

How a router works

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Related product (if any):	N/A
Description:	Describes what a network router is, how it works, and some basic concepts relating to its functions.
Symptoms:	N/A
Cause:	N/A
Files Needed:	N/A

Steps to Correct:

What is a router?

A router is a Layer 3 network device which routes IP packets. Without it, network devices will not be able to talk to each other. It facilitates communication by creating a local area network (LAN) which devices join, and it uses a **routing table** to route traffic to the Internet, and other remote networks.

Routers differ from modems in that modems connect your home and business to Internet access via your ISP, whilst your router is the device which you actually connect to on your network--which your modem also connects to.

How does a router work?

A router figures out the fastest path between devices connected on a network, and sends data to those paths. To do this, routers use what's called a **metric value** or **preference number**. So if a router has to choose between two routes to the same location, it will choose the one with the lowest metric. Metrics are stored and shown in the routing table. P.S., there are different ways in which a router learns routes. Routes can be learned either **statically** or **dynamically** and generally speaking, static routes tend to have a higher preference when compared to a dynamic route. How a router chooses a route to a network via static route versus a route learned via a dynamic routing protocol, is via its **administrative distance (AD)**. So the flow is **Choose lowest AD route type/protocol > Choose route with lowest metric**.

The **routing table** is a list of all possible paths in your network. When a router receives IP packets that need to be routed to another network, the router looks at the packet's IP address and then searches the routing table for routing information. Learning about routing tables is crucial for managing networks regardless of what protocols are being used.

Managing routers involves making changes when necessary. This involves logging into your router via software, webpage, or through a terminal session. For example, you may need to change login passwords, encrypt the network, create port forwarding rules, or update the router's firmware.

NOTE: Traffic destined for another host on the same network will almost never go to the router. The network switch will use its forwarding information base (FIB) to send Layer 2 frames to the host instead.

ARP and the routing table

Address Resolution Protocol (ARP) is a Layer 2 protocol that routers use to create a table that binds IP addresses to MAC addresses. Or in other words, it binds an IP address to the hardware device on the network. This is important since routers are normally Layer 3 devices on the OSI model. A router needs to know how an IP address relates to a Layer 2 MAC address, and ARP is how it figures this out.

If a host wants to send a packet to another host via its IP

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