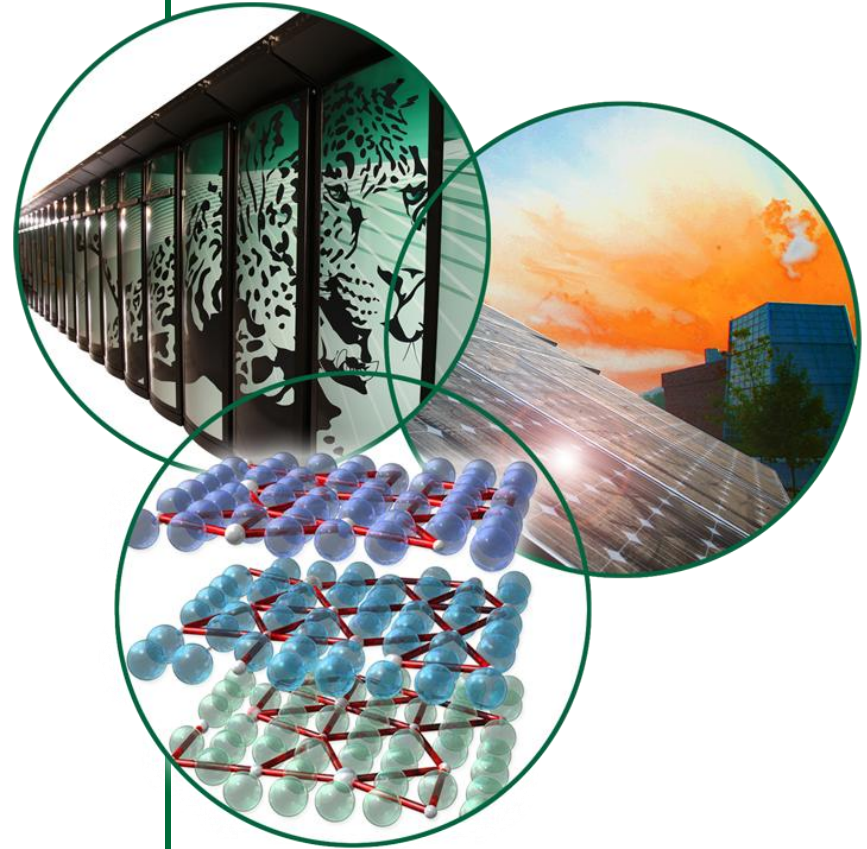


EPICS support for Building Automation i.e. “BACnet”

Brad Webb,
SNS

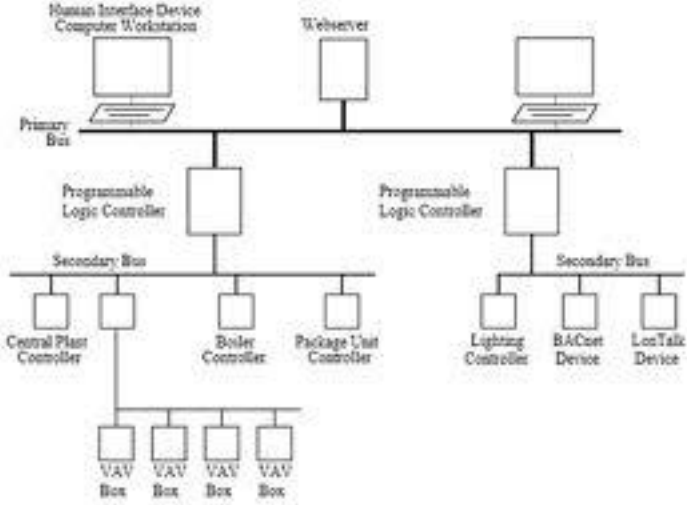
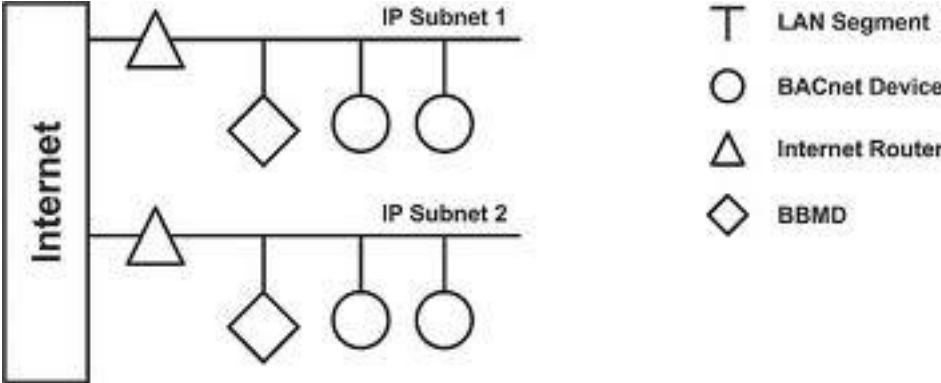
webbsb@ornl.gov



What Is BACnet?

- Data communication protocol.
- Stands for: Building Automation and Control Networks.
- Developed by ASHRAE ~1987.

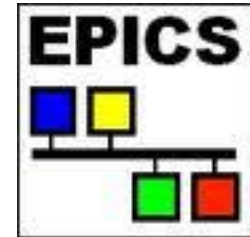
Example Of BACnet Network.



Process Automation Vs. Building Automation



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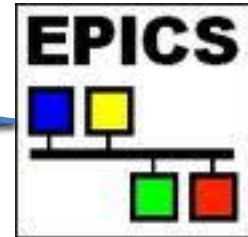
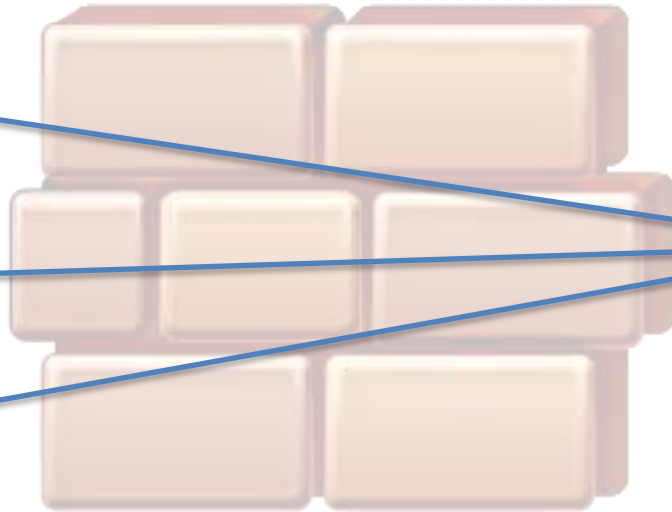


BACnet?

Johnson
Controls



SIEMENS



How does EPICS interface to BACnet?

- **Physically.**
 - Ethernet (BACnet/IP)...
 - Twisted-Pair (MSTP)...
- **Mentally (software😊).**
 - EPICS BACnet support drivers...

Inside a BACnet device.

- **BACnet Device Object Example...**

BACnet Device

OBJECT TYPE	DESCRIPTION
(0) Analog Input	Resistivity?
(1) Analog Output	Positioner?
(3) Binary Input	Interlock?
(4) Binary Output	Enable/Disable?

Inside a BACnet device.

- BACnet Object & Properties...

BACnet Device

OBJECT TYPE	PROPERTIES	VALUE
(0) Analog Input	(85) Present_Value:	27.0237689
	(77) Object_Name:	“Resistivity_1”
	(79) Object_Type:	Analog-Input
	(81) Out_Of_Service:	FALSE
	(117) Units:	Rs

How does EPICS interface to BACnet? (Continued.)

- **BACnet “Services” Supported:**
 - **Who-Is and I-Am**
 - **Read-Property**
 - **Write-Property**
 - **Subscribe-COV**

EPICS Record Support?

- **Record Types Supported:**
 - **Analog In & Out.**
 - **Binary In & Out.**
 - **MBBI.**
 - **String-In.**

EPICS Startup Command File... (Example “st.cmd”)

- **Define a BACnet field-device (i.e. a server).**
 - bacnetDefineServer(<arbitraryName>, <instance number>, <port>, <poll-delay ms>)
 - bacnetDefineServer(“siemens_1”, “8025”, “47808”, “25”)
 - bacnetDefineServer(“siemens_2”, “8026”, “47808”, “25”)
 - bacnetDefineServer(“jci_1”, “2025”, “47808”, “25”)
- ...

EPICS Record Example.

- **AI record example:**

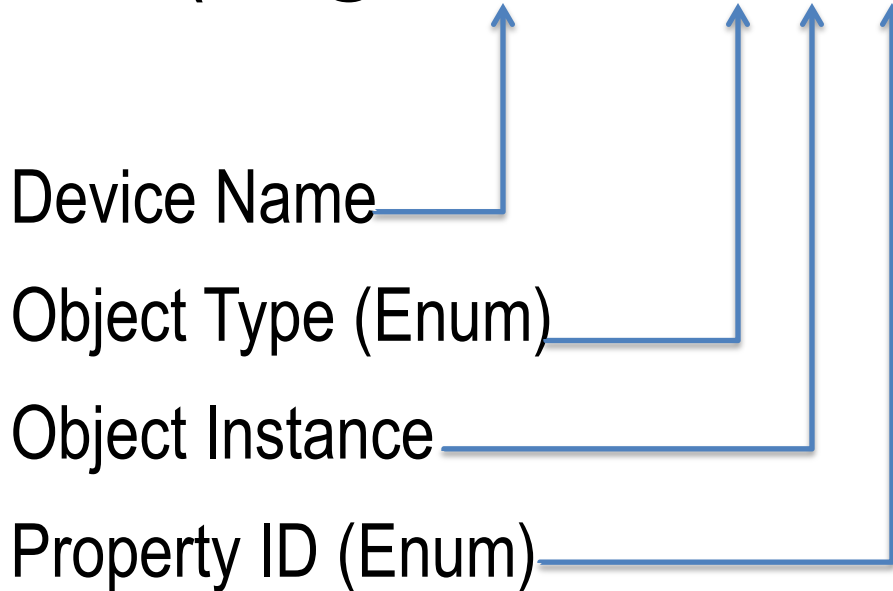
```
record(ai, "DTL:TT2101:F") {  
  field(DTYP, "BACNet")  
  field(INP, "@siemens_1 0 4 85")  
  field(SCAN, "1 second")  
}
```

- **AI record example (COV):**

```
record(ai, "DTL:TT2101:F") {  
  field(DTYP, "BACNet")  
  field(INP, "@siemens_1 0 1 85 c60")  
  field(SCAN, "1 second")  
}
```

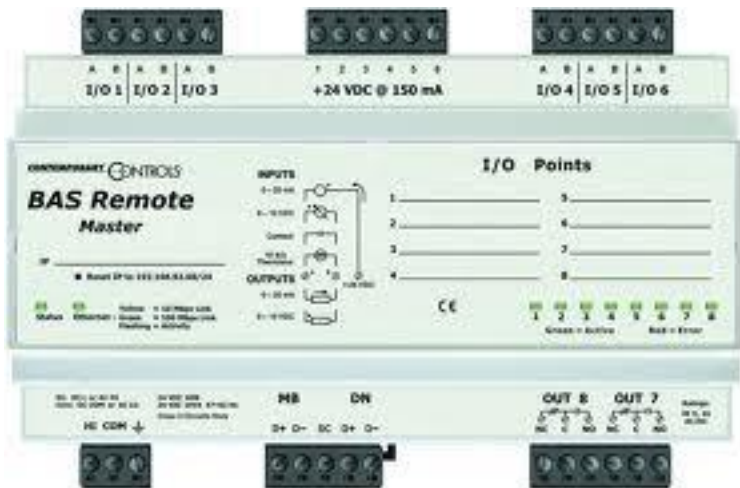
EPICS Record Example.

- **field(INP,@siemens_1 0 4 85)**



Summary

- BACnet is industrial protocol.
- There is an EPICS driver.
- Operational at SNS for <1 Year.
- For more, see: <http://ics-web.sns.ornl.gov/webb/>



Who's using BACnet?



- Spallation Neutron Source...
- Fritz-Haber-Institute in Berlin, Germany.

Process Automation Vs. Building Automation



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