Fundamentals of Information Security: Cybersecurity (88252)

Security Lab 11 - Configuring a Wireless Router

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Exercise 1 – Configuration a Wireless Router

Today, Wireless Technology is everywhere. From Homes to Companies, Access to a network is easily available using Wireless (Wi-Fi) technology. The ability to properly configure a Wireless Access Point or Wireless Router is an important skill for any wireless network professional, security professional, or home user. In this project, students will use an online emulator from TRENDnet to configure a Wireless Router.

This Exercise is taken from your textbook, Module 11, Project 11-3.
Answer all the questions asked below and provide a snippet in the emulator section for each number showing where you found the information.

1. Use your web browser to go to www.trendnet.com/emulators/TEW-818DRU_v1/login.htm. (The location of content on the Internet may change without warning; if you are no longer able to access the program through this URL, use a search engine and search for “Trendnet Emulators.”)

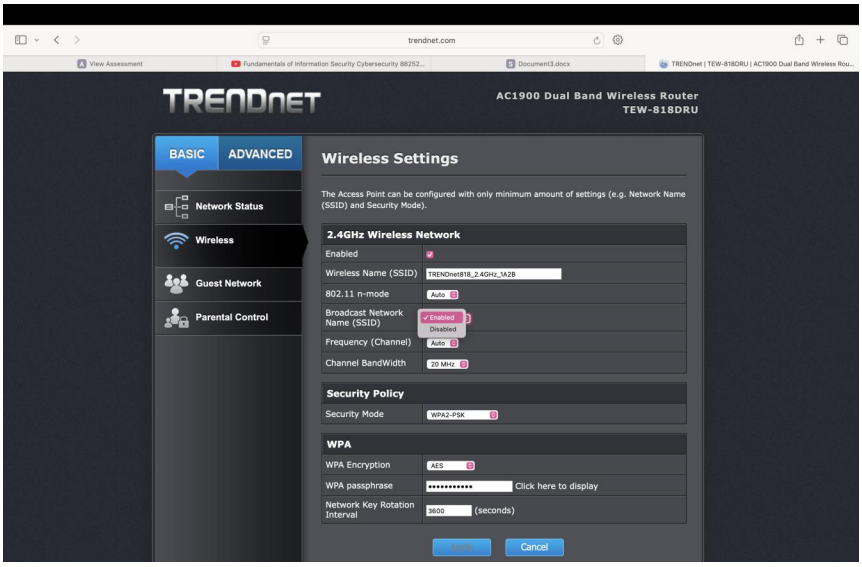
2. The emulated login screen will appear. Click Login without entering a username or password.

3. An emulated Setup screen is displayed, showing what a user would see when configuring an actual TRENDnet.

4. Be sure that the BASIC tab is selected in the left pane. Note the simulated Network Status information.

5. Click Wireless in the left pane and read the information displayed.

6. Under Broadcast Network Name (SSID), click the down arrow next to Enabled. What other option is available? Would it be an advantage to change this setting? Why or why not?



The 2 options are: enabled and disabled. No, it wouldn't be an advantage because it would be harder to find and configure for some devices. Also, hackers can still find it and would think there is something hidden. A stronger password and appropriate security mesaures will be better to protect the network than hiding the SSID.

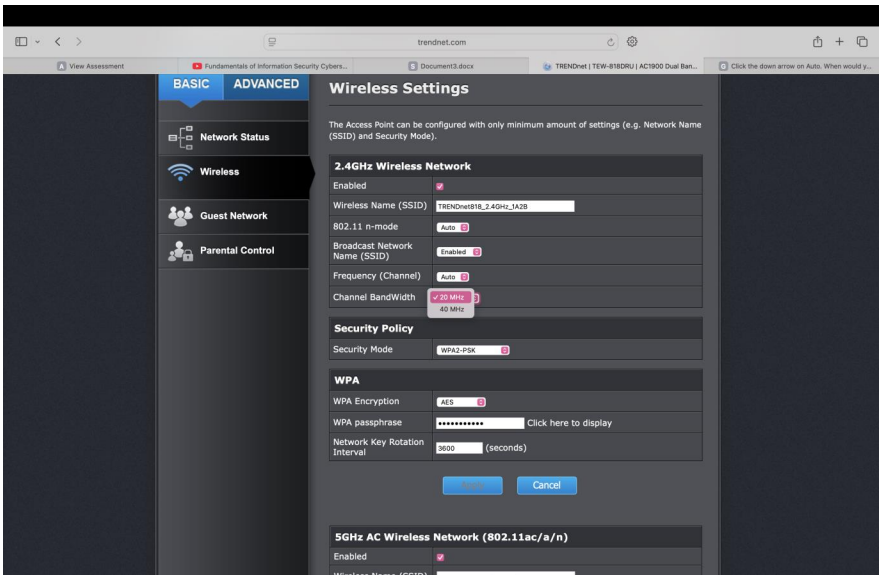
7. Under Frequency (Channel), note that the default is Auto. What does this mean?

It means that the router will select a channel to communicate automatically.

8. Click the down arrow on Auto. When would you want to change the channel on which the wireless signal is broadcast?

You would want to change the channel when the performance seems slow.

9. Under Channel BandWidth, click the down arrow on 20 MHz. What is the other option? Why would you choose this option? What are the advantages and disadvantages of changing the channel bandwidth?



The other option is 40MHz. This option allows faster data speed.

Advantages:

- Faster transmission of data
- Better for high-resolution streaming and video games
- Sometimes can improve the transmission of data and reduce the impact of noise

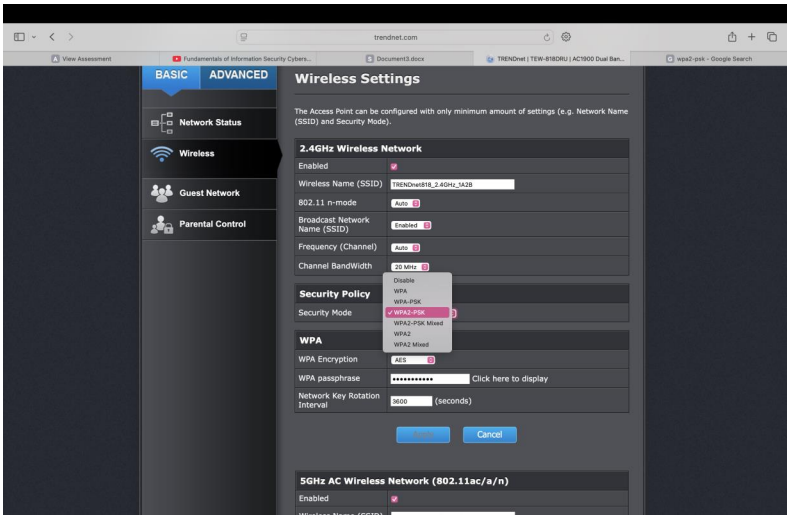
Disadvantages:

- Interference and noise
- It can increase the consumption of power
- It might reduce the range even if the speed it's faster

10. Under Security Policy is a single configuration option, Security Mode. Note the default setting. Is this a good option default option? What does WPA2-PSK mean?

WPA2-PSK or WIFI protected access 2 - pre-shared key is a security protocol that we use in wireless networks. It is a good option because it uses AES for better encryption and a pre-shared key for authentication.

11. Click the down arrow on WPA2-PSK. What are the other options? What do they mean?



WPA: (WIFI Protected Access) replaces WEP protocol, which is known for its security flaws, giving better encryption.

WPA-PSK: better encryption than WEP, it is used when a single pre-shared key is used by the devices connecting to the network.

WPA2-PSK Mixed: it supports older devices that only allow WPA-PSK, and newer devices that allow WPA2-PSK. This can be bad for security because it communicates with TKIP when using WPA-PSK, which is not as secure as AES.

WPA2: security protocol, it is more secure than its previous version WPA, and it uses AES.

WPA2 Mixed: it allows devices to use either WPA or WPA2 to connect to the network, but reduces security because allows TKIP, whic is considered not secure.

12. Under WPA, note the option WPA Encryption. Click the down arrow on AES. What are the other options available and what do they mean?

The other option available is TKIP+AES. It means that it allows TKIP and AES, which is a security flaw because TKIP is outdated.

13. Under WPA passphrase, note the length of the default passphrase. Is that sufficient?

Yes, it is a decent length for a password.

14. In the left pane, click Guest Network. A guest network allows you to have an additional open network for occasional guests that does not affect the main wireless network. How could this be an advantage?

It allows guests to connect to the network without compromising your data, enhancing security.

15. Note the option under Internet Access Only. When would you select this option?

This option should be selected when you don't want guests to have access to your private LAN.

16. Note the option under Wireless Client Isolation. Why is this not enabled by default?

The option is Wireless Client Isolation, we use this option when we want to allow guests to access internet but without accessing each other's resources.

17. Under Security Policy, note that the Security Mode is set to Disable by default. Why would a guest network's security be turned off by default? (Hint: If it were turned on, what would the guests need before they could use the network?)

This is only for convenience and accessibility, so the guest won't need a pre-shared key or password, but it should be changed for better protection.

18. In the left pane, click Advanced.

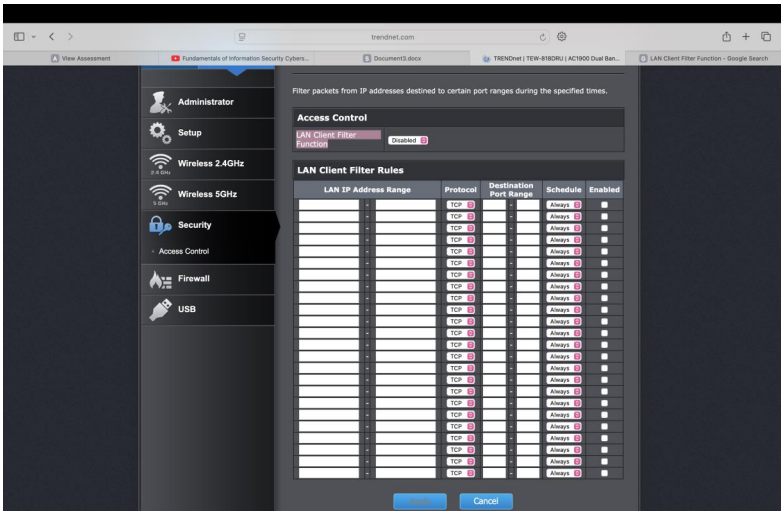
19. Click Security.

20. Under Access Control, what is the LAN Client Filter Function? Does it provide strong security if it were enabled?

The LAN Client Filter Function allows you to filter which devices can connect to the LAN, this is possible by filtering the MAC address or the IP address .

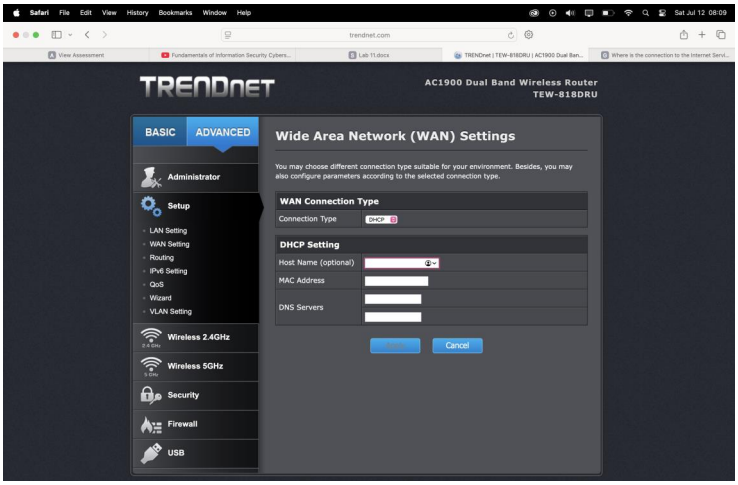
21. How easy is this user interface to navigate? Does it provide enough information for a user to set up the security settings on this system?

The user interface is really easy to navigate. It offers LAN IP address range, what protocol you want to configure TCP/UDP, the port range, schedule, and if you want to enable this.



22. Explore the Wireless Router further an answer the following questions on functionality. Provide snippets as well:

A. Where is the connection to the Internet Service Provider (ISP) configured? Hint: WAN

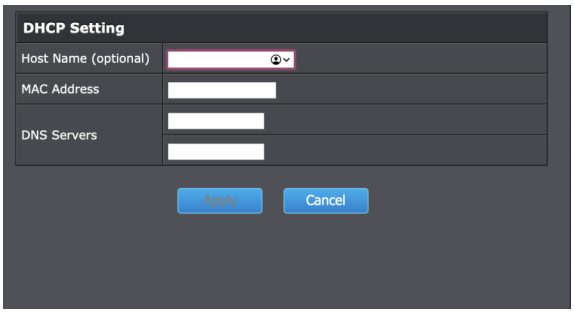


It is configured on the WAN Connection Type option.

B. How does a Desktop or Laptop using this Wi-Fi Router get an IP Address? What protocol is being used to provide the address? Explain.

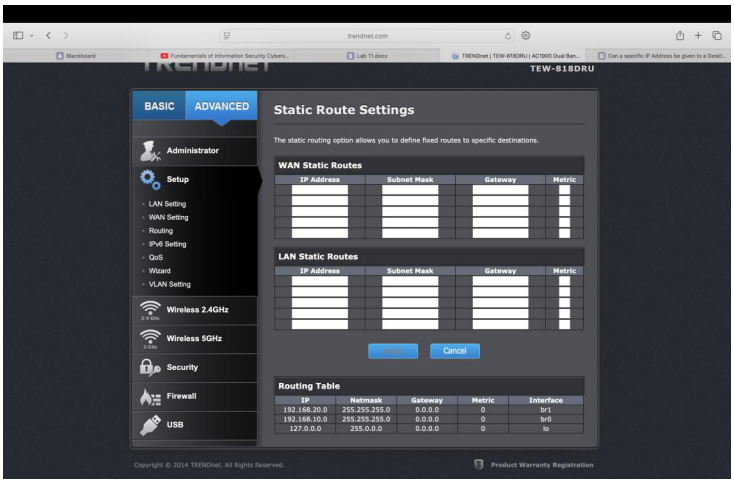
A desktop or laptop gets an IP address through the router, using DHCP protocol. The device sends a request to the router, which has a pool of available IP addresses, and the router assigns one to the device.

C. Can a specific IP Address be given to a Desktop, Laptop, Server using their MAC Address? Where is this configured?



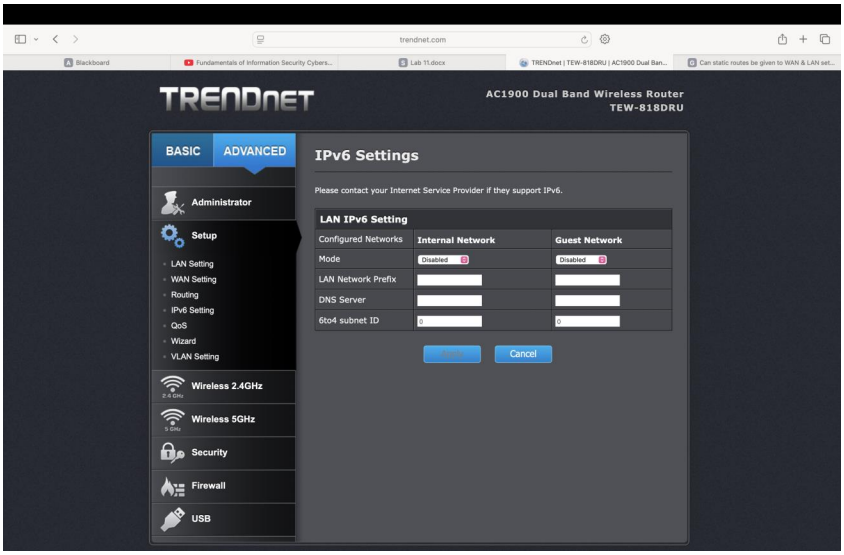
Yes, you can assign a specific IP address to a device, so when this device connects to the network, it will always use the same IP address. This is possible by entering the MAC address of the device in the DHCP settings.

D. Can static routes be given to WAN & LAN settings? What is a static router? Where can this be configured?



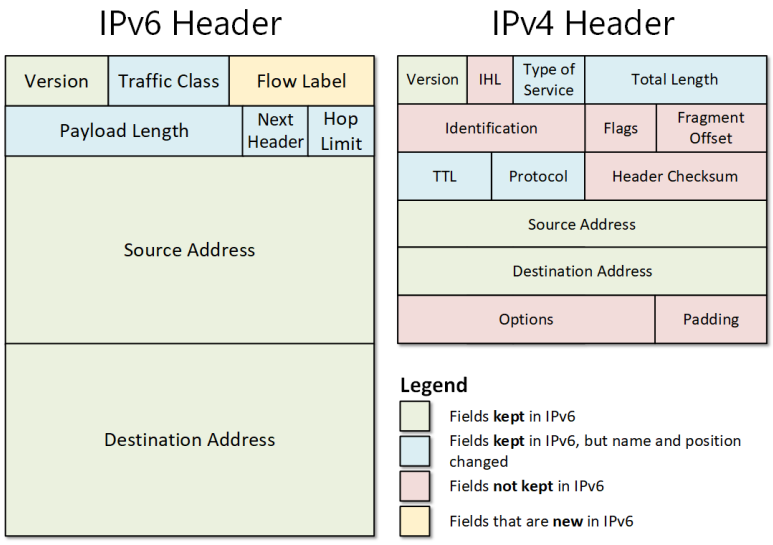
Yes, this is possible for both WAN and LAN. A static route consists of a router there is manually configured using a routing table, and they do not get updated based on network conditions, but by the administrator.

E. Does this Wireless Router support IPV6? Where is it configured? What is IPV6 vs IPV4?



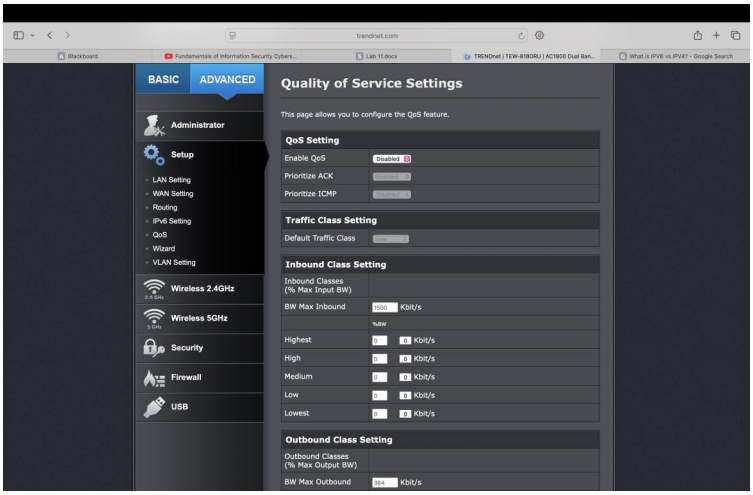
Yes, this router supports IPv6, and it is configured in the IPv6 settings.

IPv6 and IPv4 are both versions of the IP protocol. IPv4 came first than IPv6, they have different structures, IPv4 uses 32-bit addresses, and IPv6 uses 128-bit addresses offering a wider range of IP addresses. IPv6 was developed because of the need for more IP addresses.



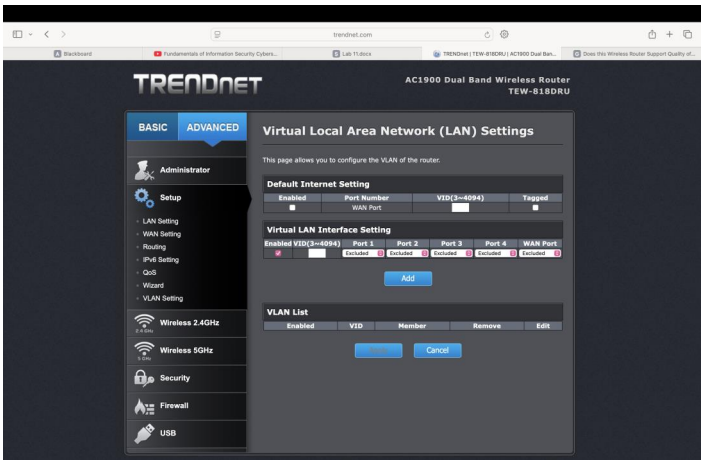
Structure of IPv6 vs IPv4.

F. Does this Wireless Router Support Quality of Service? What is Quality of Service?



Yes, this router supports Quality of Service. QoS allows you to prioritize certain traffic on the network, giving more bandwidth to applications like video streaming or gaming.

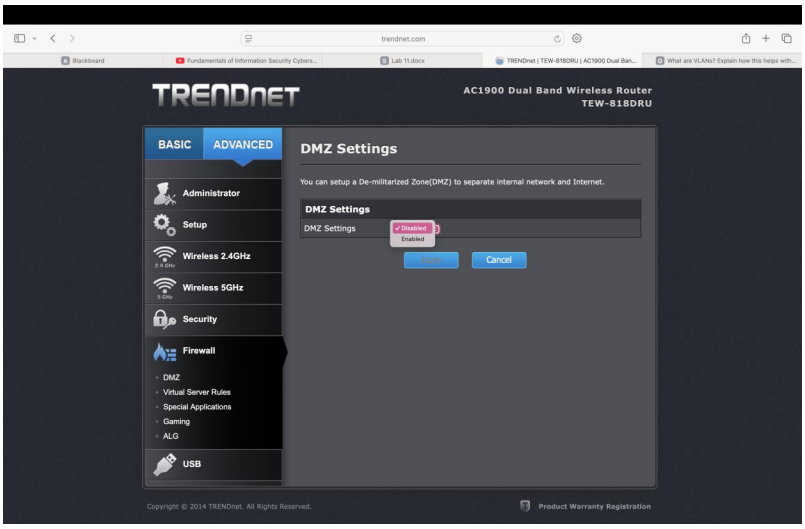
G. Does this Wireless Router Support VLAN's? What are VLAN's? Explain how this helps with security.



Yes, the router supports VLAN's. VLAN's are logical networks created with software or switches that allow the segmentation of a physical network into multiple logical networks. Every logical network that is created has its own rules and policies.

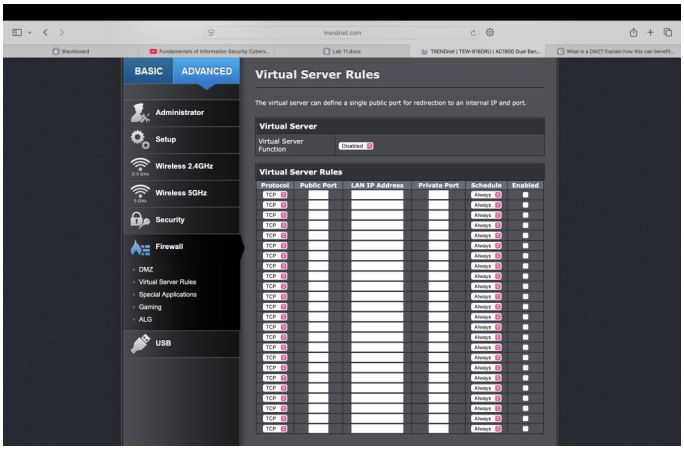
23. Explore the Firewall Details of the Wireless Router and answer the following questions:

A. Can a De-militarized Zone (DMZ) be configured? What is a DMZ? Explain how this can benefit a company?



Yes, the DMZ can be configured. DMZ is a network segment that acts like a buffer between the company's internal network and external untrusted networks like the Internet. It can benefit a company because it isolates services that connect to the Internet, preventing direct access to the internal network and its resources, adding an extra layer of security.

B. Explain Virtual Server Rules.

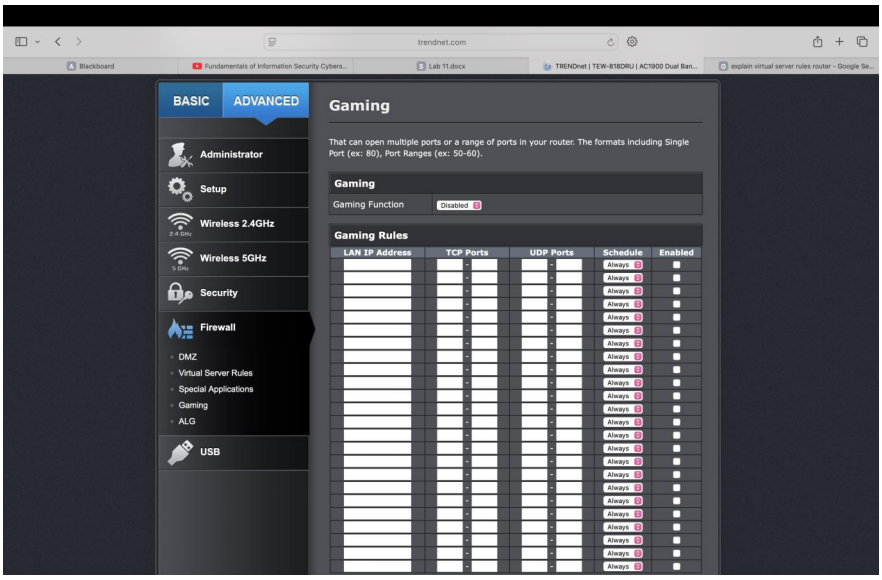


Allows you to expose certain parts of your private network to the Internet, redirecting traffic from an external port to an internal port.

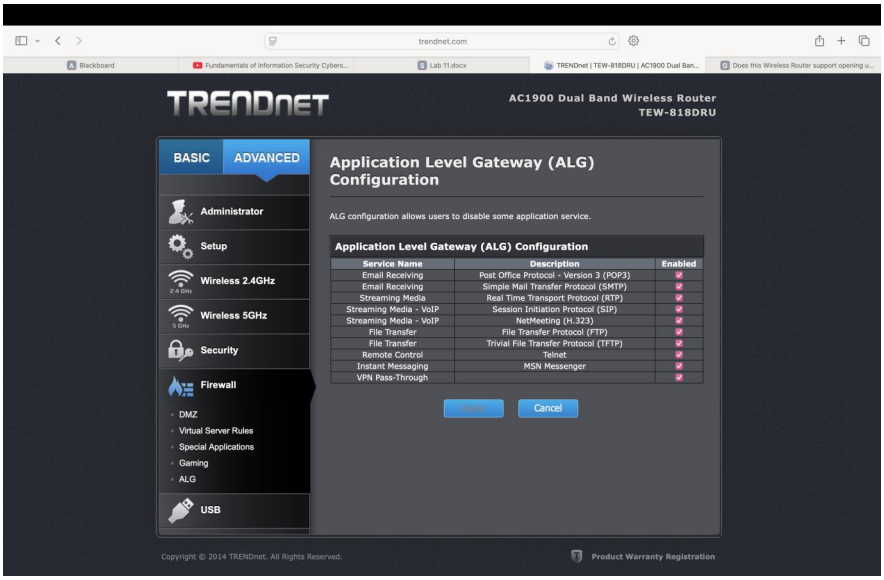
C. Does this Wireless Router support opening up ports for gaming? Explain.

Yes, it does. You create a rule entering the correct information on the Gaming Rules table, and the router allows port forwarding for that specific port, making this communication

bypass the router's firewall and go to a particular device which sometimes is necessary for gaming.

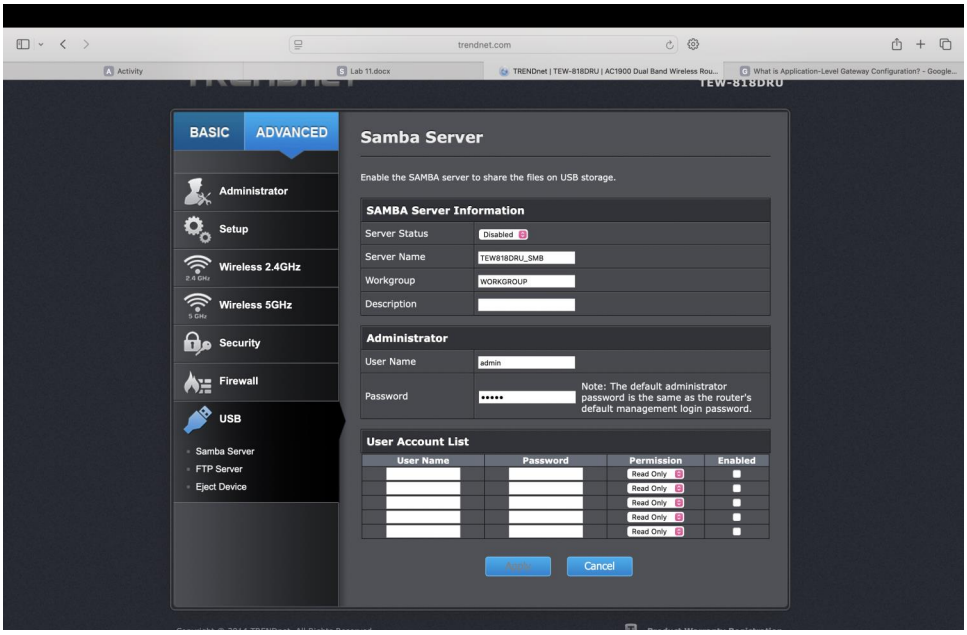


D. What is Application-Level Gateway Configuration?

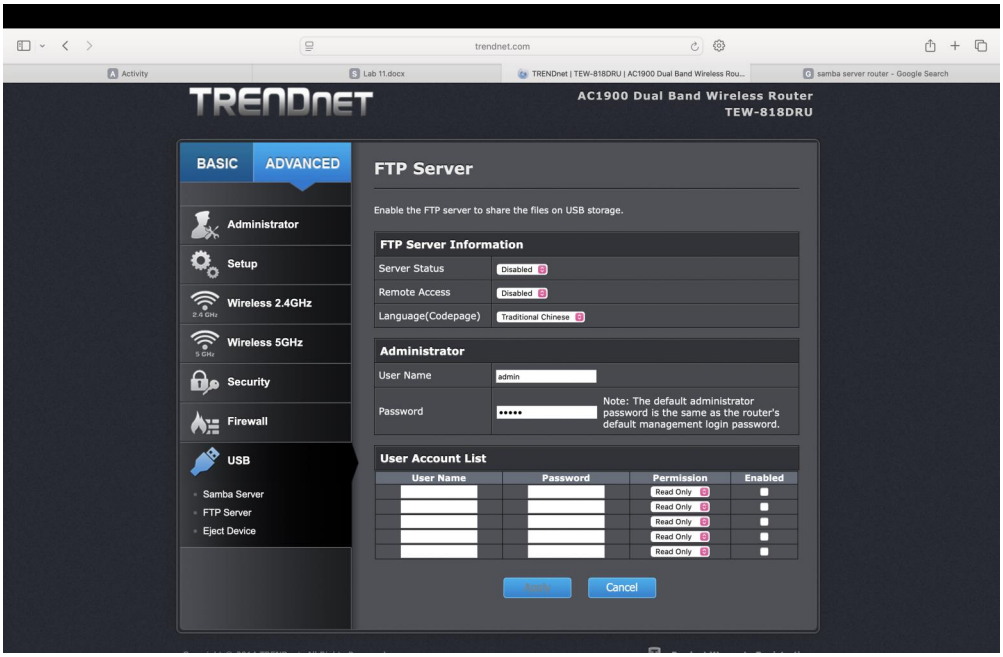


An ALG is a security feature that allows the user to customize specific applications and protocols.

24. Will this Wireless Router allow us to share files over a network using a USB storage? How about an FTP Server?



Yes, we can do this if we enable the SAMBA server.



Yes, it is also possible if we enable the FTP server.