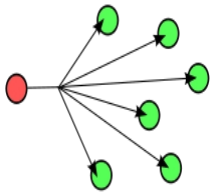
# *Ethernet Broadcasting*

***Date 14/10/2013- RRU***

**Broadcasting (networking)**



In telecommunication and information theory,**broadcasting** refers to a method of transferring a message to all recipients simultaneously. Broadcasting can be performed as a high level operation in a program, for example broadcasting Message Passing Interface, or it may be a low level networking operation, for example broadcasting on Ethernet.

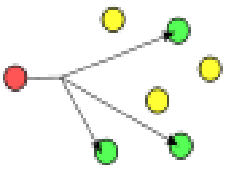
In computer networking,**broadcasting** refers to transmitting a packet that will be received by every device on the network. In practice, the scope of the broadcast is limited to a broadcast domain. Broadcast a message is in contrast to unicast addressing in which a host sends datagram to another single host identified by a unique IP address.

Not all network technologies support broadcast addressing; for example, neitherX.25 nor frame relay have broadcast capability, nor is there any form of Internet-wide broadcast. Broadcasting is largely confined to local area network(LAN) technologies, most notably Ethernet and token ring, where the performance impact of broadcasting is not as large as it would be in a wide area network.

The successor to Internet Protocol Version 4(IPv4), IPv6 also does not implement the broadcast method, so as to prevent disturbing all nodes in a network when only a few may be interested in a particular service. Instead it relies on multicast addressing - a conceptually similar *one-to-many* routing methodology. However, multicasting limits the pool of receivers to those that join a specific multicast receiver group.

Both Ethernet and IPv4 use an all-ones broadcast address to indicate a broadcast packet. Token Ring uses a special value in the IEEE 802.2 control field.

**Multicast**



In computer networking,multicast is the delivery of a message or information to a group of destination computers simultaneously in a single transmission from the source. Copies are automatically created in other network elements, such as routers, but only when the topology of the network requires it. Multicast is most commonly implemented in IP multicast, which is often employed in Internet Protocol (IP) applications of streaming mediaand Internet television. In IP multicast the implementation of the multicast concept occurs at the IP routing level, where routerscreate optimal distribution paths for datagrams sent to a multicast destination address.

At the Data Link Layer,multicast describes one-to-many distribution such as Ethernet multicast addressing, Asynchronous Transfer Mode(ATM) point-to-multipoint virtual circuits (P2MP) or Infiniband multicast.

**IP multicast**

IP multicast is a technique for one-to-manycommunication over an IP infrastructure in a network. It scales to a larger receiver population by not requiring prior knowledge of who or how many receivers there are. Multicast uses network infrastructure efficiently by requiring the source to send a packet only once, even if it needs to be delivered to a large number of receivers. The nodes in the network take care of replicating the packet to reach multiple receivers only when necessary.

The most common transport layer protocol to use multicast addressing is User Datagram Protocol(UDP). By its nature, UDP is not reliable—messages may be lost or delivered out of order. Reliable multicastprotocols such as Pragmatic General Multicast (PGM) have been developed to add loss detection and retransmission on top of IP multicast.

IP multicast is widely deployed in enterprises, commercial stock exchanges, and multimedia content delivery networks. A common enterprise use of IP multicast is for IPTV applications such as distance learning and televised company meetings.

As of 2006, most effort at scaling multicast up to large networks have concentrated on the simpler case of single-source multicast, which seems to be more computationally tractable.

Still, the large state requirements in routers make applications using a large number of trees unable to work while using IP multicast. Take presence information as an example where each person needs to keep at least one tree of its subscribers, if not several. No mechanism has yet been demonstrated that would allow the IP multicast model to scale to millions of senders and millions of multicast groups and, thus, it is not yet possible to make fully general multicast applications practical.

**Multicasting using TCP/IP for Multiple clients** :

This is not possible. TCP is a **connection based** protocol, meaning any connection is established between exactly two partners, starting out with the three-way handshake, the data transmission and acknowledgments, and the connection tear down. This ensures complete delivery verification of all communications at the expense of the protocol overhead. (similar to a classic phone connection between two people: First you verify the right person picks up, then you talk, then say goodbye)

UDP is a **connectionless** protocol, meaning any packets are simply placed on the wire and the protocol itself does not ensure any verification of delivery (similar to e.g. a radio broadcast). Any two-way communication needs to be done by the program, e.g. the receiver could send another UDP packet back to notify the sender that a packet was received.
Broadcast and multicast packets **must be connectionless**. There is no way around it. One can use UDP for broadcasts and TCP for for data at the same time in the same program, but cannot combine the two into a single connection. They don't mix.