Key Differences Between Routers and Different Types of Switches

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Contents

Introduction

In the world of networking, devices like routers and managed switches play crucial roles in facilitating the efficient flow of data and maintaining network integrity. However, each of these devices serves a distinct purpose and offers unique capabilities. In this article, we'll explore the main differences between routers, unmanaged switches, managed L2 switches, managed L2+ switches, and managed L3 switches, helping you understand their respective functions and when to use them.

Router and switch place in the OSI model.

Routers

Routers are key components of any network, whether at home or in an enterprise environment. They are responsible for connecting multiple networks, such as your local area network (LAN) to the wider internet. Key differences between routers and switches include:

- Routing Functionality. Routers make decisions based on IP addresses to determine the best path for data packets. They maintain a routing table and perform network address translation (NAT) to manage multiple devices sharing a single public IP address. Also, routers can use dynamic routing protocols (e.g., OSPF, BGP) to exchange routing information with other routers dynamically. This enables routers to adapt to changes in the network topology and automatically update their routing tables, ensuring efficient and up-to-date path selection.

- Network Layer. Routers operate at the network layer (Layer 3) of the OSI model, providing interconnectivity between different IP subnets.

- Security Features. Routers often include firewall capabilities, which can filter and control the flow of traffic to enhance network security.

- QoS support. Routers often support Quality of Service mechanisms to prioritize certain types of network traffic over others. This is crucial for applications that require consistent and low-latency communication, such as voice and video conferencing.

- Virtual LANs (VLANs). Routers can be configured to support Virtual LANs, allowing the segmentation of a physical network into multiple logical networks. VLANs enhance network efficiency, security, and management by isolating broadcast domains and controlling communication between different segments.

- Network Monitoring and Management. Routers typically come with management interfaces that allow administrators to monitor and configure the device. They support protocols like SNMP, MQTT for network monitoring, making it easier to identify and troubleshoot issues in the network.

[Teltonika](#) [Router selection](#)

Unmanaged Switch

An unmanaged switch is a basic, plug-and-play device used to expand the number of Ethernet ports on a network. Key differences include:

- No Configuration. Unmanaged switches do not require any configuration. They simply pass data between connected devices.

- Cost-Efficiency. Unmanaged switches are cost-effective and are ideal for simple, small-scale networks.

[Teltonika](#) [Unmanaged Switch selection](#)

Managed L2 Switch

Managed Layer 2 switches are more sophisticated than unmanaged switches and offer advanced networking capabilities: Configuration Options: Managed L2 switches allow for configuration of VLANs, link aggregation, and port-based security. They operate at the data link layer (Layer 2) and use MAC addresses to forward traffic.

- QoS Support. Quality of Service settings can be configured to prioritize certain types of traffic, ensuring better network performance.

- Monitoring Tools. Managed L2 switches typically provide network monitoring and troubleshooting features.

- Enhanced Security. They offer improved security options, including access control lists (ACLs) and port security.

Managed L2+ Switch

Managed Layer 2+ switches build upon the capabilities of managed L2 switches such as QoS Support, Monitoring Tools and Enhanced Security and additionally offer some Layer 3 features without full routing capabilities:

- These switches can perform basic routing functions between VLANs.

- Enhanced Network Segmentation. Managed L2+ switches provide more advanced VLAN support and a better network segmentation.

- Port control. Enable/disable, link speed control, port isolation, EEE (802.3az) management, Port Mirroring option.

- Static Routing. Static IPv4 routing, static IPv6 routing, DHCPv6 client, static IPv6 address, They can handle static routing to connect different VLANs or subnets.

- Teltonika L2+ Switches also add additional Services for such protocols as Ethernet/IP, Profinet (class B), SNMP v2, v3, LLDP

Teltonika L2+ Switch selection

Managed L3 Switch

Managed Layer 3 switches are essentially a hybrid between routers and switches, combining routing and switching functionalities:

- Full Routing Capabilities. Managed L3 switches can perform advanced routing functions, including dynamic routing protocols like OSPF and BGP.

- Inter-VLAN Routing. They facilitate efficient routing between VLANs, allowing for better network segmentation and traffic management.

- High Performance. Managed L3 switches are known for their high throughput and low latency, making them suitable for demanding networks.

- Advanced Security. These switches offer robust security features, including ACLs, firewall capabilities, and deep packet inspection.

Conclusion

Routers and managed switches serve distinct roles in a network. Routers handle inter-network communication and maintain security, while managed switches offer advanced network management and traffic control within a local network. Choosing the right device depends on your network's specific requirements, size, and complexity. Understanding these key differences can help you make informed decisions when designing and maintaining your network infrastructure.