Mobile Computing
Mr. Saurabh Singh

Data casting or Data Broadcasting:

Data broadcasting (data broadcasting) refers to broadcasting data over an outsized area through radio waves.

It usually refers to the supplementary information sent by TV stations and digital TV, but it also can be applied to digital signals on analog TV or broadcasting. It always doesn't apply to the inherent data of the media that outline virtual channels for DTV or direct broadcast satellite systems; or things like cable modems or satellite modems, which use completely independent data channels.

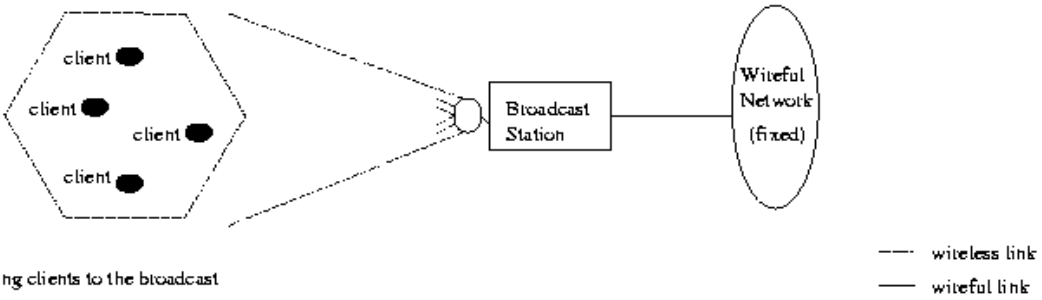
Data broadcasting usually provides news, weather, traffic, stock exchange and other information, which can or might not be associated with the program carried. It also can be interactive, like games, shopping or education.

Data broadcasting requirements:

Due to the limited bandwidth of mobile systems, data should be organized and provided to users according to data needs.

Data broadcasting can be used to manage the interest in sending (pushing) the same data to listening clients without prior request (or locking). The server continuously broadcasts data to the MU.

- Scalability: The cost does not depend on the number of users listening.
- The mobile unit may/may not be cached.
- Facilitate data access during disconnection.
- Allow access to location-related data.
- There is no need to predict future data requirements with 100% accuracy.
- Broadcast according to access probability.
- Broadcast all data regularly.



Listening clients to the broadcast

MOBILE IP (Problem situation):

The host's address consists of two parts: (1) The high-order bits of the address determine the n/w where the host is located (2), and the remaining low-order bits determine the host number. IP determines the next hop by determining network information based on the destination IP address of the data packet. On the other hand, higher layers like TCP maintain information about the connection, which is indexed by a four-tuple containing the IP address and port number of the endpoint. Therefore, when trying to support mobility on the Internet under the existing protocol suite, we are faced with two conflicting requirements:

Whenever a mobile node changes its connection point, it must change its IP address in order to correctly route data packets destined for that node.

To maintain an existing TCP connection, the IP address of the mobile node must remain unchanged. Changing the IP address will cause disconnection and loss of connection.

Computer mobility in heterogeneous networks.

Relocation between different IP subnets.

Goal: Transparent migration and localization, compatibility with IP, no changes to existing routers.

Idea: Introduce temporary/actual IP addresses (also known as "care-of address", COA);

Use localization technology to map permanent IP addresses to temporary IP addresses.

Motivation:

Mobile IP may be a proposed standard protocol, which is predicated on the web protocol, and realizes packet routing and delivery by making mobility transparent to applications and higher-level protocols (such as TCP).

Due to the big variety of wireless devices that provide IP connectivity (such as PDAs, handheld devices, and digital cellular phones), people's views on the web have changed.

Routing:

- Based on IP destination address, network prefix (for example, 129.13.42).
- Determine the physical subnet.
- The change of the physical subnet means changing the IP address to possess the right topological address (standard IP) or a special entry must be added to the routing table.

The specific route to the ultimate system?

- Change all routing table entries to forward the packet to the right destination.
- Cannot follow the rise within the number of mobile hosts and frequent changes in location, security issues.

Change IP address? : A simple solution is to let the mobile host change its address when entering a new network.

- Adjust the host IP address according to the current location.
- DNS update almost takes a long time to find the mobile system.
- TCP connection is interrupted, security issues.
- Without specific support, the mobile node cannot deliver from its local IP subnet (because of the routing based on the network prefix and destination IP address).
- The IP address cannot be changed when moving to a new IP subnet (because TPT/higher level connections cannot be maintained).

Use DHCP to obtain a new address to associate it with the new network. This method has several disadvantages.

- The configuration file will need to be changed
- Every time a computer moves from one network to another, it must be restarted.
- The DNS table needs to be modified so that all other hosts on the Internet are aware of the change.

- If the host roams from one N/W to another N/W during transmission, the data exchange will be interrupted. This is because the port and IP address of the client and server must remain unchanged during the connection.

MOBILE IP: Introduction:

Mobile IP was developed to enable a computer to take care of an online connection while moving from one Internet connection point to a different Internet connection point. It is an online Engineering Task Force (IETF) standard communication protocol designed to permit mobile device users to move from one network to a different while retaining a permanent IP address. Provide an efficient and scalable mechanism to roam within the web.

- Using mobile IP, a node can change its connection point with the web without changing its IP address. This permits them to take care of transmission and high-level connections while on the move.
- Don't assume "base stations" are everywhere.
- Simple
- The communication host doesn't got to understand mobility
- Suitable for changing domain and network interface
- Although suitable for wired environments, it's especially suitable for wireless environments
- In "mobile connection": keep the connection, in "mobile connection": establish a replacement connection after each move.

Requirements to Mobile IP (RFC 2002):

Compatibility:

- Support the same layer 2 protocol as IP.
- No need to change the current terminal system and router.
- Mobile terminal system can communicate with fixed system.

Transparency:

- The mobile terminal system reserves its IP address.
- Possibility to continue communication after the link is interrupted.
- Can change the connection point with the fixed network.

Efficiency and scalability:

- Only a few additional messages to the mobile system.
- (Usually connected via a low-bandwidth radio link).
- Support for a large number of mobile systems worldwide.

Safety:

- Verify all registration messages.

Mobile IP: Terminology:

Home network: In terms of its IP address, it's the subnet to which the MN belongs. No mobile IP support is required within the home network.

External network: this is often the present subnet visited by the MN, not the local network.

Mobile Computing
Mr. Saurabh Singh

Mobile Node (MN): A node that moves throughout the network without changing its IP address.

Communication node (CN): MN and its corresponding host (TCP).

Home Agent (HA):

- The host within the MN's home network, usually a router.
- Maintain the mobility binding table, where each entry is identified by the tuple. The aim of this table is to map the house address of the mobile node with its COA and forward data packets accordingly.
- Register the situation of the MN, and transmit the IP data packet to the COA through the tunnel.

Foreign Agent (FA):

- The host within the current external network of MN, usually a router.
- Maintain a visitor list that contains information about the mobile nodes currently visiting that n/w. Each entry within the visitor list is identified by the tuple.
- Forward tunnel packets to MN, usually the default router of MN.

Care of address (COA):

- MN's current tunnel endpoint address (in FA or MN).
- View the particular location of MN from an IP perspective.