

MIT WORLD PEACE UNIVERSITY

**Wireless Devices and Mobile Security
Third Year B. Tech, Semester 5**

**STUDY AND COMPARISON OF DIFFERENT TYPES
OF APN ROUTERS, LIKE CISCO, TP LINK,
D-LINK, ETC.**

LAB ASSIGNMENT 8

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1 Aim

To learn about different types of APN routers, like CISCO, TP Link, D-Link, and compare their features.

2 Objectives

1. To learn about different types of APN routers, like CISCO, TP Link, D-Link, etc.
2. To compare their features.
3. To learn about the security features of these routers.

3 Theory

3.1 What is a Router?

1. **Definition:** A router is a network device that connects multiple computer networks together and directs data traffic between them. It operates at the network layer of the OSI model and is a key component in home and enterprise networking.
2. **Functionality:** Routers forward data packets based on their destination IP addresses, making decisions about the optimal path for data transmission.
3. **Key Features:** Many routers also include built-in features like firewalls, DHCP servers, and wireless access points.
4. **Use Cases:** Routers are essential for enabling communication between devices on different networks, providing internet access, and ensuring data security.



Figure 1: A Router



Figure 2: A Router

3.2 What is an APN Router?

1. **Definition:** An APN router, or Access Point Name router, is a specialized router designed to manage the connection between a mobile network and the internet. It plays a crucial role in enabling data communication for mobile devices.
2. **Mobile Network Integration:** APN routers facilitate the integration of mobile devices with the internet by providing a gateway for data communication.
3. **Configuration:** Users can configure APN settings on these routers to specify the network to which they want to connect.
4. **Use Cases:** APN routers are commonly used in scenarios where reliable mobile data connectivity is required, such as in remote locations or for mobile hotspots.

3.3 What is the Difference between a Router and an APN Router?

1. **Scope:** A standard router manages data communication between different computer networks, while an APN router specifically handles the connection between mobile networks and the internet.
2. **Functionality:** Routers focus on directing data packets between networks based on IP addresses, while APN routers specialize in managing mobile data connections for devices like smartphones and IoT devices.
3. **Configuration:** APN routers involve configuring settings related to mobile network access, including APN settings, which are not typically found in standard routers.
4. **Use Cases:** Routers are used in general networking scenarios, while APN routers are tailored for mobile data communication, making them suitable for mobile hotspots, remote locations, and IoT applications.

3.4 Different Types of Routers Available in the Market

3.4.1 CISCO

1. **Enterprise Focus:** CISCO routers are widely used in enterprise-level networks, providing advanced features and scalability.
2. **Security Features:** CISCO routers often include robust security features, making them suitable for securing large networks.
3. **Variety of Models:** The product range includes routers for small businesses, branch offices, and large data centers.



Figure 3: Cisco Routers

System Information		Firmware Information	
Serial Number:	1234567891Z	Firmware Version:	1.0.00.14
System Up Time:	0 days 0 hours 38 minutes 43 sec	Firmware MD5 Checksum:	98f272e5fd26c9982cd3355603d72e26
Current Time:	2018-Jul-15, 00:19:01 UTC	Locale:	English
PID VID:	RV260W-I-K9 V19	Language Version:	1.0.0.0
LAN MAC:	3A:3B:3C:3D:22:11	Language MD5 Checksum:	de8b3226eeb53c508a06390d4ce33ceb
WAN MAC:	4A:4B:4C:4D:11:12		

Figure 4: Cisco Router Admin page

3.4.2 TP Link

1. **Consumer and Small Business Focus:** TP-Link routers are popular among consumers and small businesses, offering a balance between features and affordability.
2. **Wireless Technologies:** Many TP-Link routers support advanced wireless technologies, including Wi-Fi 6.

- 3. User-Friendly Interface:** TP-Link routers often feature a user-friendly interface, making them accessible for home users.



Figure 5: TP Link Routers

A screenshot of the TP-Link Router Admin interface for the WR841N model. The top navigation bar shows the title 'TP-Link Wireless N Router WR841N' and 'Model No. TL-WR841N'. The left sidebar menu is visible, with 'Network' selected and highlighted in yellow. The main content area is titled 'LAN Settings' and contains fields for MAC Address (00:0A:EB:13:09:69), IP Address (192.168.0.1), and Subnet Mask (255.255.255.0). There is also a checkbox for 'Enable IGMP Snooping' which is unchecked. At the bottom right of the form is a red-bordered 'Save' button. To the right of the main content area, there is a vertical sidebar with sections for 'LAN', 'Note', and 'Click to', though they are mostly cut off by the edge of the frame.

Figure 6: TP Link Router Admin page

3.4.3 D-Link

- 1. Home and Small Office Use:** D-Link routers cater to home users and small office environments.
- 2. Affordability:** D-Link routers are known for their affordability and straightforward setups.

3. Wireless Connectivity: Many D-Link models support wireless connectivity, making them suitable for homes with multiple devices.



Figure 7: D Link Routers

Figure 8: D Link Admin Page

3.4.4 Netgear

1. Home Networking Focus: Netgear routers are designed for home networking, emphasizing ease of use and reliability.

2. **Mesh Wi-Fi Systems:** Netgear offers mesh Wi-Fi systems for extended coverage in larger homes.
3. **Parental Controls:** Some Netgear routers include robust parental control features for managing internet access.



Figure 9: Netgear Routers

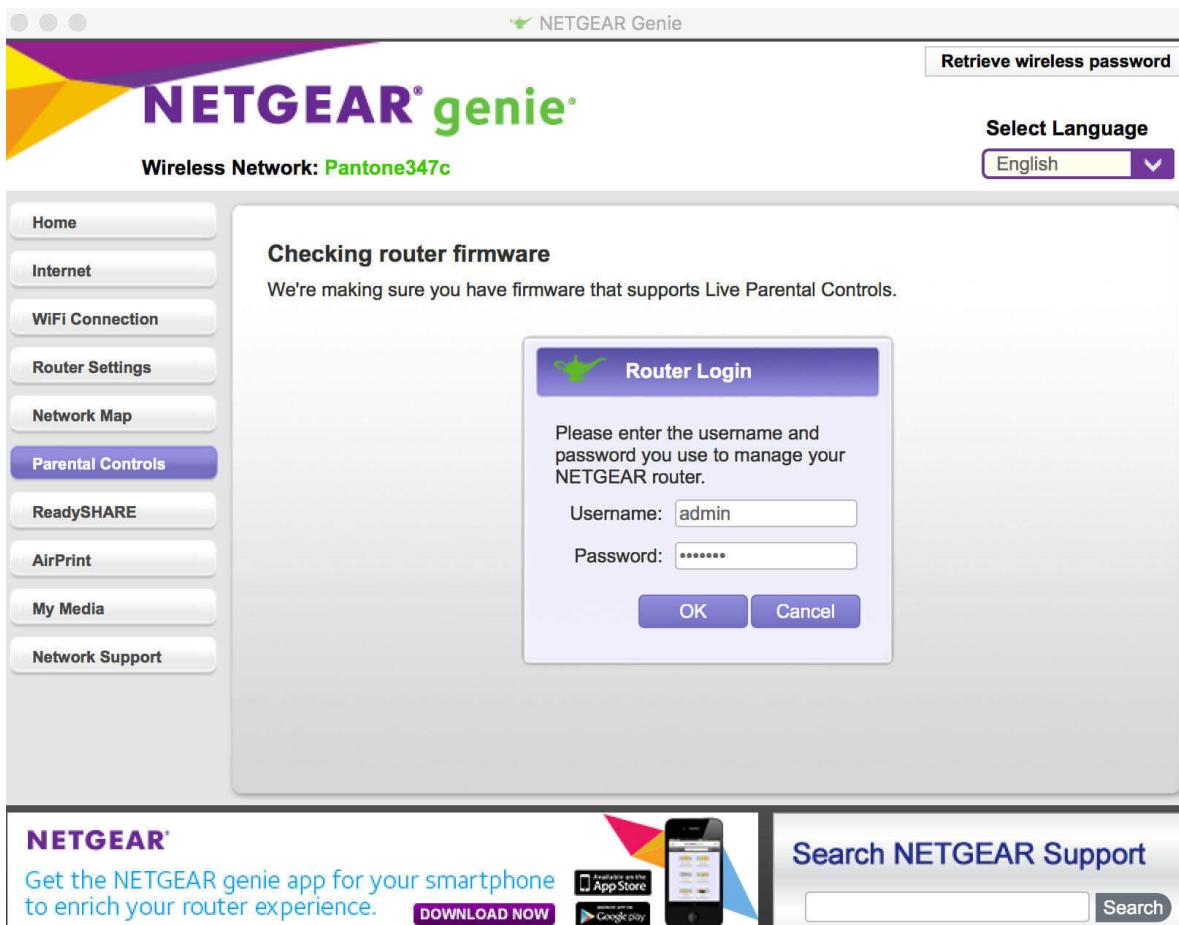


Figure 10: Netgear Router Admin Page

3.4.5 Asus

- Gaming and High-Performance:** ASUS routers often target gamers and users seeking high-performance networking solutions.
- Advanced Features:** ASUS routers may include features like gaming acceleration, VPN support, and AiMesh for mesh networking.
- Quality of Service (QoS):** ASUS routers may prioritize gaming traffic using QoS features for an enhanced gaming experience.



Figure 11: Asus Routers

A screenshot of the Asus Router Admin Page for the RT-AC68U. The page has a dark theme. On the left is a sidebar with icons for Quick Internet Setup, General, Network Map, Guest Network, AiProtection, Adaptive QoS, Traffic Analyzer, Game, Open NAT, and USB Application. The main area shows the router's operation mode as "Wireless router" and firmware version as "3.0.0.4385_20490". It also displays the SSID as "Asus 2.5GHz" and "Asus 2.5GHz 5G". A navigation bar at the top includes Logout and Reboot buttons. Below this, a tab bar has "LAN IP" selected, along with DHCP Server, Route, IPTV, and Switch Control. The "LAN - LAN IP" section contains an "Apply" button and fields for Host Name (RT-AC68U-A640), RT-AC68U's Domain Name, IP Address (192.168.1.1), and Subnet Mask (255.255.255.0).

Figure 12: Asus Router Admin Page

3.4.6 Linksys

1. **Home and Small Business:** Linksys routers cater to both home users and small businesses.
2. **Mesh Networking:** Linksys offers mesh networking solutions for whole-home coverage.

3. **Open Source Firmware:** Some Linksys models support open-source firmware, allowing advanced users to customize their router's functionality.



Figure 13: Linksys Routers

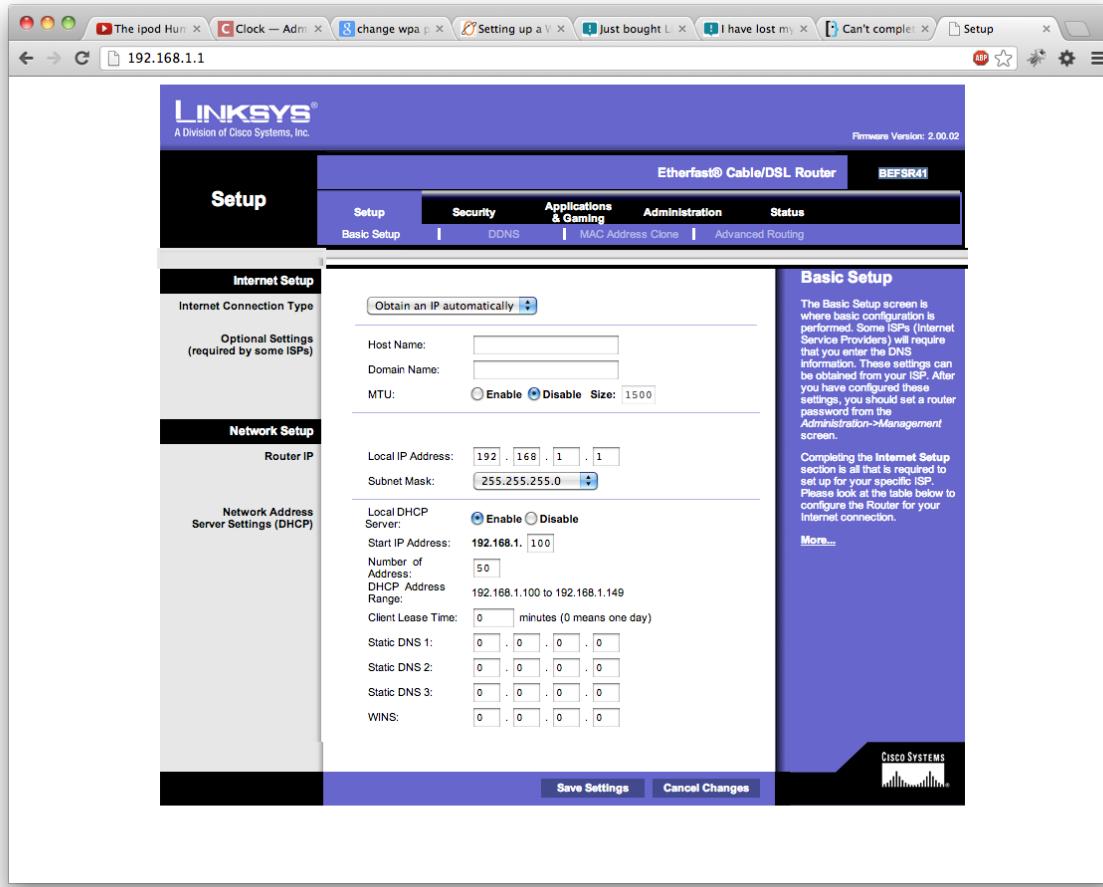


Figure 14: Linksys Router Admin Page

3.4.7 MikroTik

1. **Affordable and Versatile:** MikroTik routers are known for their affordability and versatility.
2. **RouterOS:** MikroTik routers run on RouterOS, a Linux-based operating system, providing extensive configuration options.
3. **Enterprise Solutions:** MikroTik offers routers suitable for both small networks and larger enterprise solutions.

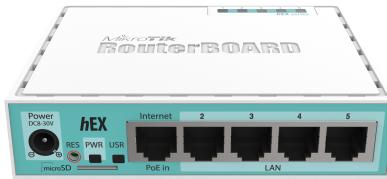


Figure 15: Mikrotik Routers

Figure 16: Mikrotik Router Admin Page

3.4.8 Ubiquiti

1. **Enterprise Networking:** Ubiquiti routers focus on providing solutions for enterprise-level networking.
2. **Unified Networking:** Ubiquiti offers routers that integrate with their broader ecosystem of networking products, providing a unified network management experience.
3. **Scalability:** Ubiquiti routers are scalable and suitable for building large, complex networks.



Figure 17: Ubiquiti Routers

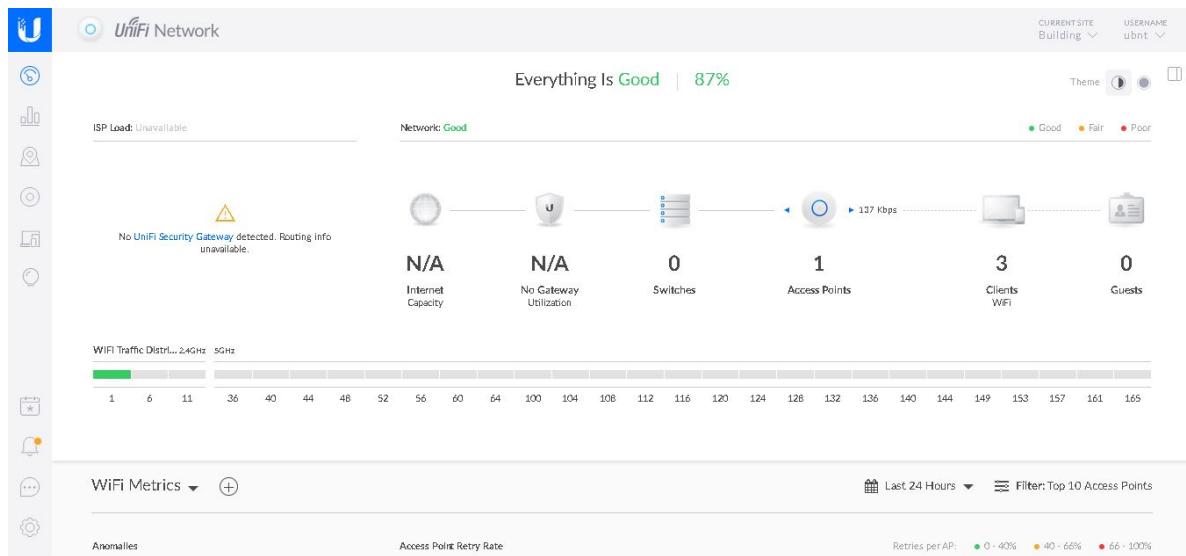


Figure 18: Ubiquiti Router Admin Page

3.4.9 Huawei

- Diverse Product Range:** Huawei offers a diverse range of routers, including models for consumers, small businesses, and large enterprises.
- 5G Routers:** Huawei is known for its 5G routers, providing high-speed internet connectivity.
- Advanced Technologies:** Huawei routers often incorporate advanced technologies, making them suitable for modern networking requirements.



Figure 19: Huawei Routers

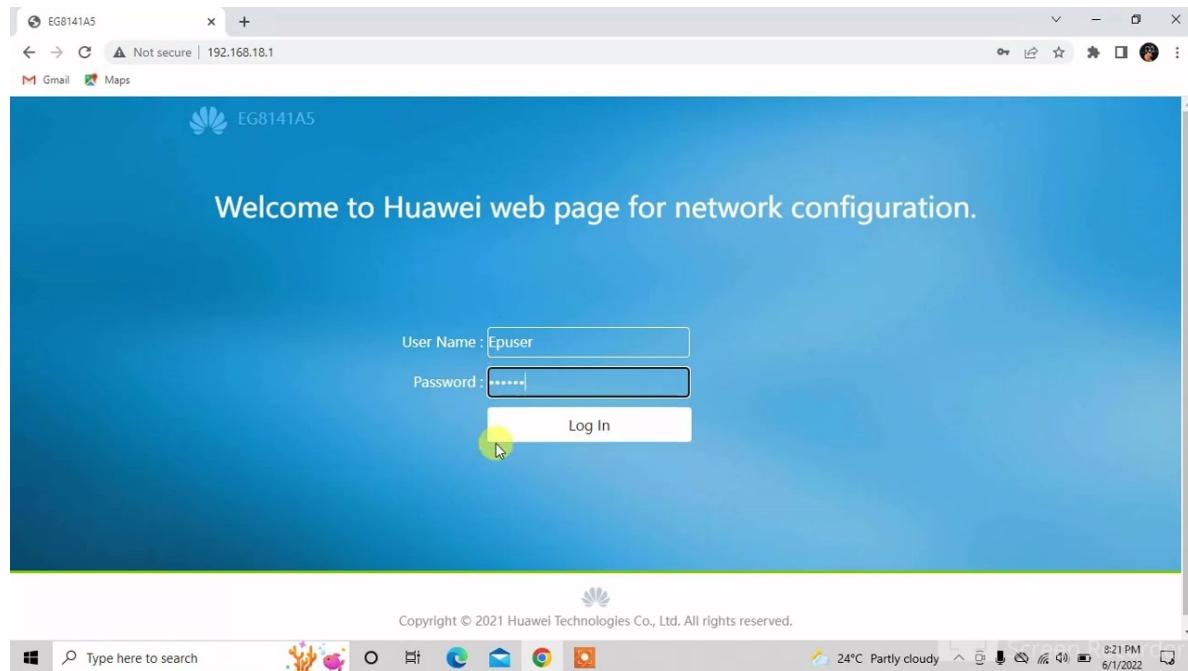


Figure 20: Huaewi Router Admin Page

4 Router Comparison

4.1 Cisco Routers

Pros:

- Advanced features suitable for enterprise networks.
- Robust security features.
- Variety of models catering to different network sizes.

Cons:

- Higher cost, especially for enterprise-level models.
- Steeper learning curve for configuration.

4.2 TP-Link Routers

Pros:

- Affordable options for home and small business users.
- Support for advanced wireless technologies.
- User-friendly interface.

Cons:

- May lack some advanced features compared to enterprise-level routers.
- Limited scalability for large networks.

4.3 D-Link Routers

Pros:

- Cost-effective for home and small office use.
- Straightforward setups.
- Wireless connectivity for multiple devices.

Cons:

- Limited feature set compared to more advanced routers.
- May not be suitable for larger networks.

4.4 Netgear Routers

Pros:

- Designed for home networking with a focus on ease of use.
- Mesh Wi-Fi systems for extended coverage.
- Some models offer robust parental control features.

Cons:

- Features may be less advanced compared to routers targeting enterprise or gaming markets.
- Limited options for advanced configurations.

4.5 ASUS Routers

Pros:

- Targeted towards gaming and high-performance users.
- Advanced features like gaming acceleration and AiMesh support.
- Quality of Service (QoS) prioritization for an enhanced gaming experience.

Cons:

- Higher cost compared to basic home routers.
- May have a steeper learning curve for users unfamiliar with advanced networking concepts.

4.6 Linksys Routers

Pros:

- Suitable for both home users and small businesses.
- Mesh networking solutions for whole-home coverage.
- Some models support open-source firmware for customization.

Cons:

- Features may not be as advanced as routers designed for specific purposes like gaming or enterprise networking.
- Limited scalability for larger networks.

4.7 MikroTik Routers

Pros:

- Affordable and versatile routers.
- RouterOS provides extensive configuration options.
- Suitable for both small networks and larger enterprise solutions.

Cons:

- May have a steeper learning curve due to advanced configuration options.
- Limited brand recognition compared to more mainstream options.

4.8 Ubiquiti Routers

Pros:

- Focused on enterprise networking solutions.
- Integration with a broader ecosystem of networking products.
- Scalable for building large, complex networks.

Cons:

- Higher cost compared to routers designed for home use.
- May be overkill for smaller networks or home users.

4.9 Huawei Routers

Pros:

- Diverse product range catering to consumers, small businesses, and large enterprises.
- Known for 5G routers providing high-speed internet connectivity.
- Incorporates advanced technologies suitable for modern networking requirements.

Cons:

- Limited availability in certain regions compared to more globally recognized brands.
- Some models may be priced higher than comparable options from other brands.

5 Platform

Operating System: Arch Linux x86-64

IDEs or Text Editors Used: Visual Studio Code

Compilers or Interpreters: Python 3.10.1

6 Conclusion

Thus, we have successfully studied and compared different types of APN routers, like CISCO, TP Link, D-Link, etc.

References

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