FT 6000 and BACnet FT

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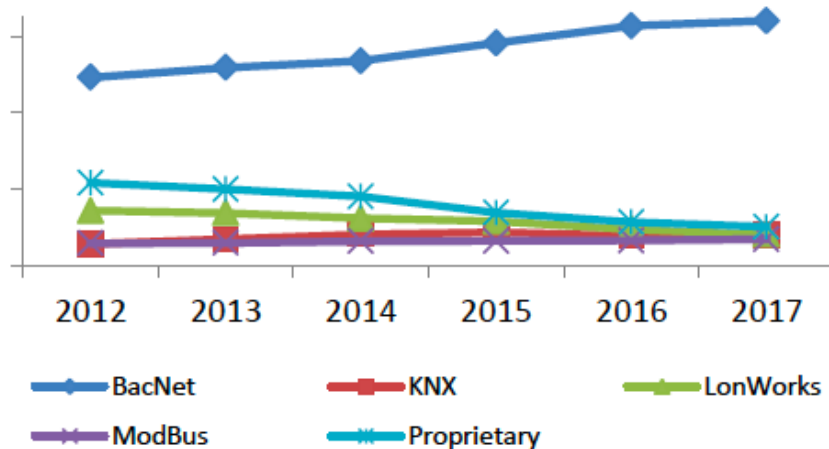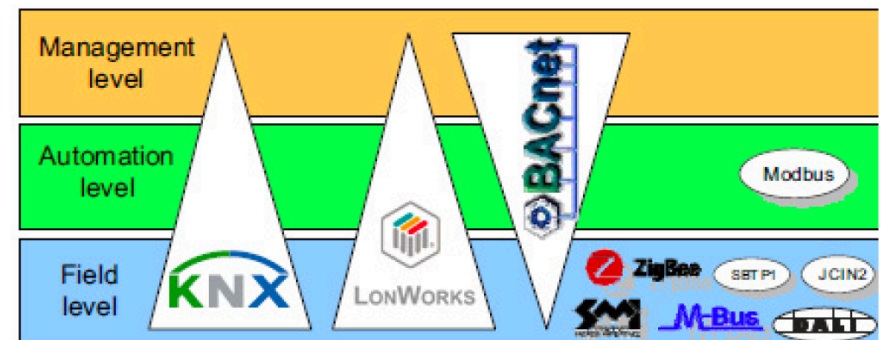
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Market Need for BACnet FT

Multiple protocols in the Buildings Market … BACnet holds a dominant position in global Building Automation market

BACnet and LON have their advantages. BACnet was designed with tops-down HMI integration in mind while LON was designed from the bottom up device/application interoperability.
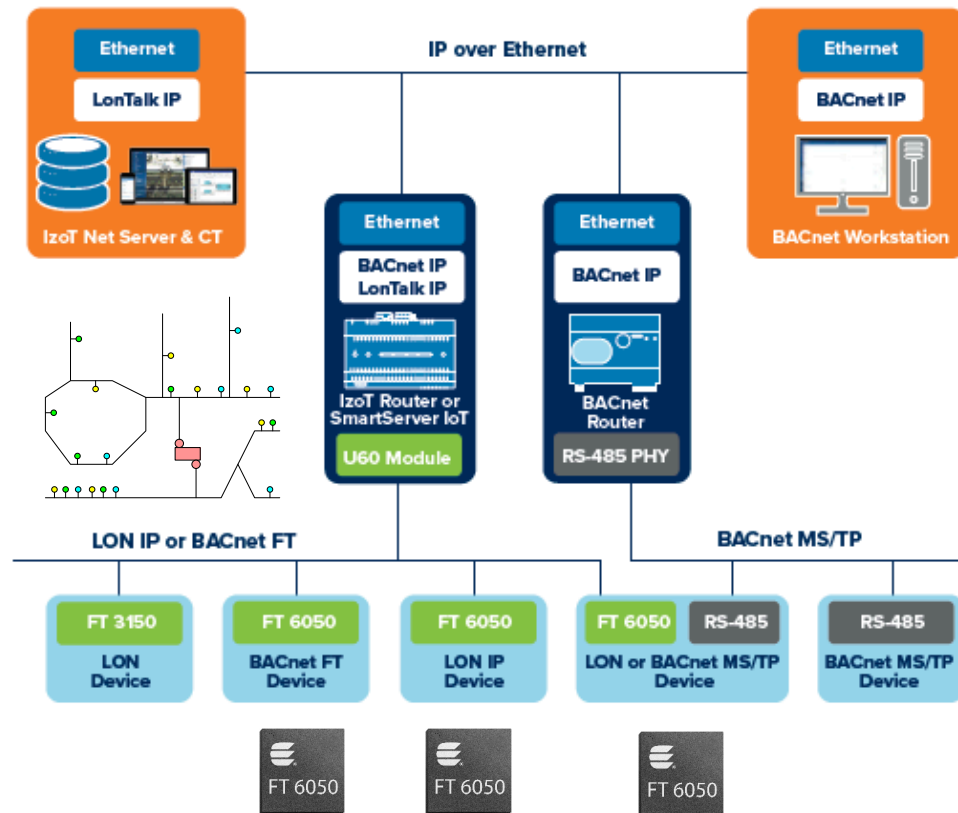

BacNet — KNX — LonWorks
ModBus — Proprietary

BA Device TAM: 50-70M/year

We have a solution to reduce the cost of ownership of BACnet networks and solve interoperability between LON and BACnet

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FT 6000 Series Chips Combine BACnet and LON over FT

- FT 6000 devices simultaneously provide a LON, LON IP, BACnet IP Server, and BACnet MS/TP Server interface

- Supported BACnet Object types
  - Analog Input – sensor input
  - Analog Output – control output
  - Binary Input – switch input
  - Binary Output – relay output

- Supported BACnet BIBBs—can be BTL certified
  - Application-specific Controller
  - Smart Sensor
  - Smart Actuator

- Other BACnet features
  - Read Property Multiple
  - Change of Value (COV)
  - BACnet/IP and BACnet MS/TP support

FT 6000 Multi-Protocol Smart Transceiver

FT 6050

- LON
- LON IP
- BACnet IP
- MS/TP

FT6010

- LON IP
- BACnet IP
- MS/TP

- ◆ Improves performance vs. the Series 3100
  - – Up to 8x effective clock speed increase over Series 3100
  - – Up to 254 network variables
  - – Up to 254 address table entries
  - – Dedicated interrupt processor
  - – Hardware multiplier
- ◆ Supports multiple protocols
  - – LonTalk/IP and classic LON
  - – BACnet/IP and BACnet MS/TP
- ◆ Supports larger applications
  - – Up to 256KB for applications

- ◆ Low power 3.3V design
- ◆ Reduces board footprint
  - – 7mm x 7mm 48-pin QFN
- ◆ Reduces memory cost
  - – On-chip 64KB RAM and 16KB ROM
  - – Requires low-cost (< $0.35) external 8-pin SOIC serial flash memory
    - • Including AT25SF041/AT5SF081
- ◆ More cost effective
  - – Up to a 50% cost reduction vs. the Series 3100
  - – Eliminates external serial EEPROM required by the Series 5000
- ◆ -40°C to +85°C

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Advantages of FT as BACnet or LON media

- **Versus MSTP**
  - Substantially improves noise immunity
  - Substantially reduces installation complexity
    - Error prone commissioning: 3 wires, polarity sensitive, double termination, dip switch addressing, baud rate selection…
  - Increased devices per channel and maximum wiring distance
  - Fault tolerant
  - Link power support
  - Simpler debugging

- **Versus Ethernet**
  - Eliminates home run wiring or limited number of hops
  - Improves noise immunity
  - Eliminates heavy IT involvement during installation
    - Reduces need for DHCP leases per device
    - Removes additional IT costs
      - Uplink switches and VLAN
  - Error free commissioning; Reduces risks of un-managed IP devices
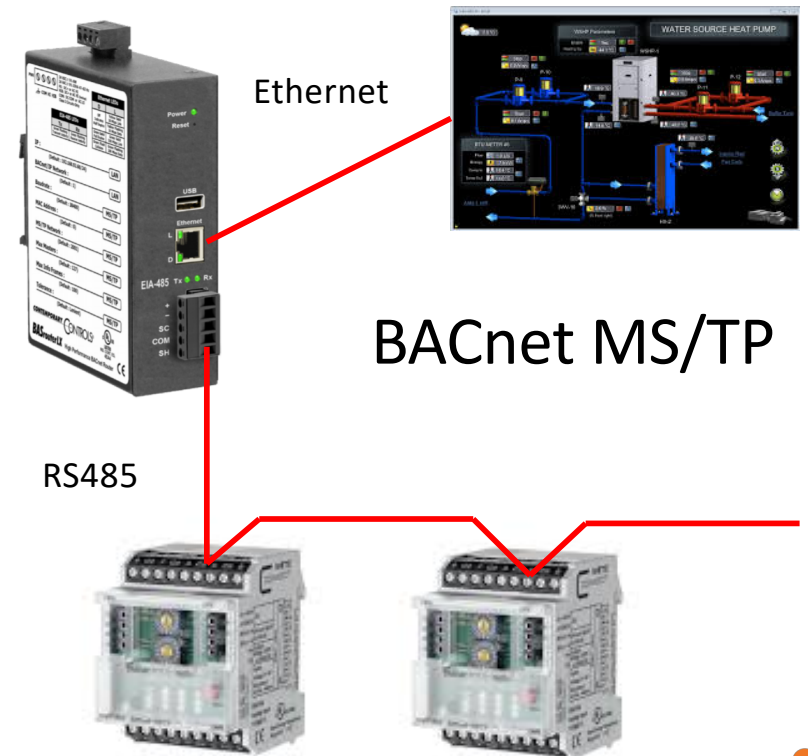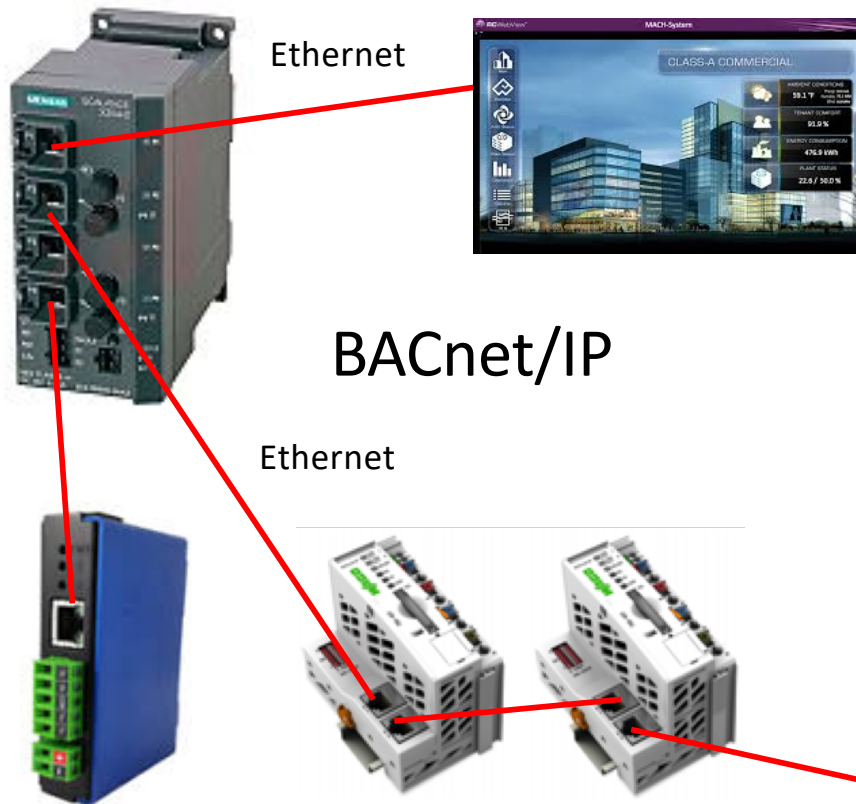
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Messaging

- **Message to OEMs**
  - Combine the benefits of BACnet and LON
    - Rich BACnet server functions
    - Diverse LON applications with peer to peer networking
  - Single SKU
  - Opportunity to differentiate

Message to Integrators
  - Single installation and management tool
  - Ease of installation and wiring
  - Less field support issues

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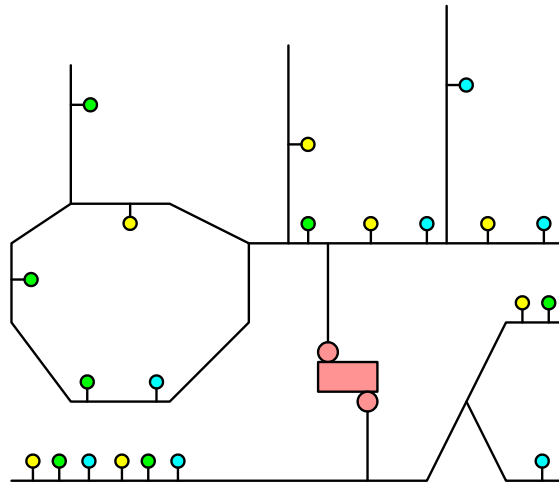# BACnet Architectures

Ethernet

BACnet/IP

Ethernet

Ethernet

BACnet MS/TP

RS485

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Multi-Drop BACnet FT Architecture

Ethernet

FREE TOPOLOGY

FT-10

BACnet MS/TP Vs BACnet FT Cost of Ownership

Assumptions					
Device Count	64				
Labour Rate $/h	100.00	Labour Rate $/m	1.67		
Belden 8471LSNH $/m	1.70				
Belden 3105A $/m	2.61				
MS/TP Contempory Controls BASRTLX-B BASrouterLX	436.00				
FT IzoT Router	600.00				
Cost of Device Similar					
Numbers		MS/TP	$	BACnet FT	$
Cable m (circumstantial)		500	$1,305.00	500	$850.00
Labour Cable Pulling/Device (m) (circumstantial)		Same as FT	$106.67	1	$106.67
Labour Cable Termination (m) (strip, plug test etc.)		2	$213.33	1	$106.67
Device Configuration/Commissioning (m)		2	$213.33	1	$106.67
Segment Termination (m)		2	$3.33	N/A	$0.00
Router		BASrouterLX	$436.00	IzoT Router	$600.00
		Sub Totals	$2,277.67		$1,770.00
		Cost Difference	$507.67		-$507.67
Things to Consider					
Maximum Distance		Function of Baud Rate		500m Ring, 2700m Bus Total	
Redundant Rings		No		Yes	
Link Power Support		No		Yes	
Noise Immunity		Function of RS485 Transceiver Cost		Very good	
Debugging		Difficult		Simple	
Traffic Rate Calculation		Difficult		Simple	
MS/TP Issues:					
Polarity Sensitive Wiring, Segment Bias Resistor Selection, Double Termination, Device Unit Load, Manual DIP Switch Address Allocation, Auto/Manual Baud Rate Selection, Response Times May Need New Segment, Channel Max Master Count Adjustment, One Device Can Pull Channel Down					

Saving $8 /device

Notes: 1) 64 devices on an MS/TP channel is optimistic
2) SmartServer IoT will reduce router costs

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BACnet/IP (home run) Vs BACnet FT Cost of Ownership

Note: SmartServer IoT will reduce router costs

Assumptions				
Device Count	64			
Labour Rate $/h	100.00	Labour Rate $/m	1.67	
Cost Per Industrial Switch Port ($500/16 port) $	31.25			
Belden 8471LNH Cable $/m	1.70			
Belden CAT5E 1583ENH.01U305 LSZH Cable $/m	0.56			
Cost of Device the Same				
Numbers		BACnet/IP (Ethernet)	$	BACnet FT	$
Cable (m) (circumstantial)		At least 5x on FT	$1,405.00	500	$850.00
Labour Cable Pulling/Device (m) (circumstantial)		At least 5x on FT	$533.33	1	$106.67
Labour Cable Termination (m) (strip, plug test etc.)		5	$533.33	1	$106.67
Industrial Ethernet Switch Port		All Devices	$2,000.00	1 per 64 devices	$31.25
IzoT Router		N/A	$0.00	$600	$600.00
		Sub Totals	$4,471.67		$1,694.58
		Cost Difference	$2,777.08		-$2,777.08
Things to Consider				
Cost of DHCP server(s), uplink switches, VLANs, additional power requirements etc.				
Distance		100m Switch to Device		500m Ring, 2700m Bus Total
Redundant Rings		No		Yes
DHCP Leases		Per Device		Per IzoT Router
Potential adverse affect on existing IT installation, permissions		High		Low
Noise Immunity		Standard Ethernet is not good enought for indsutrial installations, special car has to be taken		Very good
		https://literature.rockwellautomation.com/idc/groups/literature/documents/wp/1585-wp001_-en-p.pdf		

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BACnet/IP (daisy chain, 7 hops) Vs BACnet FT Cost of Ownership

Note: SmartServer IoT will reduce router costs

Assumptions					
Device Count	64				
Labour Rate $/h	100.00	Labour Rate $/m	1.67		
Cost Per Industrial Switch Port ($500/16 port) $	31.25				
Belden 8471LSNH Cable $/m	1.70				
Belden CAT5E 1583ENH.01U305 LSZH Cable $/m	0.56				
On cost of dual port BACnet/IP device	15				
Numbers		BACnet/IP (Ethernet)	$	BACnet FT	$
Cable (m) (circumstantial)		At least 3x on FT	$843.00	500	$850.00
On cost of dual port BACnet/IP device		As above	$960.00	N/A	$0.00
Labour Cable Pulling/Device (m) (circumstantial)		At least 3x on FT	$320.00	1	$106.67
Labour Cable Termination (m) (strip, plug test etc.)		5	$533.33	1	$106.67
Industrial Ethernet Switch Port		8 devices per port	$250.00	1 per 64 devices	$31.25
IzoT Router		N/A	$0.00	$600	$600.00
		Sub Totals	$2,906.33		$1,694.58
		Cost Difference	$1,211.75		-$1,211.75
Things to Consider					
Cost of DHCP server(s), uplink switches, VLANs, additional power requirements etc.					
Distance		100m Switch to Device		500m Ring, 2700m Bus Total	
Redundant Rings		No		Yes	
DHCP Leases		Per Device		Per IzoT Router	
Potential adverse affect on existing IT installation, permissions		High		Low	
Noise Immunity		Standard Ethernet is not good enought for industrial installations, special care has to be taken		Very good	

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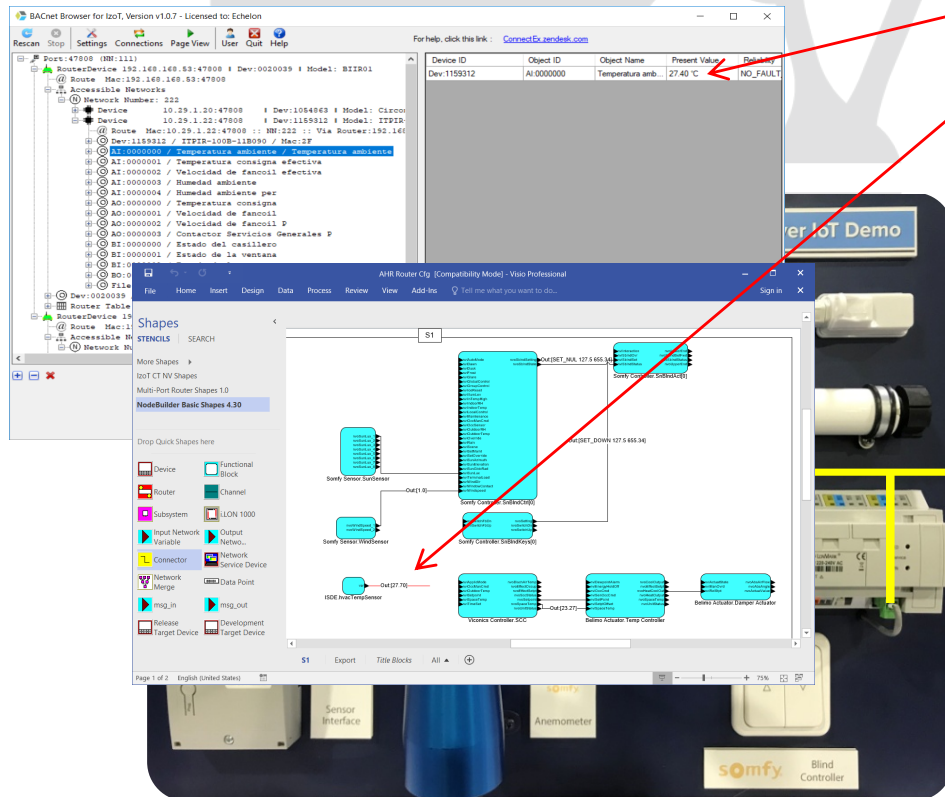
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Recent Successes

CIRCON (EBAC) VAV-350-IMV
CONFIGURABLE VAV TERMINAL UNIT CONTROLLER
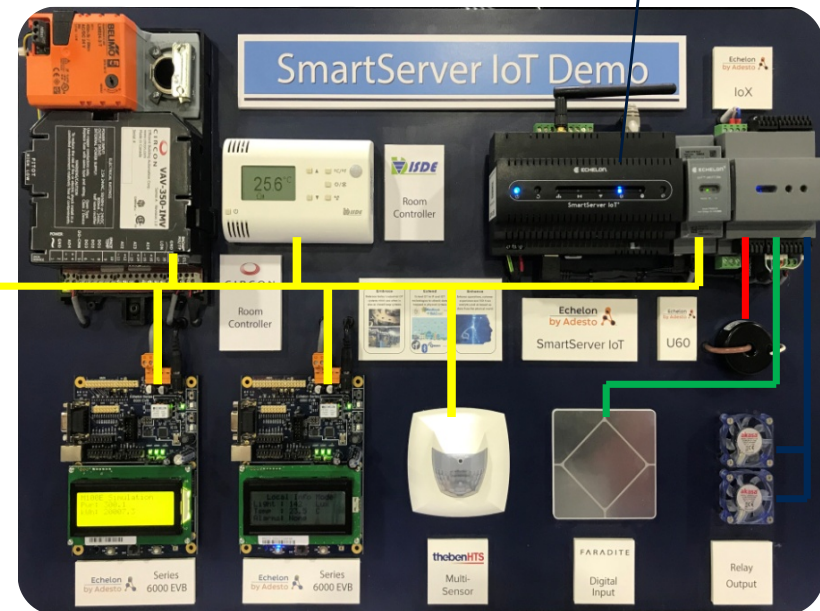

ISDE ITPR-100 Room Controller

SmartServer IoT Demo – Booth 10.3 B50

Connect Ex BACnet Workstation

Adesto IzoT CT

SmartServer IoT

BACnet Protocol Response Time Demo