Handoffs

Handoff refers to a process of transferring an ongoing call or data session from one channel connected to the core network to another.
- Process of transferring a MS from one base station to another.
- Also called as Hadover

Handoff management is the process by which a mobile node keeps its connection active when it moves from one access point to another. There are three stages in a handoff process.

- First, the initiation of handoff is triggered by either the mobile device, or a network agent, or the changing network conditions.
- The second stage is for a new connection generation, where the network must find new resources for the handoff connection and perform any additional routing operations.
- Finally, data-flow control needs to maintain the delivery of the data from the old connection path to the new connection path according to the agreed-upon QoS guarantees.

Reasons for a Handoffs to be conducted:

- To avoid call termination: call drops
- When the capacity for connecting new calls of a given cell is used up.
- Interference in the channels.
- When the user behaviours change like - Speed and mobility.

Handoff Detection

- The plane wave amplitudes, phases, and angles of arrival relative to the direction of motion are random.
- These plane waves interfere and produce a varying field strength pattern.
- The MS's received signal fades rapidly and deeply as it moves through this interference pattern.
- By reciprocity, the BS receiver experiences the same phenomenon as the MS due to the MS motion.

Types of Handoffs

Types of handoff depends on the movement of the mobile device, it may undergo various

(a)   Hard handoff: *break before make* connection

- Intra system handoff / horizontal handoff
- Inter-system handoffs / vertical handoff
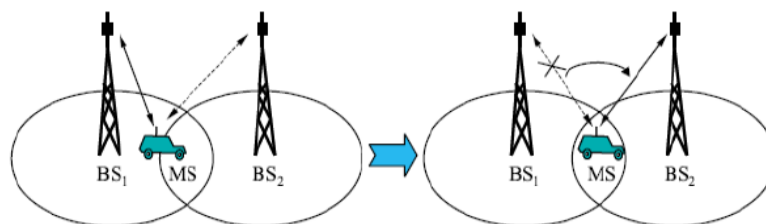
Hard Handoff between the MS and BS

Handoffs in homogeneous networks are referred to as intra-system handoffs. This type of handoff occurs when the signal strength of the serving BS goes below a certain threshold value.

An inter-system handoff between heterogeneous networks may arise in the following scenarios.

  (i)   when a user moves out of the serving network and enters an overlying network,
  (ii)   when a user connected to a network chooses to handoff to an underlying or overlaid network for his/her service requirements,
  (iii)   when the overall load on the network is required to be distributed among different systems.

(b)   Soft handoff: *Make-before-break connection*
        Mobile directed handoff.- Multiways and softer handoffs
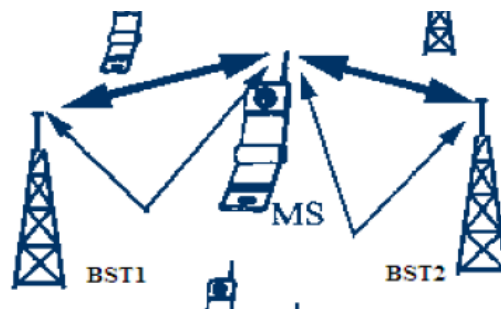
Soft Handoff between MS and BSTs

Hand off protocols

Mainly there are Four types of handoff protocols which help in providing continuous and QOS-guaranteed service.
        – Network-controlled handoff (NCHO)
        – Mobile-assisted handoff (MAHO)
        – Soft handoff (SHO) and
        – Mobile-controlled handoff (MCHO)

The design of handoff management techniques in all-IP based next-generation wireless networks must address the following issues:

  •   signaling overhead and power requirement for processing handoff messages should be minimized,
  •   QoS guarantees must be made,
  •   network resources should be efficiently used, and
  •   the handoff mechanism should be scalable, reliable and robust.