

ASHRAE Ottawa Valley Chapter

Chapter Meeting #1 – 17 September 2019

Meeting Date:	17 September 2019
Location:	Mill Street Brew Pub, 555 Wellington Street, Ottawa, ON
Attendance:	Total: 86
	Members: 61 Guests: 20 Students: 5
Theme:	Membership
Tour:	None
Tech Session:	None
Table Top:	Schneider Electric
Program:	BACnet for Engineers
Speakers:	Michael Colicchio
Prepared by:	Ryan Dickinson

Social (17:30 – 18:30)

Business Session (18:30 – 18:52)

- President Aaron Dobson called the meeting to order, and provided a recap of summer events and news. Darryl Boyce from the Ottawa Chapter became Society President at the Kansas City Meeting in June. At the regional level, Student Activities Chair Elizabeth Primeau was recognized as having the Best Student Branch of the year. Past President Daniel Redmond was awarded the William J Collins Jr Research Promotion award for excelling in Research Promotion. This is the second year in a row that the Ottawa Chapter has won this Society level award, with Adam Graham being the previous recipient. The award recognizes the top research promotion contributor on a society level. Daniel Redmond is also continuing on at the regional level, representing us as a Region Vice Chair for CTTC.
- President Aaron Dobson thanked all of the local volunteers for their contributions and introduced the Executive, Board of Governors and Chapter Chairs and Volunteers.
- Secretary Ryan Dickinson introduced the guests for the evening.
- Andrew Brown, the membership promotion chair, talked about how you can do more for ASHRAE, including participating in technical committees and continued education through the ASHRAE Learning Portal. If anyone is looking to help out with committees, there are plenty of opportunities for networking and personal growth. Andrew also reminded members to update their biographies on the society website. If an associate member has 12 years of combined education and work experience, they are eligible for full membership. Andrew introduced six new members that joined our Chapter over the summer.
- President Aaron Dobson thanked the chapter for the resounding success of last year's Research Promotion campaign in raising almost \$38,000 for research. In the last 5 years, the Ottawa Chapter has raised roughly \$250,000.
- Adam Moons, President-Elect and Research Promotion Chair, thanked everyone for their incredible generosity over the past few years. All of the money donated comes back into Canadian Research projects. Currently, we have 83 funded projects, 100

member-led technical committees, and in excess of 27 million dollars-worth of current implications from research promotion, not including scholarships, bursaries, funds or endowments.

- President Aaron Dobson briefly talked about upcoming YEA events that will be posted to the website shortly.
- CTTC Chair Trevor Thomson spoke about the upcoming full day seminar on Fundamentals of Air Systems Design. There are seats remaining, and registration includes breakfast, lunch, and the ASHRAE Fundamentals of Air System Design handbook. The Stroke Play Golf Tournament is also coming up in a few weeks, and will be held at Emerald Links on Friday October 11th.
- There was one table top for the evening. Martin Fransham from Schneider Electric talked about his table top, including energy savings initiatives and integrated buildings.

Business Session Finished at 18:52.

Dinner (19:00 – 19:30)

- Dinner was served at 19:00.
- Dinner was family style service, including choice of Kale Caesar Salad and Strawberry Spinach Salad for starter. Choices of southern fried chicken, salmon, sautéed green beans, mashed potatoes, and hand cut fries for the main, with apple crumble served for dessert.

Evening Program (19:30- 20:24)

- Evening program started at 19:30.
- President Aaron Dobson announced that the Chapter is now on social media. The Chapter Twitter page can be found @ASHRAEOttawa, and the Linkedin page name is ASHRAE-OVC.
- Raffle tickets were sold to win four Club level Redblacks tickets donated by Ainsworth. A total of \$920 was raised for ASHRAE research. Todd Legere was the lucky winner of the Redblacks tickets.
- President Aaron Dobson announced the program topic for the evening, BACnet for Engineers, and introduced the speaker, Michael Colicchio from Montreal. Michael works for Schneider Electric as a Building Automation Solutions Specialist.
- Michael started off by providing an introductory overview of BACnet. BACnet, which stands for Building Automation and Control Network, started off as ASHRAE 135 in 1995. BACnet defined protocol, objects, services, transports, device profiles, and PICs (Protocol Implementation Conformance statement). A protocol is a set of rules devices follow when communicating with each other. A protocol defines IDs (device identifiers), message types (read, write, etc.), the transport (physical media), and packets (communication message). BACnet includes a standard set of objects, such as Binary Input, Analog Input, etc. In 1995, there were only 23 object types, but that number has increased to 60 today.
- BACnet Services are the method that the devices use to communicate, and are based on a client-server model. The client initiates the service (such as read outdoor air temperature from device), and the server receives and executes the service. BACnet devices can either be a client or a server. Discovery service builds a database of all of the BACnet devices on the network by polling all of the devices and receiving a response with all of the objects the devices have. In complex buildings, there may be

hundreds of devices, and that can create a lot of traffic on the network. Change of Value (COV) is critical for managing the traffic on the network to prevent hundreds of devices on the network from polling all the devices at the same time. Devices now subscribe to the object that they want to get an update from, and will only update if that value changes above or below a threshold. For outdoor air temperature, it might be half or one degree. If the value doesn't change, then there's no traffic.

- BACnet transport defines the physical media, packet formation and media access. BACnet MSTP and BACnet IP are the two most common transports. BACnet MSTP stands for Master/Slave Token Passing, and uses low cost RS-485 twisted pair. BACnet IP communicates over standard Ethernet IP networks. Today, limitations are starting to arise with BACnet MSTP as analytics and a larger number of nodes on the network can begin to impact latency. BACnet IP solves this by providing higher bandwidth. Other transports include BACnet Ethernet, BACnet Arcnet, BACnet LonTalk, BACnet PTP, and BACnet Zigbee.
- BACnet IP System Topology includes Daisy Chain, Star, and Daisy Chain Loop. Daisy Chain is the most cost effective; however, if there's a break in between the switch and one of the controllers, than all of the other controllers are lost. Star has higher performance and reliability but at a greater cost, since each controller has to be connected back to the switch. This is beneficial in critical applications such as data servers and hospitals, where extremely high reliability is required. If one controller goes down, the others are not affected. RSTP (Rapid Spanning Tree Protocol), or Daisy Chain Loop, is a mix of Star and Daisy Chain. It includes a managed switch capable of diverting data from one port to the other, and the last controller is connected back to the switch so if there's a break in the chain, the managed switch automatically diverts the data up the other end.
- BACnet Device Profiles came out around 2004 and include:
 - o B-SS (Smart Sensor) and B-SA (Smart Actuator): the most basic type of device.
 - o B-ASC (Application Specific Controller): thermostat, fan coil or heat pump controller with read/write property. No support for COV, alarms or notifications.
 - o B-AAC (Advanced Application Controller): plant or chiller controller with read/write property multiple, alarms, event notifications, time synchronization.
 - o B-BC (Building Controller): building automation system or enterprise level server.
 - o B-OWS (Operator Workstation)
 - o B-AWS (Advanced Workstation)
- Protocol Implementation Conformance statement (PICs) is a 3-4 page statement from the manufacturer that describes what the BACnet device can handle. PICs include the Device Profile, objects supported, services supported, and transport supported, so that the technician knows how to wire the device and what exactly it supports. Manufacturers are also able to have their devices BTL certified through the BACnet Testing Laboratories. BACnet Test Labs is run by BACnet International, a group of manufacturers that are working together to advance the BACnet protocol.
- BACnet started in 1987 as ASHRAE 135, but was not officially released until 1995. The initial release had limited adoption. Even though it was open, it had a lot of interoperability issues and they didn't have Device Profiles at the time. Around 2000, several manufacturers came together to create the BACnet Manufacturers Association, or BMA, which later became BACnet International. In 2004, BACnet IP and Device

Profiles were introduced. Since 2004, the standard has continued to evolve. BACnet is not an encrypted protocol, but a new standard called BACnet SC aims to address that by supporting Authentication and Encryption over IP. BACnet SC is still out for public review.

- Conformance to the BACnet standard ensures a known level of interoperability. Key successes for interoperability with BACnet include using BTL listed devices. BACnet interoperability through a gateway is less than ideal, but if there is an existing proprietary BAS, a gateway allows you to share some of the proprietary information converted to BACnet. When integrating lighting controls, access controls, and elevator controls, BACnet may not be the best option.
- Michael concluded his presentation with some specification items to consider. BTL listing ensures conformance to the standard. When specifying Device Profiles, it's important to consider what features matter so that you're not over-specifying devices. When choosing between BACnet IP and BACnet MSTP, consider the future data needs of the building.
- President Aaron Dobson thanked Michael Colicchio and reminded attendees of the survey which will be emailed. The next meeting is scheduled for October 15th at the Centurion Conference and Event Center.

Meeting adjourned 20:24.