

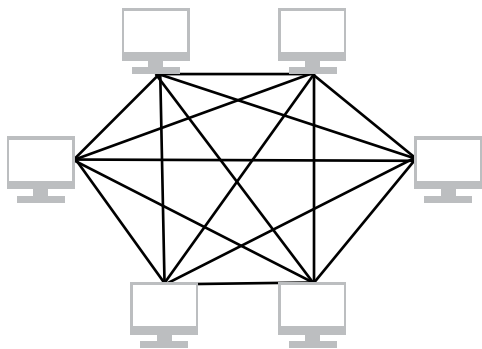
Overview

The Internet allows information to be passed from one device to another. To facilitate this process of sending data from one device to another, the Internet makes use of **routers**, which are the components of the Internet that direct packages of data across various networks. Routers follow a very specific set of instructions in order to ensure that data being sent across the internet ends up at the correct location.

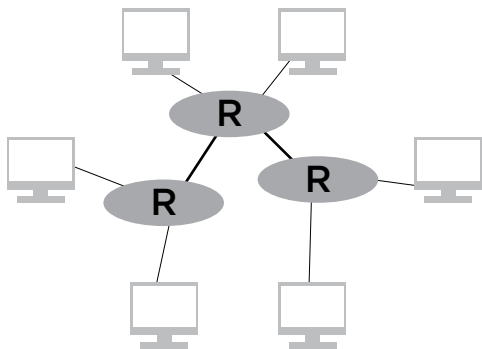
Key Terms

- router
- routing table

Network Without Routers



Network With Routers



The Routing Model

On the Internet, every Internet-connected device needs to be able to communicate with every other Internet-connected device. One possible way to organize such a network is with the diagram at left: where every computer on the network is physically connected to every other computer on the Internet.

Such a model would certainly be fast: to get information from one computer to another, the information could be sent directly to the destination. However, such a model would require an infeasible number of physical connections. The connection web is already complicated, even with just six computers connected to the Internet. With millions or even billions of Internet-connected devices, having every computer connected to every other computer isn't reasonable.

Instead, the Internet makes use of routers. Routers act as intermediaries between devices on the Internet. Every computer is connected to a router, and each router is connected to other routers. This way, a computer can send information to any other computer on the Internet by passing data through one or more routers.

In this way, every computer on the Internet can still communicate with every other computer, just not directly. Packets of data are sent through the Internet via routers, each of which sends the packet along to another router which is closer to the final destination, until finally the packet arrives at a router which is connected to the destination computer.

Routing Tables

Routers are programmed with instructions about where to send each packet of data, depending on the destination's IP address. These instructions are often stored in a **routing table**. Routers can judge, based on the initial digits of an IP address, which direction packets need to be sent.

However, routers don't need to have information about the exact path that the data packet needs to take to get to its destination: the router just sends the packet one step closer to the destination, and lets the next router take care of the rest.

In addition, there often won't be just one route that data can take in order to get from one location on the Internet to another. Routers will frequently move packets of data across different routes, even if they are intended for the same location.