



Course Workbook

2nd Edition



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Succeed in this course

I want you to succeed in this course. But I can't do the work for you. I've captured everything you need to know from this course in this workbook.

But here's the deal.

You need to fill this workbook out.

That is the process.

If you don't do this, you won't grow in your knowledge, you won't gain mastery of the things you need to know.

The fact that you are here means that you are a doer. You aren't someone who cries about IT and how hard it is.

You stepped up and you made the choice to learn.

Now, I'm asking you to continue that action.

I am going to do everything in my power to help you on this journey.

I've poured my heart into the video training, I will send you daily e-mails to drive you.

But...

I can't make you fill out this workbook.

That is all you!

So here's my challenge.

Print this workbook out.

And follow along.

In 4 weeks you will be amazed by how much knowledge you've gained.

To your success,

-Phil Zito

Module 1: Introduction to IT

Module 1 Lesson 1: What is IT

What are the four reasons BAS professionals should understand IT?

- IT can keep you from getting your system installed
- More BAS systems are utilizing IT systems
- You need to work with IT to remotely access your BAS
- IT can be a deciding vote in whether you win a project

What are the five areas of IT that impact BAS?

- Networks
- Databases
- Applications
- Servers
- Security

Module 1 Lesson 2: How a IT Group Works

What are the common titles of IT professionals?

- CIO
- CTO
- CISO
- VP of Department
- Manager or Director of Group
- Technician
- Engineer
- Developer

What are the six groups that make up most modern IT organizations?

- Helpdesk
- Network Administration
- System Administration
- Database Administration
- Cyber Security
- Enterprise Architecture

How can each group help you with your Building Automation System?

- Helpdesk
 - 1
 - 2
- Network Administration
 - 1
 - 2
- System Administration
 - 1
 - 2
- Database Administration
 - 1
 - 2
- Cyber Security



INFORMATION TECHNOLOGY

FOR BAS PROFESSIONALS

- o 1
- o 2
- Enterprise Architecture
 - o 1
 - o 2



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Module 2: Networking

Module 2 Lesson 1: Networking Components

What is the purpose of the network interface card?

What is a port?

What is an access port?

What is a trunk port?

What is an uplink port?

What is a downlink Port?

What is a switch?

What is a router?

What is the difference between a switch and a router?

What is transmission media?

What are 3-types of transmission media?

What is a wireless access point?

What is a wireless network interface card?

Module 2 Lesson 2: The IP Address

What is an IP Address?

What is a bit?

What is a byte?

What is an octet?

What is a bit table?

What is a subnet?

What is an address pool?

What is a broadcast address?

What is a default gateway?

What is a subnet mask?

How do you determine the network and host bits?

What is a private IP address?

What is a public IP address?

What are the differences between public and private IP addresses?

How are IP addresses assigned?

What is a static IP address?

What is a dynamic IP address?

What is the DHCP process?

How does DHCP work?

What is the 5 step process for figuring out your IP count?

Did you complete the scenario in the video?

Module 2 Lesson 3: Local Area Networks

What is a layer 2 device? (use the OSI Model attachment from the video)

What is a local area network?

What are the components in a Local Area Network?

What is a MAC address?

What is a broadcast?

What is a broadcast used for?

What is address resolution protocol (ARP)?

How does ARP work?

How does the MAC address get tied to the IP address?

What is MAC address mapping?

Why is MAC address mapping important?

What is encapsulation and decapsulation?

What are headers?

What is a switch port?

What is the OSI Model?

What OSI Layers are used within a Local Area network?

Module 2 Lesson 4: Wide Area Networks

Describe how a default IP address works.

What is a route?

What kind of ports do routers use to communicate with other network devices?

What is a VLAN?

Why do we use VLANs?

How does a VLAN impact your BAS?

How does a VLAN impact your network troubleshooting?

Module 2 Lesson 5: Wireless Networks

How does a wireless network work?

What is a Wireless Lan Controller?

What is a wireless access point?

What is a wireless network interface card?

What are the three forms of wireless?

What is an SSID?

What are the three wireless frequencies?

What are wireless channels?

What is bandwidth?

Why does bandwidth matter?

What are the three secured protocols for wireless?

How does wireless encryption work?

What are Pre-shared keys?

Why is the statement “Wi-Fi is insecure” false?

What is mesh?

How is mesh different then WiFi?

What is a mesh coordinator?

What is a mesh node?

What is a cellular network?

How do cellular networks work?

Module 2 Lesson 6: Asking for IP Addresses

How do you approach knowing how many IP addresses you need? (Hint remember the 5-step process from Module 2 Lesson 2)?

How many addresses do you need?

How many of these addresses need to be static?

How many addresses need to need to be dynamic?

What subnet do the addresses need to be on?

Why do we want our IP addresses outside the DHCP pool?

What is a permanent lease in a DHCP pool?

What is the precaution you should be aware of if you use a permanent DHCP lease?

What other information do you need to know from IT?

If you have multiple subnets or VLAN's what do your devices need to communicate?

How would you turn multiple physical networks into one logical network?

In summary what are the 5 things we need to verify when working with IT?

Module 2 Lesson 7: Why do you need an IP Address?

What is going on in the mind of IT when you ask for IP addresses?

How do you avoid “asking IT to do more work”?

How can you help IT be comfortable with who you are and what your BAS “stuff” that you want to put on their network is?

How can you address the issue around who will pay for the IP addresses?

Module 2 Lesson 8: Why do you need to be on my network?

What are the three reasons why you'd want to be on the IT network?

Why is just using a cable modem a bad idea?

What are the four things that IT is concerned about when you ask to put your BAS devices on their network?

How do you handle each concern?



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Module 3: Servers and Stuff

Module 3 Lesson 1: Parts and Pieces of PC's

What is a computer?

What are inputs?

What are common inputs?

What are outputs?

What are common outputs?

What is storage?

What is memory?

What is a CPU?

How does a computer work?

Describe the process?

What kind of document would you use to find your BAS “computer requirements”?

Where would you find this document?

Module 3 Lesson 2: What are Clients and Servers

What are the three main types of BAS servers?

What are they used for?

What are servers?

What are servers used for?

What are clients?

What is the client server architecture?

Why is it a bad idea to use a server as a client?

How does the client server communication process work?

What are files?

What is HTML?

What are the three big differences between servers and desktops?

What is the only purpose of a server?

Module 3 Lesson 3: What are Virtual Servers?

What are server resources?

What is a virtual server?

How does it work?

What does it mean by a virtual server being elastic?

What happens if you need more resources for a virtual server?

What is a “virtual image”?

Module 3 Lesson 4: Virtual Machine or Physical Machine?

What are the three pros of a physical machine?

What are the three pros of a virtual machine?

What are the three cons of a physical machine?

What are the three cons of a virtual machine?

How would you decide if you needed a virtual machine?

How would you decide if you needed a physical machine?

Why do I recommend using virtual machines?

Module 3 Lesson 5: Why do you need a VM?

What are the common objections by IT around providing you with a virtual machine?

How do you deal with the three main objections around a getting a VM?

A)

B)

C)

Module 4: Databases

Module 4 Lesson 1: What is a Database?

What is a database?

What does a database do?

What are the two main types of databases?

What is a relational database?

What are the parts of a relational database?

What are tables?

What is a schema? How does it work?

How do databases work with a BAS?

What is a database query?

What is a data model?

What is a data type?

Why do I recommend that you do not try to combine BAS databases?

How would you combine two disparate pieces of data?

What is the difference between a stream and a batch?

What are the pros and cons of batching and streaming?

What are non-relational databases?

Module 4 Lesson 2: How a database works?

What does SQL stand for?

What is a table?

What are rows?

What does a query do for us?

Can you have multiple databases on a single server?

Module 4 Lesson 3: Shared or Non-Shared Databases

What is a shared database?

How is a shared database different than a non-shared database?

What are the potential risks of a shared database?

What is locking? How could this impact your BAS database?

What is a non-shared database?

What is a hybrid database solution? How would this work?

Module 4 Lesson 4: Why do you need a database?

What are the three IT Objections?

What do you need to know when you are requesting a database?

How do you determine this information? (Hint we covered this in this lesson and in the server's module...)

How can you deal with IT people who don't prioritize your project?



Module 5: Remote Access

Module 5 Lesson 1: What is Remote Access?

What is remote access?

What is the difference between remotely accessing a device versus a network?

What are three reasons why you would want to access a BAS remotely?

Why do you need a router for remote connections?

Module 5 Lesson 2: Methods

What are the four methods for remote access?

How does a VNC connection work?

What are some examples of VNC solutions?

When would you want to use a VNC solution?

How does a VPN work?

What does it mean when I say you are “extending the network”?

What is a VPN tunnel?

What do I mean when I say you are becoming a “logical not physical” part of the network?

When would you want to use a VPN?

What is the difference between a VNC and VPN?

How do you use a public IP address for remote access?

What is the router’s role in the public IP connection option?

How can you use a modem to remotely connect to your BAS?

Why do I not recommend using a modem for remote connections?

What is the big difference between using a remote client vs remotely logging into a server?

Module 5 Lesson 3: Setting up remote access

Watch the video of how to setup a VNC and VPN connection.

Think about what you just learned around VNC and VPN connections.

Based on everything you've learned and what you saw in this video, you should now understand how to gather the information you need for getting remote access.

You need to be able to answer these questions before meeting with IT

What network do you need to be connected to, to reach the BAS?

What device(s) will you be using to connect to the BAS?

What user(s) will be connecting to the BAS?

When will they be connecting?

What will you be using the connection for?

What software will you be using to connect to the BAS?

What ports will you need open to access the BAS?

Module 5 Lesson 4: Why do you need a VPN?

What is the difference between a VNC and VPN connection?

What are the five fears of IT around giving you remote access?

How do you answer the five fears of IT around remote access?

Why do I recommend that you control who can remotely access your customers?

If a security breach happens through your computer can you be held liable for the breach?



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Module 6: Cyber Security

Module 6 Lesson 1: What is cyber security?

What is cyber security?

What is the purpose of cyber security?

What is business continuity?

What is an attack vector?

What are the three main attack vectors? What is an example of each?

As a BAS Professional three things do you need to understand when it comes to cyber security?

How does a firewall work?

When using a firewall what should you do to keep your BAS secure?

What is patching?

Why is patching vital to having a secure BAS?

What are the three things you need to be aware of with passwords?

Module 6 Lesson 2: The anatomy of a hack

What are the phases of a cyber-attack?

1. Reconnaissance
2. Scanning
3. Access and Escalation
4. Exfiltration

What happens during each phase?

What are two major hacks folks reference?

What is one website that you can use to find exposed BAS?

What is a device signature?

What is an exploit database?

What is malware?

The Target Attack

How did the Target attack happen?

How did this relate to a BAS?

How did this not relate to a BAS?

How could this have been prevented?

The IoT DDoS Attack

How did the IoT DDoS attack happen?

How did this relate to a BAS?

How did this not relate to a BAS?

How could this have been prevented?

Module 6 Lesson 3: Hardening your BAS

What does the term controls mean in the world of cyber security?

What is hardening your BAS mean?

What are the three types of cyber security?

What does it mean that a control is policy driven?

What is the mission of cyber security?

What are my user account recommendations?

Why is it such a bad thing if people have physical access to a server?

Where are the three places that I recommend you store your backups?

Module 6 Lesson 4: Is your system secure?

How do you isolate the question?

What does isolating the question mean?

What are the counter questions you can ask?

What are the three buckets surrounding the term “secure”?

How do you answer the question is your BAS secure?

Why does the security of a BAS also depend on the customer?

What questions would you ask your manufacturer to determine the security level of your BAS?

Why is it important that a customer be willing to work with you on keeping a BAS secure?

Module 7: Cloud

Module 7 Lesson 1: What is the cloud

Who are the two largest cloud providers in the world?

What is the cloud?

What do I mean when I say the cloud is a timeshare of computers?

What are some of the capabilities of cloud services?

What are the capabilities of the cloud?

Module 7 Lesson 2: Cloud Hosting a BAS

What does a building automation system consist of?

What are the three ways you could “cloud host” your BAS?

What are the two varieties of cloud hosting your database?

What is my recommendation when backing up your database?

How can you cloud host your server?

What is a “soft-supervisor”?

What does “off-prem” mean?

What does “on-prem mean?

Why do I not recommend cloud hosting your supervisory devices?

Module 7 Lesson 3: Is the cloud secure

Why does the cloud provider have a greater focus on keeping your systems up then a traditional IT group?

Why do I argue that cloud providers are more secure then onsite IT installations?

What are the three ways in which a cloud provider is more secure?

Why is a cloud provider more “physically secure” then an onsite installation?

What is redundancy and why does it matter?

What could make a cloud provider insecure?

What is the difference between managed hosting and self-hosting?

Who are the two primary providers of cloud services?

Module 8: Internet of Things

Module 8 Lesson 1: What is IoT?

What are the main areas for the Internet of Things?

What do I mean by the term consolidation?

What would a consolidated system look like?

What do I mean by the phrase data at the edge?

What advantage does data at the edge provide?

How is machine to machine (M2M) with IoT different then M2M within a BAS?

Module 8 Lesson 2: Common IoT Platforms

Why do I say you need to be comfortable with research in the BAS world?

Where do I recommend you go to stay up to speed with IoT?

What are the three main guides I recommend you review to learn more about IoT?

What is a platform?

Module 8 Lesson 3: Evaluating IoT Applications

What are the four areas to look at when evaluating an IoT solution?

What should you learn about the IoT manufacturer?

Why is it important to understand what protocol the IoT solution speaks?

Why should your solution have an API and SDK ?

Why is it important to have talent who can install the IoT solution?

Why is it important to understand the technology that is being used by the IoT solution?

Module 9: API's and Programming

Module 9 Lesson 1: What is an API?

What is an API?

What does an API do?

How does an API share data?

How would you access the functions of an API?

What is an API string?

What is a root URL?

What do I mean by “calling a function” or “making a call”?

What is a parameter?

What is a return data set?

What are GET and POST messages? What are they used for?

What is a data adapter? Why is it critical to an API working?

What is a data mismatch?

Module 9 Lesson 2: The Fundamentals of Programming

What is a programming language?

What does a program is “classful” mean?

What is a variable?

What is a function?

What does it mean to instantiate a class?

What are the main two methods you would use with an API?

Module 9 Lesson 3: SDK's and Libraries

What is an SDK?

What will a good SDK contain?

How would you use an SDK to work with an API?

Why is a library and DLL so important when using an API?

Where does the DLL get installed?

What is a service?

What do I mean by we want to package our program as a library?

How do we constantly run our library of code?

Module 9 Lesson 4: Working with API's

What is an IDE?

Describe how I used the URI to call against the Weather Underground API.

What is the benefit of using a networked weather station?

What do I mean by Key : Value in my API response?

What do I mean by “getting” and “setting” values?

Module 10: Computer Management, Services, and Logs

Module 10 Lesson 1: An overview of Windows Computer Management

How do you get to computer management?

What are the three categories computer management breaks into?

Module 10 Lesson 2: A look into System Tools

What are the main tools within system tools?

What is the purpose of task scheduler?

Where would you find out how set a task using task scheduler?

What is the purpose of event failure?

What are logs?

When a customer asks for logs where would you go?

What is performance monitor?

How could you use performance monitor to troubleshoot issues?

Why is it very important to turn off your logging once you are done with it?

What is device manager? What would you use device manager for?

Module 10 Lesson 3: Services and Applications

What is IIS?

What is a GET request?

What do I mean when I say the web server provides a resource?

What are services?

What is SQL Server Configuration Manager?

What is the difference between the shared pipes and TCP/IP settings in the SQL Server Configuration Manager?

Module 11: Protocols and Ports

Module 11 Lesson 1: What are Protocols and Ports

What is the difference between a physical port and application port?

Why is it important to understand application ports?

What are the three categories of application ports?

What is a protocol?

How are protocols and ports related to one another?

Module 11 Lesson 2: Common IT Protocols and Ports

What is the purpose FTP?

What is the purpose of SMTP?

What is the purpose of DHCP Server and Client ports?

What is the purpose of HTTP?

What is the purpose of SNMP?

What is the purpose of HTTPS?

What is the Terminal Server Port (RDP) used for?

What is the purpose of Netstat?

Module 11 Lesson 3: The OSI Model

What is the main purpose of the OSI model?

How many layers does the OSI Model have?

What are the names of each layer in the OSI Model?

Describe how a computer communicates from Layer 1 to 7?

How does a computer communicate from Layer 7 to 1?

What do I mean by encapsulation and decapsulation?

If you are receiving a message what layer do you start at?

If you are sending a message what layer do you start at?

How do you think knowing whether you are sending or receiving a message would affect your troubleshooting process?

Module 11 Lesson 4: TCP and UDP

From lesson 1 what are the three **categories** of ports you can have?

What are the two **forms of communication** your ports can have?

What are the main three protocols that I cover in this lesson? Are they TCP or UDP?

How does a protocol being “TCP” or “UDP” affect the protocol?

How does UDP or TCP affect your troubleshooting?

Why would you not be seeing BACnet traffic on a HTML user interface?

What are TCP messages called?

What is a TCP Stream?

What are message flags?

Why is TCP known as the reliable protocol?

Describe the TCP Handshake process.

What would happen if the TCP Message was not received?

Why is UDP known as an unreliable protocol?

What are the major differences between TCP and UDP?

Module 12: Advanced Networking

Module 12 Lesson 1: NAT and Remote Access

What is the purpose of network address translation?

What is the difference between private and public IP addresses?

What is the purpose of a private IP address?

What are the three kinds of NAT?

How does each of the kind of NAT work?

What does NAT have to do with remote access?

How does NAT effect the troubleshooting process?

What do I mean by port mapping?

Module 12 Lesson 2: VLSM and VLAN Segmentation

What is VLSM?

What do I mean by slicing a subnet off?

What is VLAN Segmentation?

Did you perform the exercises in the lesson?

What do I mean by a logically a VLAN looks like a single physical LAN?

What do I mean by you will be getting a portion of an Octet?

What is CIDR notation (hint.. module 2)?

Module 12 Lesson 3: Port security and QoS

What is IEEE 802.1X?

What are the two things that 802.1X define that are important to BAS professionals?

What is MAC address authentication?

What are the signs that MAC address authentication may be enabled on a port?

What is single MAC control?

What is quality of service?

What is a QoS Tag?

Where would you find the QoS Tag?

What is flow control?

How could flow control impact a BAS?

What is VLAN trunking?

How could VLAN trunking affect your BAS traffic?

What do I mean by a messaging having “priority”?

Module 13: Network Troubleshooting

Module 13 Lesson 1: When networks go bad

What are the 6 most common issues related to information technology?

What are the symptoms of IP Address conflict?

What is an ARP table?

What is a flapping IP gate?

What are the symptoms of a Firewall issue?

What are the symptoms of a bad route?

What are the symptoms of a DNS failure? How is this different than a bad route?

What are the symptoms of port security?

What are the symptoms of bandwidth or QoS issues?

Module 13 Lesson 2: Common Network Troubleshooting Commands

How do you get into the command prompt?

How can you make your command prompt text size larger?

How do you make your command prompt full screen?

What is Ipconfig?

How can you learn all of the information about your Network Interface Cards?

What is a preferred DHCP address?

What is the ping command?

How would you ping another IP address?

What is a ping packet?

What is time-to-live?

What does it mean when ping says destination host unreachable?

What does request timed out mean?

What is netstat?

Why is netstat an important tool?

What is tracert?

What is a hop?

How does tracert resolve a domain name?

Module 13 Lesson 3: Common network troubleshooting tools

How do you download Wireshark?

How do you pick the NIC for Wireshark to use?

How can you sort by protocol in Wireshark?

What is a filter in Wireshark?

What would you do if IT asked you for a network traffic sample?

What is Zenmap?

What would you use Zenmap for?

How would you download Zenmap?

Module 13 Lesson 4: The networking troubleshooting process

What is my troubleshooting process?

What are the 4 steps?

Why is it important to document when you troubleshoot?

How do you document your troubleshooting process?

What do I mean by start physical things?

What physical things should you check?

What do I mean by checking a cable for continuity?

What do you want to check on the network?

How would you go about checking the network?

What network troubleshooting steps would you take?

What steps do you want to take to make sure that your webserver is working?

What are the two additional steps you will want to use if you are troubleshooting applications?

What do I mean by checking if your services or applications are running?

What is the most likely issue if you are still having problems after performing an application or server rollback?

Bonus 1: Wireshark Mini Course

Where do you go to install Wireshark?

How do you connect Wireshark to your network?

How do you capture network traffic?

How can you filter network results?

How do you use operators on your filters?

How do you understand the performance of your network?

How can you export specific results?

How can you follow message trails?

Bonus 2: Secure your BAS Mini Course

How would you go about securing a BAS?

What are the three “security control areas” you would focus on?

What are the three physical controls I recommend?

How do you implement them?

What are the three logical controls I recommend?

How do you implement them?

What are the three administrative controls I recommend?

How do you implement them?