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# IHE NA Connectathon 2019: Network

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## Revisions

- 2018-11-26: Initial publication

## Network Sharing Rules

Below are what I hope are simple rules that will allow our group to share the wired and wireless networks. If you have any questions or concerns, please direct these to Steve Moore.

### Wireless

1. Do not bring your own wireless access points. The network group will provide wireless access.
  - a. If you are bringing an internal switch that happens to have wireless, you will need to know how to turn off the wireless. That does not mean “We are not using the wireless”. That means you are not allowed to have a device that is broadcasting wireless.
  - b. This means you should not bring MiFi devices or anything that is equivalent.
2. Many of you have devices with both wired and wireless interfaces.
  - a. Use the wired interface. Performance, reliability and security will be better.
  - b. TURN OFF the wireless interface.
3. We know everyone now has an iPad or similar device. These all generate traffic. Turn them off unless they are being used for testing.
4. If your cell phone has the ability to create a wireless hotspot, turn that off.
5. Configure your cell phone to use the cell network and not piggy back off the wireless network. Yes, your reception may not be as good, but we need to protect the wireless network for testing.

### Network Disruption: Traffic, Rogue IP Addresses

6. Any of the items listed below are not allowed during the hours of **08:00** and **18:00** each day.
  - a. Streaming video is not allowed. That includes Skype video sessions. Please watch Netflix and YouTube after hours or back in the hotel. I know; you found the best cat video ever.
  - b. Streaming audio is not allowed. Bring your own music on your laptop. Skype calls (audio only) are allowed.
  - c. Peer-to-peer file sharing (Limewire, BitTorrent, etc) is not allowed.
  - d. Downloading large files is not allowed (unless they are work related)

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7. Do not disrupt the network by attaching a device (switch) that is configured incorrectly. The most common problem:
  - a. Attaching your switch to the Connectathon network using the port that puts out DHCP addresses.
  - b. Connecting cables in a fashion that causes a bridge loop. If you need assistance in connecting a cable, please see the Network Staff.
  - c. The long and short of this rule is: If you bring network gear, know how to use it.
8. Do not do the following:
  - a. Configure any of your equipment to assign DHCP addresses. We are already on a private network. We will give you as many fixed IP addresses as you need.
  - b. Configure your VMWare or any other VM host implementation such that they assign DHCP addresses. Use fixed IP addresses.
9. We allocate fixed IP addresses to you in advance. Take the time to know your IP address. You are not given a range. Do not just pick an address that you think is empty.

### **Anti Virus Software**

10. All systems are required to have active and up to date anti-virus software. Relevant operating system security patches should be installed. Ports that are not needed by other participants should be blocked by a software or hardware firewall at your table.

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## Room Configuration and IP Assignments

*The network configuration is the same for all locations in the room.* That means that any fixed IP address assigned to you should work at any location in the testing area. You should be able to pick up your laptop, walk over to a partner's table, plugin to the network and continue working without changing your configuration.

There is one caveat to the statement above. *If you connect to a switch that is configured by one of your testing partners, they might have ignored the advice above and done something different with that switch.* If you have issues at another table, plug in to the switch provided by the convention center as your first troubleshooting step.

### Fixed IP Addresses

Each **computer** that needs a fixed IP address will be assigned an IP address that is valid at any location in the testing area.

### DHCP Addresses / Wired

If you want to connect to the network but don't require a fixed IP address for testing, you can make a **wired** connection and get a DHCP address. This is the preferred method if you do not require a static IP address for testing. As with the fixed IP addresses, your DHCP address should work anywhere in the room.

### Connectathon Wireless

The network contractor will work with the convention center staff and provide two wireless networks for participant use. One wireless network will be provided for general participant use. A second wireless network will be used to support PCD systems. A third wireless network is available only for monitor use.

The wireless networks are:

Description	SSID	Password	Security type
General Connectathon	NA2019	cleveland19	
PCD testers	PCD	cleveland19	

**The wireless network will not have the same performance characteristics as the wired network. You will be able to connect to any device on the network, but on average, your wireless connection will be slower than a wired connection. If at all possible, turn off your wireless interface and use the wired connection. Use the wired network when possible to exchange data for testing.**

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## Switch / Router / Firewall

Each collection of tables (approximately 17) will have **one** Cisco switch in the middle. *We are asking that you provide your own cable (singular) and make a connection to the switch located in the center of your area.* We ask that each table use only one connection. If you need extra connections we encourage you to bring a small switch of your own (a switch only, please do not bring a router or firewall if you only need extra fanout) Also, **DO NOT** use the switch ports on the back of a router or firewall as a switch. We have seen this in the past and it causes major problems on the network.

- *The network group is not providing small switches at the ends of the sectors.* if you are at the end tables of a sector (11, 12, 17, 18, 21, 22, 27, 28 ...), you will have to bring a long cable to reach the switch. Each table is 6 feet; you could be 4 tables away from the switch. You could be as far as ..... 24 feet, or 8 meters from the switch.

*If you plan on bringing a router or firewall, think twice about why you are bringing it.* Please remember that the Connect-a-thon network is already firewalled. Routers and firewalls that are configured incorrectly can cause problems for you and others on the network. If you do decide to bring a router or firewall remember that it is your responsibility to make sure it is configured correctly. **The only connection to our network will be on the WAN or Outside port of your device.**

## Network Parameters

The table below lists network parameters that are used by everyone; they are not tied to your subnet. Please configure only the DNS server listed and do not include any backup DNS servers. Backup DNS servers will only cause problems in our network environment.

Netmask	255.255.248.0
Default Gateway	10.242.128.1
DNS 1 (same for all, tied to Gazelle)	10.242.128.35
DNS 2	<b>Do not specify any further DNS</b>
Domain Name	ihe-us-test.net

These parameters mean that the fully qualified name of a computer as seen by your partners will be something similar to: **acme0.ihe-us-test.net**.

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## Public IP Addresses / Offsite Data Centers

The Connectathon is set up to have all equipment on a private network inside the testing area. Invariably, a few groups will indicate they have monster computers in data centers that cannot be transported. You can run your applications on your data center, but all network risk associated with that is yours. If there is a network problem from the hotel to your site that prevents you from completing testing, the sponsors will take no responsibility for that. Your Connectathon partners are on a private network inside the hotel. If your off-site equipment needs to initiate a connection to different testing partners who are inside the Connectathon firewall, you will need to work with the Network Staff to make certain you can establish those connections.

Some participants will tell me that they need a public IP address for a computer within the test area so that folks from back home can access their software. The Convention Center will create a small number of VPN accounts that Steve Moore will allocate on a per request basis. Please only request a VPN account if you have the need; do not request a VPN account “just because I might need it.”

## VPN Instructions

1. Install the Cisco AnyConnect software found here: <https://vpn.clevelandconventions.com>
  - a. You will be prompted for a login/password that we will provide
2. Once the software is installed, use it to connect. The first prompt is for a hostname (not a URL). Use:
  - a. `vpn.clevelandconventions.com`
3. Then, enter:
  - a. Group: IHE-VPN
  - b. Username: *Assigned to each user*
  - c. Password: *Assigned to each user*

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## Why Must I Use the Hostname for my Computer from Gazelle?

You do not have to change the hostname of your computer as your computer knows it. You only have to make sure that your computer responds to the IP address that is assigned in Gazelle. Other participants will use DNS to lookup [acme0.ihe-us-test.net](#). If you built your system five months ago and the hostname as you know it is bambi, the network connections will still work. All you need to remember:

1. Your test partners will find your IP address by performing a look-up of [acme0.ihe-us-test.net](#).
2. Inbound http connections to your system may include [acme0.ihe-us-test.net](#).

## Interpretation of Network Parameters

1. We will assign fixed IP addresses to each computer that needs one. Your fixed IP address will be on your subnet in the range of 10.242.128.41 through 10.242.129.254. Do not configure any fixed IP addresses that are not in that range.
2. If you plug into the wired network using DHCP, you will be granted an IP address in the range of 10.242.130.11 through 10.242.135.254. If you are using DHCP and your address is not in that range, something is not right. Please release your DHCP address and try again.

## Special Tables

Network Support Staff	<b>TBD</b>
DNS Help	With network staff: <b>TBD</b>
Connectathon Manager (Moore)	<b>TBD</b>
Network policy questions	<ul style="list-style-type: none"> <li>• First: network staff <b>TBD</b></li> <li>• Second: Moore <b>TBD</b></li> </ul>

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## Network Debugging Tips

This section contains no rules. It contains suggestions from a **non-network engineer** (Steve Moore) who has observed Connect-a-thon participants with connectivity problems. We have a network contractor on site to run the network and project managers who are familiar with network problems. However, we expect you to be able to configure your own equipment and understand how to track down network problems. You won't be able to fix a problem if there are two gateways that do not communicate. However, if you approach the network group or project managers and say "The network is broken" or "It doesn't work", we will point you back to this document and ask you to provide better diagnostic information.

While the steps listed below may not be optimal for debugging network problems, these are the steps I will ask you to run if you come to me (Steve Moore) for network help.

The Network Staff are on-site to keep the network operational and to handle any issues you may encounter in using the network. Please come see the Network Staff if you are having issues with the network.

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## Client Application Cannot Send a Message of Type X to Server Y, Port Z

Step	Question	If Yes	If No
1	<p>Open a terminal emulator on your computer. Enter this command:</p> <p><b>telnet host port</b></p> <p>where host/port match your target application</p> <p>Do you get a connection?</p> <p>If you do not have telnet, use the MESA tool: tcp_connect</p>	<p>To kill the telnet connection, hit “Ctrl ]”. That will get you back to the telnet prompt.</p> <p>Enter “quit”</p> <p>Conclusion: Your network connection is fine; you have an application problem.</p>	Step 2
2	Can you ping the other computer?	Then they either have a hardware/software firewall that is blocking the port or their application is not listening. Go talk to them.	This does not mean their computer is down or that the network is down either. They might block ICMP. Continue to Step 3
3	Is the target computer on a different subnet from you?	Determine if you have network connections to the other subnet, starting at step 3.1	Step 4
3.1	First check for local network connections by following these steps.		
3.2	Can you ping or connect to a computer located at your table (your switch)?	Step 3.3	Then it is local to your table.
3.3	Can you ping your default gateway (10.242.x.1)?	Step 3.5	Then, it is a problem in your sector. Step 3.4
3.4	Can your neighbor at an adjoining table ping the gateway?	Wow, scratch your head	Talk to the network contractor
3.5	Can you ping the default gateway on the subnet with the target computer?	You have a network connection to their sector, but not to that port on their computer. They might not respond to ping. You have more work to do. Step 3.6	Network problem. Talk to the network contractor.
3.6	Can you connect to anything that might be on their box? Use a web browser and try a standard http:// Hope it is a linux box and try	If you can connect to something on their box, then it is an issue with their application. Go talk with them. Tell	You cannot connect to anything. Bring this information when you discuss with them.

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	<b>telnet host 22</b> to see if it responds to ssh	them you can connect to some ports but not the one for this application.	
4	You will run tests under step 4 if you are trying to connect to a computer on your same subnet. These are similar to step 3.		
4.1	Can you ping or connect to a computer located at your table (your switch)?	Step 4.2	Then it is local to your table.
4.2	Can you connect to anything that might be on their box? Use a web browser and try a standard http:// Hope it is a linux box and try <b>telnet host 22</b> to see if it responds to ssh	If you can connect to something on their box, then it is an issue with their application. Go talk with them. Tell them you can connect to some ports but not the one for this application.	You cannot connect to anything. Bring this information when you discuss with them.

### Client Application Sends a Message But Does Not Get a Response

Here are some suggestions to consider.

1. Make sure you actually have made a network connection (see above)
2. Make sure you check your logs. Maybe they sent back an errant response and your application threw it in the trash.
3. See if it is a timeout issue. Maybe the server application is being run in a debugger because of a code problem and your application is waiting for the developer to finish his testing.
4. Check with the server and see what they have in their logs. Maybe they did not like your input and crashed, broke the connection or just stalled.

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## Server Application Cannot Receive Inputs

It is a common event that someone with a server application will tell me that they cannot receive connections from other computers. We will use logic similar to what is described above. Most often, we will discover a software firewall or application failure.

Step	Question	If Yes	If No
1	You already believe your server application is running, but these next steps will help troubleshoot.	Step 2	Uhhh, start your server.
2	<p>Open a terminal emulator. Enter <b>netstat -a</b></p> <p>This will give you a bunch of network stuff and tell you which ports are active on your system for LISTENING.</p> <p>It tells you nothing about which application is listening; only that something is listening on port Z.</p> <p>Do you see something listening on the port you expect?</p>	Step 3	Check your application and configuration
3	<p>From a terminal emulator on the computer with the application:</p> <p><b>telnet localhost port</b></p> <p>Does this connect to your application? It won't mean anything, but does it connect?</p>	Step 4	Check for a software firewall or configuration issue.
4	<p>From a terminal emulator on a different computer at your table, try the telnet trick from step 3.</p> <p>Does this connect to your application?</p>	Step 5	Check for a software firewall and that you are connected properly to your switch/hub.
5	By this step, you should know that someone at your table can connect to your server application.	They can connect with telnet, but not with their application. This is not a network problem but most likely a configuration issue.	Check for hardware/software firewall at your table. If that is not the problem, Step 6.

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	Can the person trying to connect with their application connect to you with the telnet trick?		
6	The client application cannot connect to you. It could be a number of things. Make sure both computers (yours/theirs) can ping your default gateway and each other.		