Q7. What is PING? Explain.

Ans:

Ping is a network diagnostic tool used primarily to test the connectivity between two nodes or devices. To ping a destination node, an Internet Control Message Protocol (ICMP) echo request packet is sent to that node. If a connection is available, the destination node responds with an echo reply. Ping calculates the round-trip time of the data packet's route from its source to the destination and back, and determines whether any packets were lost during the trip.

The network ping tool was created by Mike Muuss in 1983. It contains almost one thousand lines of code and has become the standard packaged tool for various network applications and operating systems.

The ping utility works by generating an ICMP data unit that is then encapsulated into IP datagrams and transmitted over the network. After receiving the echo request, the destination node copies its payload, destroys the original packet and generates an echo reply with the same payload it received.

The payload of the echo request packet often consists of American Standard Code for Information Interchange (ASCII) characters with variable adjustable lengths. Round-trip time is calculated by noting the local time of the source node clock when the IP datagram leaves the source node, then subtracting that time from the time at which the echo reply arrives.

Depending on the operating system, ping utility output varies. However, almost all ping outputs display the following:

* Destination IP address
* ICMP sequence number
* Time to live (TTL)
* Round-trip time
* Payload size
* The number of packets lost during transmission

The ping tool displays various error messages if a round trip is not completed successfully. They include the following:

* **TTL Expired in Transit:** Determines the maximum amount of time an IP packet may live over the network before being discarded if it has not reached its destination. To address this error, try to increase TTL value by using the ping -i switch.
* **Destination Host Unreachable:** Indicates that the destination node is down or is not operating on the network. It may even occur due to the non-existence of a local or remote route for the destination host. To address this error, modify the local route table or switch the node on.
* **Request Timed Out:** Indicates that the ping command timed out because there was no reply from the host. It indicates that no echo reply messages were received due to network traffic, failure of Address Resolution Protocol (ARP) request packet filtering or a router error. Increasing the wait time using the ping –w switch may address this problem.
* **Unknown Host:** Indicates that the IP address or the host name does not exist in the network or that the destination host name cannot be resolved. To address this issue, verify the name and availability of the domain name system (DNS) servers.