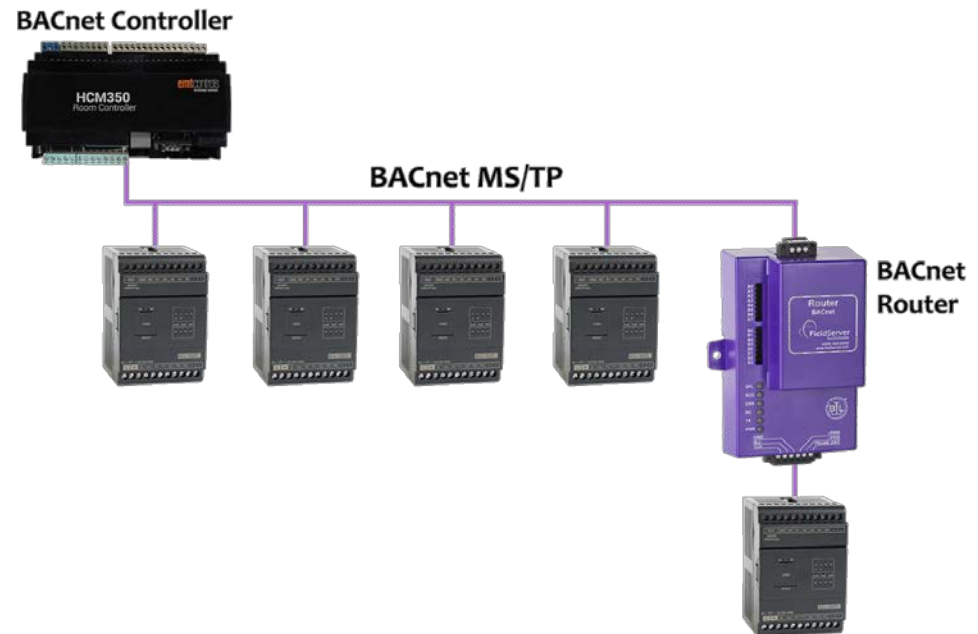
# How To: Connect a Slower MS/TP Device

- 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





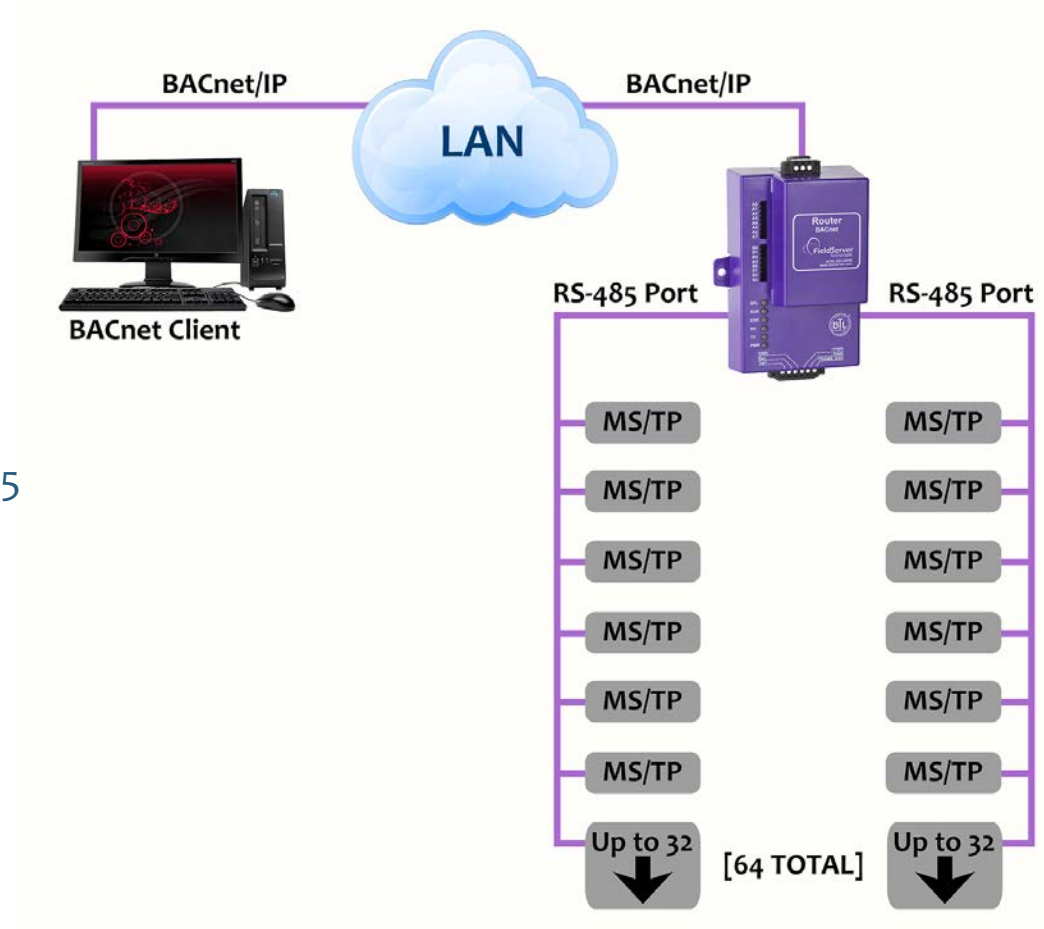
# How To: Connect 64 Devices to My Network

- 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



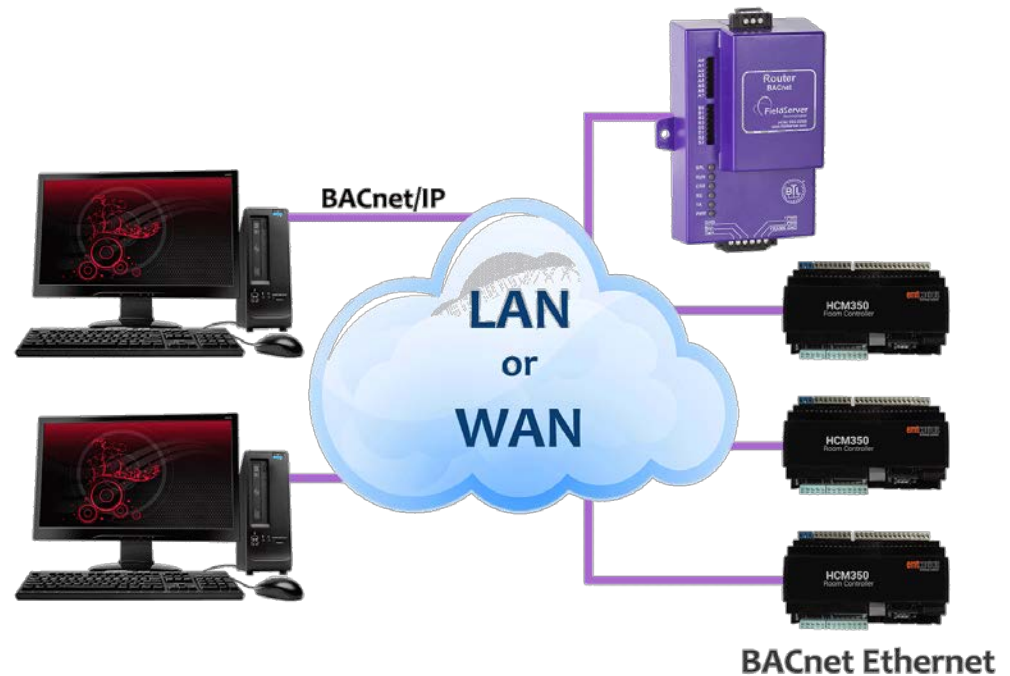
# How To: Connect Legacy Ethernet Devices

- 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



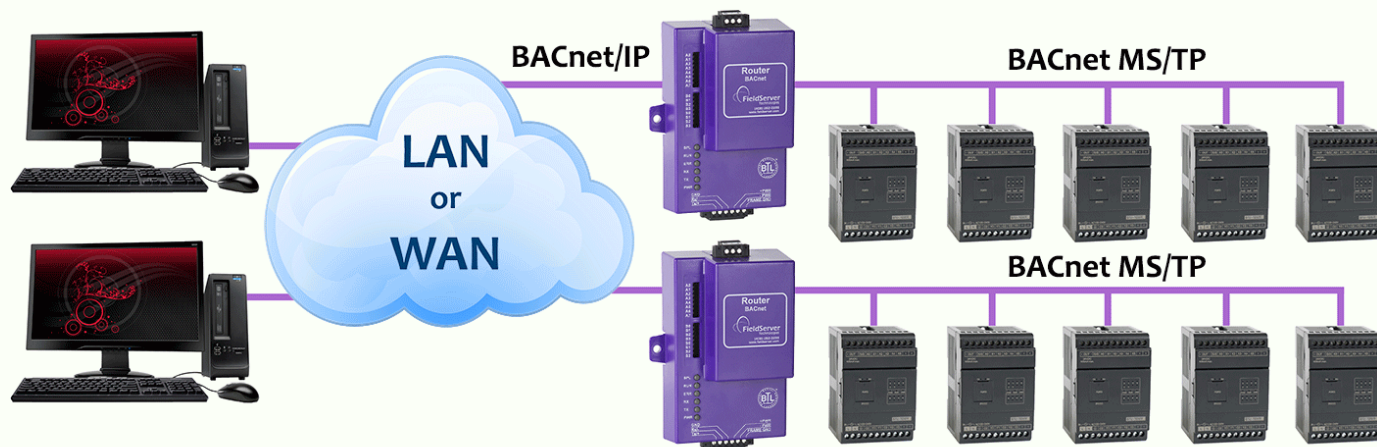
# How To: Manage Multi-Trunk MS/TP Network

## • 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



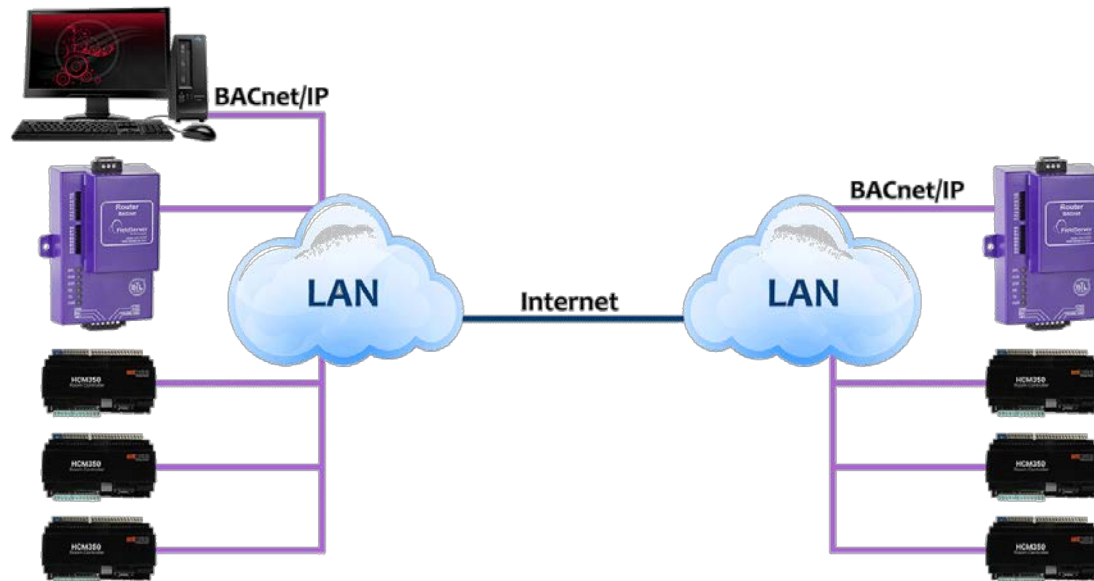
# How To: Manage a Multi-Site Network

- 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



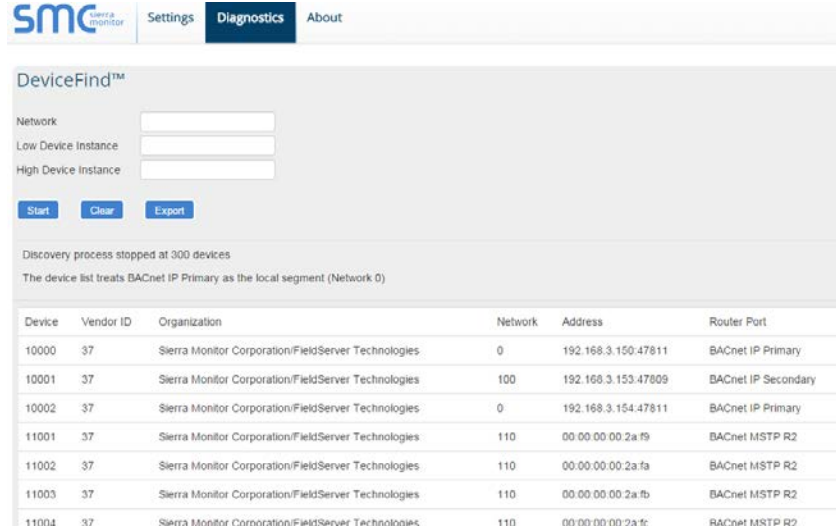
# How To: Validate Successful Commissioning

## • 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



The screenshot shows the 'DeviceFind™' web interface. At the top, there are tabs for 'Settings', 'Diagnostics' (which is active), and 'About'. Below the tabs, there are input fields for 'Network', 'Low Device Instance', and 'High Device Instance'. Below these fields are three buttons: 'Start', 'Clear', and 'Export'. Below the buttons, there is a message: 'Discovery process stopped at 300 devices' and 'The device list treats BACnet IP Primary as the local segment (Network 0)'. Below this message is a table with the following data:

Device	Vendor ID	Organization	Network	Address	Router Port
10000	37	Sierra Monitor Corporation/FieldServer Technologies	0	192.168.3.150.47811	BACnet IP Primary
10001	37	Sierra Monitor Corporation/FieldServer Technologies	100	192.168.3.153.47809	BACnet IP Secondary
10002	37	Sierra Monitor Corporation/FieldServer Technologies	0	192.168.3.154.47811	BACnet IP Primary
11001	37	Sierra Monitor Corporation/FieldServer Technologies	110	00:00:00:00:2a:f9	BACnet MSTP R2
11002	37	Sierra Monitor Corporation/FieldServer Technologies	110	00:00:00:00:2a:fa	BACnet MSTP R2
11003	37	Sierra Monitor Corporation/FieldServer Technologies	110	00:00:00:00:2a:fb	BACnet MSTP R2
11004	37	Sierra Monitor Corporation/FieldServer Technologies	110	00:00:00:00:2a:fc	BACnet MSTP R2

192.168.3.150/app/bac\_router/bac\_router.htm#/settings



Settings

Diagnostics

About

Network Settings

IP Address

192.168.3.150

Netmask

255.255.255.0

Default Gateway

192.168.3.1

DHCP Client

☐

DHCP Server

☐

Edit Password

BACnet IP Primary

Network Number

1

IP Port

47808

Device Instance

1000

Device Name

BACnet Router

Device Location

-

BACnet IP Secondary

Enable

☐

Network Number

2

IP Port

47809

Enable BBMD

☒

Public IP Address

-

Public IP Port

-

Edit BDT

BACnet MSTP Settings

Max Info Frames

50

Max Master

127

BACnet MSTP R1

Enable

☒

Network Number

3

MAC Address

0

Baud Rate

38400

Token Usage Timeout (ms)

50

BACnet MSTP R2

Enable

☐

Network Number

4

MAC Address

0

Baud Rate

38400

Token Usage Timeout (ms)

50

BACnet Ethernet

Enable

☐

Network Number

5

Controls

Reload

Defaults

Save

Restart


Status

Router is online

Log


Powered by

FieldServer



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[Settings](#)
[Diagnostics](#)
[About](#)

## DeviceFind™

Network

Low Device Instance

High Device Instance

Start

Clear

Export

Discovery process received 3 responses

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

Device	Vendor ID	Organization	Network	Address	Router Port
1	37	Sierra Monitor Corporation/FieldServer Technologies	0	192.168.3.12:47808	BACnet IP Primary
11	37	Sierra Monitor Corporation/FieldServer Technologies	0	192.168.3.235:47808	BACnet IP Primary
1000	37	Sierra Monitor Corporation/FieldServer Technologies	0	192.168.3.150:47808	BACnet IP Primary

## BACnet IP Primary

Network Number

1

Info Statistics

Messages Received

2666

Messages Sent

239

Routing Table

DNET	MAC Address	Status
5	192.168.3.235:47808	Available
50	192.168.3.101:47808	Available



## Multiple BACnet Routing Options

- BACnet/IP  $\leftrightarrow$  BACnet MS/TP
- BACnet MS/TP  $\leftrightarrow$  BACnet Ethernet
- BACnet MS/TP  $\leftrightarrow$  BACnet MS/TP
- BACnet/IP  $\leftrightarrow$  BACnet/IP
- BACnet/IP  $\leftrightarrow$  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](mailto:sales@sierramonitor.com) for additional application questions or visit [www.sierramonitor.com](http://www.sierramonitor.com)

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