CHAPTER-9

MOBILE BILLING

Mobile Billing

Billing and customer care system is an Integrated Customer Care, Billing and accounting platform which provides provisioning of wide range of GSM services like Tele-services Bearer services, supplementary services, GPRS, WAP, IN services etc. B&CCS takes care of activation, deactivation, suspension and change in the subscriber services.

Functions of B&CCS :

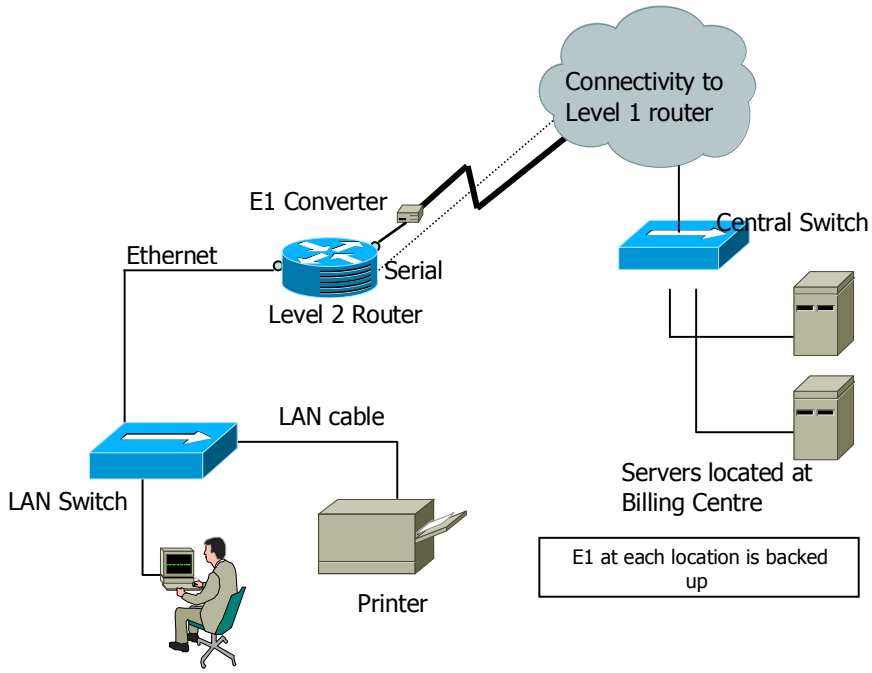
B&CCS provides a platform to effective and accurate billing, efficient customer care services and support for decision making. The major functions of B&CCS include.

- Collection of Call Detail Record (CDR) from Mobile Switching Centers.
- Timely and accurately invoicing of call details.
- Providing different Billing cycles for different category of subscribers with a support of differential Tariff.
- Support of charging for various types of existing and new services.
- Provisioning of services for mobile subscribers.
- Customers care for services requests and bill inquiry.
- Number inventory and SIM management etc.

Connectivity:

CCN Connectivity: Billing & Customer Care System has number of servers connected each other through a Wide Area Network (WAN) or a Local Area Network (LAN). For extending Provisioning & Customer Care facility to all the Customer Care Nodes (CCN) of a Billing Zone are connected to The B&CCS through Level1 router via an E1 link. The Level Routers are connected in a Ring Network. Each E1 link from CCN sites of a Billing Zones is backed up with one ISDN BRI connectivity. Depending on their physical location, the CCN may have connectivity to the Ring Network via a Level-2 router.

The CCN connectivity diagram is given below:

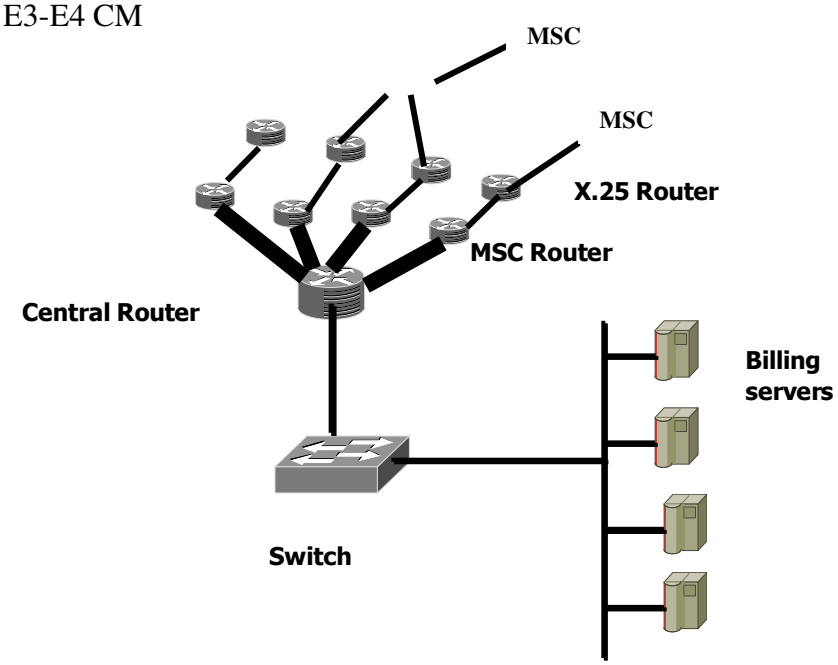


Connectivity of Customer Care Node to Billing Centre

MSC Connectivity: Mobile Switching Centre (MSC) of GSM network (Service Area) generates the usage data (Call Data Record) for every call made by Home or Roaming Subscriber. To prepare the bill for each subscriber the B&CCS collects the usage data from each MSC. The MSC Network of the Billing Zone is connected to Billing & Customer Care System.

Following are the salient connectivity points.

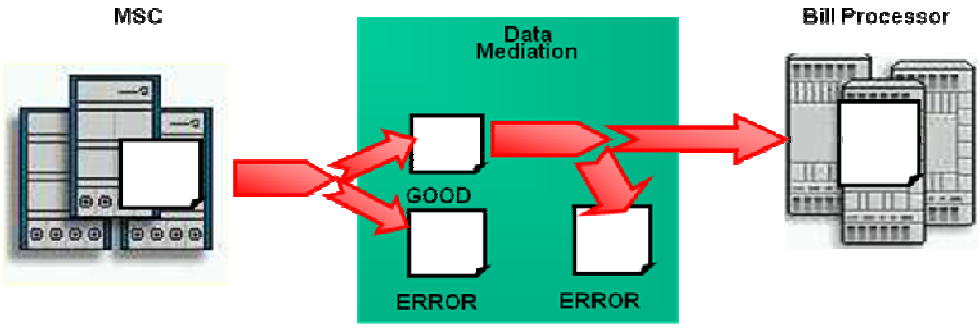
- Each MSC location is connected to B&CCS with E1 link & ISDN BRI backup.
- The E1 link is connected to the MSC router and than connected to X.25 router.
- All the MSC locations from MSC router are connected to a Central Router at Billing Center.
- The Central Router is connected to the Billing Servers where all the CDRs are sent for BILL processing.



Connectivity of Mobile Switching Centers to Billing Centre

Components of Billing & Customer Care System:

(A) **Mediation Device:** Mediation Device in the BCCS performs three main functions i.e. Collection of (Call Data Record- CDRs), Mediation of CDRs and Distribution of CDRs. It is connected to all the MSCs of number of PLMN Service Areas of a Billing Zone in CMTS. Mediation Device collects the charging data from MSC as per the defined schedule or on real time basis. Mediation Device converts the incoming charging data formats to a compatible format for further applications. During the mediation the CDRs with errors are collected in the respective Error Folders.



The CDRs in the Error folder are handled manually to remove or rectify the errors and forwarded to the next stage of mediation. It support the features viz. copy, format, merge, filter modify etc. It shall not be possible to edit the CDR in Mediation Device.

The CDRs after getting processed in the Mediation Device are distributed to other application modules such as Fraud Management. Decision Support System. Customer Care & Billing System's inter – operator accounting systems i.e. Bill Processor.

(B) Billing & Customer Care Module (B&CCM):

B&CCM is a system for processing CDRs from Mediation Device based upon predefined tariff structures. It is a flexible and powerful platform in which any type of Customized Billing can be done. B&CCS Module rapidly responds to the customer care needs and provides improved customer services. It can also provide a web based customer care to the subscriber.

The B&CCM have the following Sub-Modules:

(i) **Customer Services Module:** It provides Man-Machine interface to handle multiple types of services, administer customer services, process and distribute applicable exchange and field orders, etc.

(ii) **Order Management Module:** OM supports multiple communication services within a single UNIX-based system. The Customer Services Representative (CSR) can perform provisioning and activation of services in the GSM network. OM supports the work flow activities for Product and Services. Every service order is associated with a master account number. A service order can be sent to create a new account, add product and services, changing product & services or discontinue product & services.

An Order Manager supports the following activities:

- Order entry for new or existing account, including account creation.
- Reply to the quarry from CSR on existing orders and actions performed on the order.
- Update the number inventory databases including MSISDN, MIN, IMSI, SIM Cards and IMEI.
- Update the billing once the order is completed successfully.
- Interface SIM card manufacturers for the ordering and allocation of SIM cards and update of SIM card inventory.

(iii) **Service Provisioning Module:** It provides a flow though provisioning from an order entry or billing system to the network component like Home Location Register, Voice Mail Service, Short Message Service etc. The Service Provisioning Module provides a uniform interface to service provisioning applications, VMS, SMS etc. It performs the functions like creation of subscriber, Mobile Number assignment, and assignment of supplementary services such as: Voice Mail Service, UMS, SMS, IN, GPRS etc, SIM allocation and activation, activation of new services and deactivation of assigned services etc.

Network provisioning work-flow: The network provisioning process begins when the CSR commits an "order" comprised of one of more products associated with network provisioning related work-flow items. The sequence of state transitions occurring for each of the product level work-flow items associated with the new order.

Service Provisioning Order flow:

1. CSR 'Commits' an order.
2. Order gets inserted into a table in Order Manager (OM) Database
3. Povmgr in OM picks up the order and sends it to Service Provisioning Server
4. The order is queued in the Service Provisioning Server for respective Gateway.
5. Order is sent to the NE (HLR) for provisioning.
6. Service Provisioning Server gets the order executed in the Network Data base like HLR.
7. HLR sends an acknowledgement back to Service Provisioning Server.
8. Service Provisioning Server completes the order and sends acknowledgment to OM.
9. 'Provupdater' in OM updates the status of order as completed.
10. OM then updates the order in the BP database.

(iv) **Service Provisioning Module:** It performs number of flexible and efficient billing process for the billing operations. The process performed by Billing system includes

1. Real time and batch usage processing.
2. Real time and batch invoice calculation.

Billing system is configurable to guide and rate call event records in both real time and Batch mode. Billing system has the features of flexible billing and advance rating to offer targeted promotion and creative offers to customer

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Call Detail Records (CDR) in Billing System: Whenever a call is switched in the GSM network a CDR file is generated and stored in the Switching System (MSC). Types of CDRs generated are for Mobile Terminated Call (48 - 52 %), Mobile Originated Call (20 - 25 %), Roaming (4-5 %), Short Message Service (18 – 20 %) etc. All the voice call details (Both prepaid and postpaid) are collected from MSC. The CDRs from IN are not used by the billing System for any purpose. The Mediated CDRs are sent to the Billing system for processing.

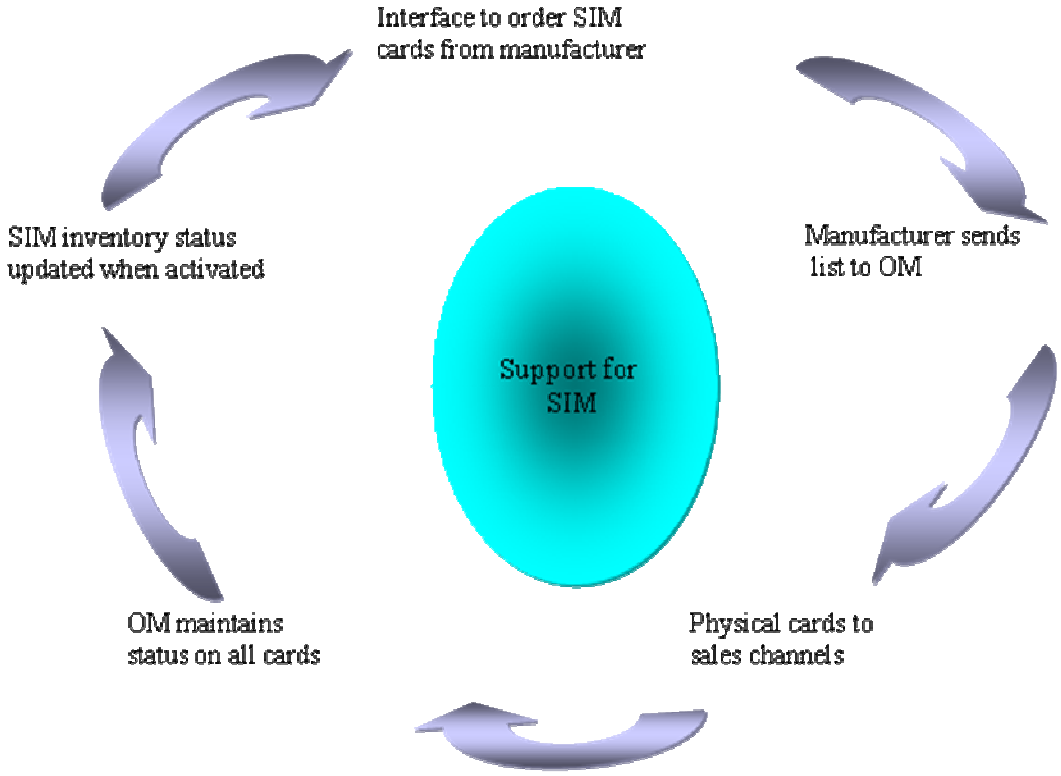
Service Provisioning System:

It is as much about maintaining the subscriber base as anything else. Its initial responsibility is activation of product selected by the subscriber; however it manages all the changes for a subscriber. It works closely with the billing system to hotline customers. The Service Provisioning System interacts with Over The Air Functionality (OTAF) to provision the handsets. Initial information enters from upstream side (From CCSN) through the service order entry system of the customer. Order Manager receives information, enters to database, performs and sequences the business logic as programmed, and sends confirmation and/or error messages.

SIM and Inventory Management System:

GSM network provides the communication services to a large number of subscribers. The management of SIM and maintaining their Inventory is a very difficult task. It is not possible to do it manually. The SIM and Inventory Management System of B&CCS carry out all such activities automatically.

B&CCS has a direct link to the SIM manufacturer for ordering to manufacture and supply a new lot of SIM cards. As per order the SIM manufacturer sends the SIM cards to the sales channels (CCSN, SIM distributors, franchises etc.). The list of all the SIM cards sent in the market is up loaded in OM Server data base. All the sold SIM cards are provisioned (activated) through the OM server only. The OM server always maintains the status of the SIM cards listed in the data base. Whenever any SIM is activated it updates the status. Thus the Inventory of SIM cards is continuously maintained in the OM database.



SIM and Inventory Management System

Depending upon the rate of supply and sale of SIM cards, the service provider defines a threshold value of balance quantity of un-activated SIM cards in the OM server. Whenever the balance crosses the threshold value automatically an order for manufacturing and supply of fresh lot of SIM cards is sent to the manufacturer.