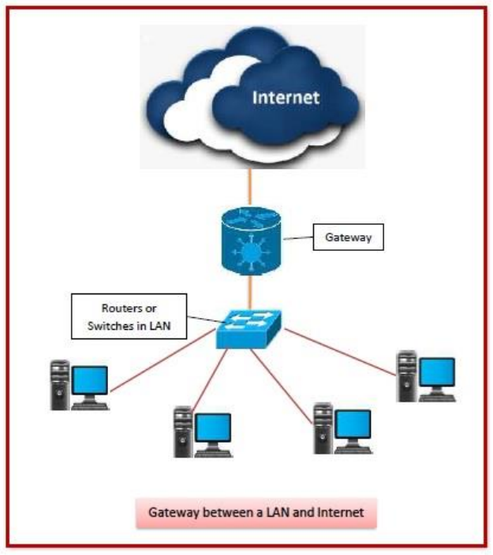
What are Gateways in Computer Network?

Computer NetworkComputer EngineeringMCA

A gateway is a network node that forms a passage between two networks operating with different transmission protocols. The most common type of gateways, the network gateway operates at layer 3, i.e. network layer of the OSI (open systems interconnection) model. However, depending upon the functionality, a gateway can operate at any of the seven layers of OSI model. It acts as the entry – exit point for a network since all traffic that flows across the networks should pass through the gateway. Only the internal traffic between the nodes of a LAN does not pass through the gateway.



Features of Gateways

- Gateway is located at the boundary of a network and manages all data that inflows or outflows from that network.
- It forms a passage between two different networks operating with different transmission protocols.
- A gateway operates as a protocol converter, providing compatibility between the different protocols used in the two different networks.
- The feature that differentiates a gateway from other network devices is that it can operate at any layer of the OSI model.
- It also stores information about the routing paths of the communicating networks.
- When used in enterprise scenario, a gateway node may be supplemented as proxy server or firewall.
- A gateway is generally implemented as a node with multiple NICs (network interface cards) connected to different networks. However, it can also be configured using software.
- It uses packet switching technique to transmit data across the networks.

Types of Gateways

On basis of direction of data flow, gateways are broadly divided into two categories −

- **Unidirectional Gateways** − They allow data to flow in only one direction. Changes made in the source node are replicated in the destination node, but not vice versa. They can be used as archiving tools.
- **Bidirectional Gateways** − They allow data to flow in both directions. They can be used as synchronization tools.

On basis of functionalities, there can be a variety of gateways, the prominent among them are as follows −

- **Network Gateway** − This is the most common type of gateway that provides as interface between two dissimilar networks operating with different protocols. Whenever the term gateway is mentioned without specifying the type, it indicates a network gateway.
- **Cloud Storage Gateway** − It is a network node or server that translates storage requests with different cloud storage service API calls, such as SOAP (Simple Object Access Protocol) or REST (REpresentational State Transfer).It facilitates integration of private cloud storage into applications without necessitating transfer of the applications into any public cloud, thus simplifying data communication.
- **Internet-To-Orbit Gateway (I2O)** − It connects devices on the Internet to satellites and spacecraft orbiting the earth. Two prominent I2O gateways are Project HERMES and Global Educational Network for Satellite Operations (GENSO).
- **IoT Gateway** − IoT gateways assimilates sensor data from IoT (Internet of Things) devices in the field and translates between sensor protocols before sending it to the cloud network. They connect IoT devices, cloud network and user applications.
- **VoiP Trunk Gateway** − It facilitates data transmission between plain old telephone service (POTS) devices like landline phones and fax machines, with VoIP (voice over Internet Protocol) network.