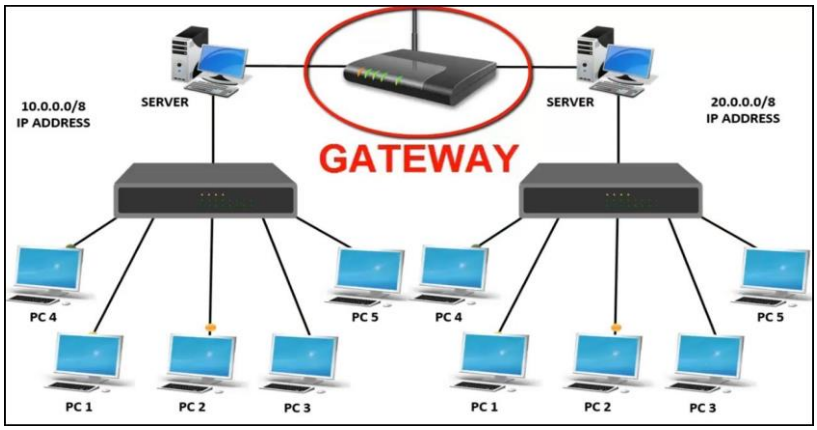
Gateway

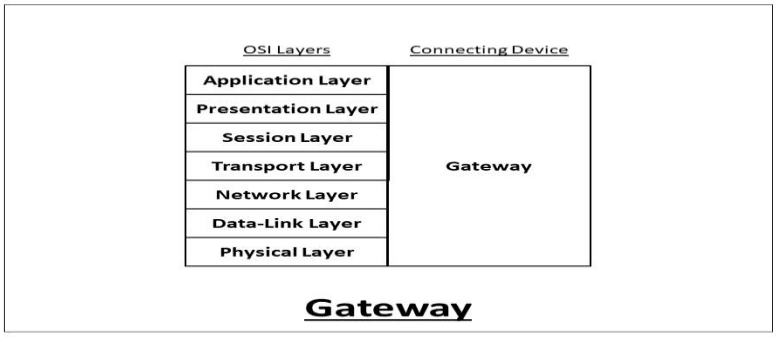
A gateway, as the name suggests, is a passage to connect two networks together that may work upon different networking models. They basically work as the messenger agents that take data from one system, interpret it, and transfer it to another system. A gateway is a hardware device that acts as a "gate" between two networks. It may be a router, firewall, server, or other device that enables traffic to flow in and out of the network.

While a gateway protects the nodes within network, it also a node itself. The gateway node is considered to be on the "edge" of the network as all data must flow through it before coming in or going out of the network. It may also translate data received from outside networks into a format or protocol recognized by devices within the internal network.

A router is a common type of gateway used in home networks. It allows computers within the local network to send and receive data over the Internet. A firewall is a more advanced type of gateway, which filters inbound and outbound traffic, disallowing incoming data from suspicious or unauthorized sources. A proxy server is another type of gateway that uses a combination of hardware and software to filter traffic between two networks. For example, a proxy server may only allow local computers to access a list of authorized websites.



A gateway operates on all the layers of the OSI model, so it can be used as a one-stop solution for all kinds of network device connectivities.



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Following are the advantages of using a Gateway:

1. It can connect the devices of two different networks having dissimilar structures.
2. It is an intelligent device with filtering capabilities.
3. It has control over both collisions as well as a broadcast domain.
4. It uses a full-duplex mode of communication.
5. It has the fastest data transmission speed amongst all network connecting devices.
6. It can perform data translation and protocol conversion of the data packet as per the destination network's need.
7. It can encapsulate and decapsulate the data packets.
8. It has improved security than any other network connecting device.

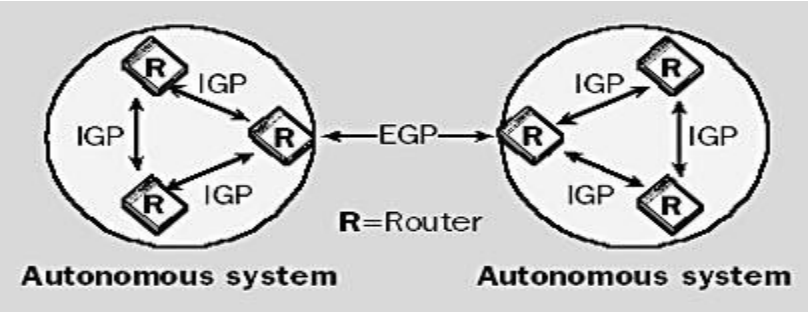
Following are the disadvantages of using a Gateway:

1. It is complex to design and implement.
2. The implementation cost is very high.
3. It requires a special system administration configuration.

Interior Gateway Protocol (IGP):

When the data packets are to be transferred within the same autonomous systems, Interior Gateway Protocols are used (IGP). For the communication to happen between the networks using Interior Gateway Protocol, both the networks must belong to same autonomous system.

The router identifies the autonomous system of a network using autonomous system number. If the autonomous system number of two networks is different, we cannot use Interior Gateway Protocol to establish a communication link between those two networks.



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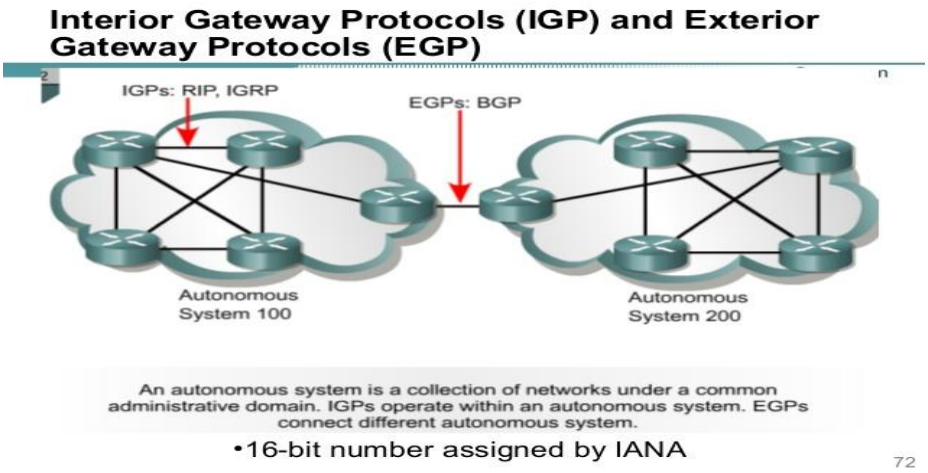

Exterior Gateway Protocol (EGP):

Exterior Gateway Protocol is used to transfer the data packets between two different autonomous systems. The router identifies the device autonomous system based on autonomous system number assigned to that network. Exterior Gateway protocol (EGP) and Border Gateway Protocols (BGP) are the examples of Exterior Gateway Protocols.

Routers that uses Exterior Gateway Protocol (EGP) maintains the information about all the IP addresses assigned to the devices, best path to a particular network and cost metrics etc.

Differences between EGP and IGP

Though the **Exterior Gateway Protocol** and Interior Gateway protocols are used to transmit the data packets between different networks using routable protocols like Internet Protocol; they are different from each other.

Interior Gateway Protocol is used to forward the packets among different networks that use the same autonomous system number. Whereas the **exterior Gateway Protocol** have the capability of forwarding data packets to different networks with different autonomous system numbers.

Interior Gateway Protocols:

1. Routing Information Protocol (RIP)
2. Open Shortest Path First (OSPF)
3. Enhanced Interior Gateway Routing Protocol (EIGRP)
4. Intermediate System to Intermediate System (IS-IS)

Exterior Gateway Protocol:

1. Border Gateway Protocol (BGP)

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Border Gateway Protocol

BGP is also a Routing protocol which has the below features:

– Border Gateway Protocol
– It is an Exterior Gateway Protocol (EGP) and the only one available today
– Protocol of the Internet
– It is mainly used for Scalability, Reliability and control but NOT SPEED, thus different than other protocols
– BGP uses the concepts of Autonomous Systems (AS)
– The IANA (Internet Assigned Numbers Authority) provides the AS numbers. The numbers 1 to 64511 are public AS numbers and 64512 to 65535 are private AS numbers
– An AS is a collection of networks under common administration
– BGP version is currently in use and the only EGP

Border Gateway Protocol (BGP) is a standardized exterior gateway protocol designed to exchange routing information among autonomous systems on the internet. BGP is mainly used by large networks for router configurations. But it's also used by small home networks to access the internet. Even though it can be a complex protocol, understanding the basics of BGP gives you the skills to increase your network's stability, security, and scalability.

How BGP works?

When you connect a primary home router, your computer pulls an IP address from the router. Devices in your home then use that IP address to access the internet. When you open a browser and access a website, you need to connect to a server that is not on your local network. Your browser needs to send the request to your home router that connects to your internet service provider's router. That router sends a request to the internet. The request then bounces from router to router until it reaches its intended destination, which is usually a web server.

BGP comes into play somewhere between your server request going from your home router to your provider's router.

When to use BGP

It is important to know cases or scenarios where we can make use of BGP:

– If AS is working as a transmit for example ISP
– When an AS is connected to multiple AS, i.e. Multihomed
– If the data needs to be manipulated while entering or leaving the AS

When not to use BGP

It is advisable not to use BGP in these conditions:

– If you have a single home AS
– Insufficient resources like memory or CPU in routers
– If do not possess proper understanding about BGP route filtering and the path selection process

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