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The Mobile Switching Center (MSC) is a core part of the GSM/CDMA network that serves as a control center within the Network Switching Subsystem (NSS). MSC routes voice calls, SMS, circuit-switched data, and more.

The Role of the Mobile Switching Center (MSC)

Set between the base station and the Public Switched Telephone Network (PSTN), the Mobile Switching Center works as a gateway for all mobile communications. Its role involves managing call setup between subscribers and overseeing both inter-BSC (Base Station Controller) handovers and inter-MSC handovers. When a mobile device approaches the edge of its cell coverage, an inter-BSC handover request is initiated by the Base Station Controller (BSC) to the MSC. The MSC identifies the appropriate adjacent BSC and executes a seamless transfer of the mobile device, ensuring continuous connectivity.

Overview of NSS Elements and Mobile Switching Center

Let's dive deeper into all NSS elements:

Component	Description
Mobile Switching Center (MSC)	Core of NSS, handles call routing, mobility, and more.

Home Location Register (HLR)	Stores subscriber information, authenticates users.
Visitor Location Register (VLR)	Temporarily stores user data for current location.
Authentication Center (AuC)	Generates and stores authentication information.
Equipment Identity Register (EIR)	Manages device identities for security.

What Are Examples of Mobile Switching Centers?

Vendor	Country
Ericsson	Sweden
Nokia	Finland
Huawei	China
Cisco	United States
Alcatel-Lucent	France (now Nokia)
ZTE	China
Samsung	South Korea

NEC	Japan
Motorola Solutions	United States
Fujitsu	Japan

What is MSC and BSC in Telecom?

In telecommunications, MSC (Mobile Switching Center) and BSC (Base Station Controller) act as major constituents within cellular networks. While the MSC enables communication between mobile devices and the public switched telephone network



What Are the Functions of a Mobile Switching Station (MSC)?

A Mobile Switching Station or Mobile Switching Center (MSC), involves some of the key functions within the mobile network infrastructure, such as call routing, mobility management, service provisioning and more:

Call routing and switching. The MSC routes and switches voice calls and data sessions between mobile users and between mobile users and the public switched telephone network (PSTN).

Mobility management. A Mobile Switching Station involves location updating, registration, and handovers between cells when users move.

Security. The MSC authenticates users credentials verification with the home network's databases. In addition, it includes encryption and other security measures.

Service Provisioning. Mobile Switching Station works with multiple subscriber services like call forwarding, voicemail, and SMS.

Interfacing with Other Networks. Moreover, MSC interfaces with other MSCs, base station controllers (BSCs), and external networks (like the PSTN and internet) to

ensure communication across different regions and technologies.

Billing and Accounting. MSC gathers billing information for calls and data sessions to provide accurate charging.

Emergency Call Ability. Mobile Switching Center ensures emergency calls are routed to the appropriate emergency services.

MSC and HLR: What's the Relation?

The Mobile Switching Center works hand-in-hand with the Home Location Register (HLR) to accommodate the dynamic mobility of the devices. The HLR acts as a database storing crucial information, including location data for each mobile device. Leveraging the HLR's repository, the MSC ensures accurate call routing and uninterrupted connectivity as mobile subscribers traverse different cellular areas.

The Place of MSC In Handovers

Cellular networks are divided into smaller areas called cells, each served by a Base Transceiver Station (BTS). These BTS cells often overlap, creating zones where a mobile device can connect to multiple cells simultaneously. This overlap is crucial for handovers.

MSC manages handovers to maintain uninterrupted services as mobile devices shift within cells. This enables reliable connectivity when changing geo-location. An MSC manages a group of Base Station Controllers (BSCs), which in turn oversee multiple BTSs. When your device moves from one cell to another, the MSC plays a key role in transferring the connection.

- ✓ Intra-MSC Handover. If the new cell belongs to a different BTS within the same MSC's area, the MSC itself handles the handover, seamlessly switching the connection.
- ✓ Inter-MSC Handover. If the new cell falls under a different MSC entirely, the original MSC coordinates with the new MSC to ensure a smooth handover.

There are different handover scenarios depending on the movement of your device:

- ✓ Intra-BTS Handover. This occurs within the same BTS, switching frequencies or connection slots.
- ✓ Intra-BSC/Inter-BTS Handover. The device connects to a different BTS managed by the same BSC.
- ✓ Inter-BSC/Intra-MSC Handover. The device connects to a BTS under a different BSC but still within the same MSC's coverage area.
- ✓ Inter-MSC Handover. The device connects to a BTS managed by a completely different MSC.

Efficient handovers are essential for maintaining uninterrupted service. They allow your device to quickly establish connections with other devices and avoid call drops or data disruptions as you move between cells.

In essence, the MSC expertly manages communication, provides seamless handovers, and ensures the continued mobility of mobile subscribers within the network.

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