

Communication Switching Systems

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Electronics & Telecommunication Engineering



Introduction to Telecommunication Billing Systems

Lecture 07

Introduction to Telecomm Billing

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Introduction

5.1. Introduction

- Subscribers/user Sending voice, data, image, etc., from one point to another using electronic media is termed as *Telecommunication Network*.
- However, to continue providing services and remain profitable Telecom Operators need to charge the subscribers for the service used, hence the need for Telecom Billing System.

5.1. Introduction

- **Telecom Billing** *is a process of collecting usage, aggregating, applying required usage and rental charges, and finally generating invoices for the customers.*
- **Billing system** *is high end, reliable, and software, which provides various billing functionalities.*
- **Telecom Billing process** includes receiving and recording payments from the customers.

5.1. Introduction

- Basic telecom services Includes
 - *Voice Call, Fax Service, SMS & MMS, Internet Connection, Data, Video Conferencing, VoD. IP based services, i.e., voice over IP or VPN*
- There are two mainly parameters used to charge a customer:
 - *Rental Charges: These are the charges taken from the customers on monthly basis against the service provided.*

5.1. Introduction

- Usage Charges: These are the charges taken from the customers based on the service utilization.
- In addition, operators may charge for service *initiation, installation, service suspension or termination.*

Billing Systems

5.2. Billing Systems

- Common basic features of the Billing system:
 - ➔ **Payment processing:** Posting of the customer's payments into his/her account.
 - ➔ **Credit control and collections:** *Follow up the outstanding payments in order to take appropriate actions to collect.*
 - ➔ **Disputes and adjustments:** *Recording customers' disputes against their bills for adjustment or dispute settlements.*

5.2. Billing Systems

- **Pre-pay and post-pay services:** supporting pre-paid and the post-paid customers.
- **Multilingual & multiple currencies:** *Some of the SP are spread across the globe and have multinational customers and requires multiple currencies.*
- **Inter-carrier settlements:** *Involve sharing of revenue between carriers that provide services to each other's customers.*

5.2. Billing Systems

- **Products & services:** *Provides flexible way to maintain various products and services and sell them individually or in packages.*
- **Discount applications:** *For providing various discount schemes in order to be competitive, reduce customer churn and attract and increase customer base.*

5.2.1. Billing System Types

- **Pre-pay Billing:** A mechanism where customer pays in advance then starts use service for the specified period. customers do not receive invoice and are charged in real time by Intelligent Network.
- **Post-pay Billing:** it is a Conventional billing, customers buy products and services and use them throughout the month, and by end of the month, invoices are generated by the SP then sent invoices to the customers to settle their payment.

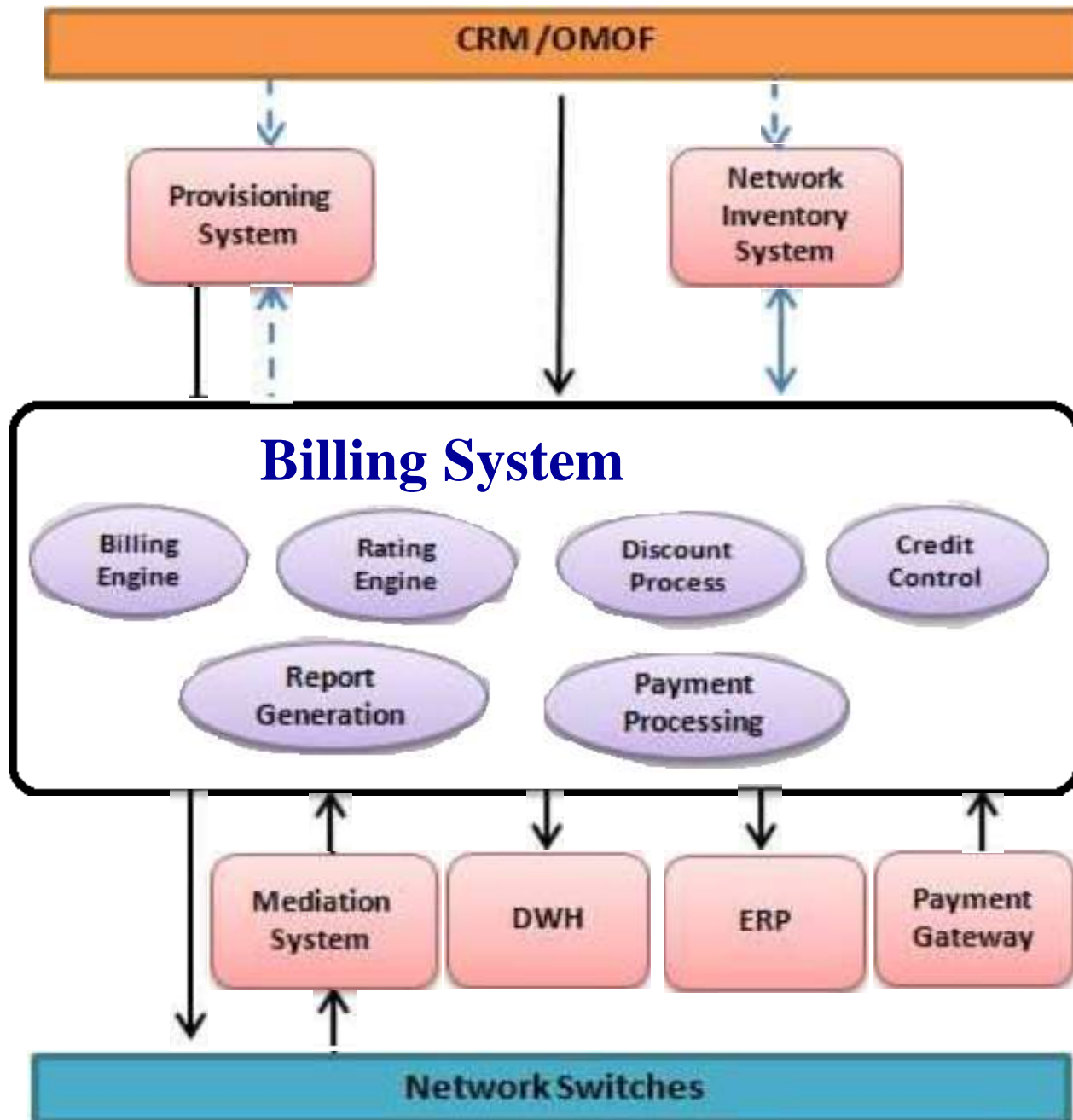
5.2.1. Billing System Types

- **Interconnect Billing:** Interconnect billing is related to inter-carrier or sometime called partner settlements. Interconnect services provided to its customers by other SPs.
- **Roaming Charges:** Charges customers incurs When goes from one network operator's coverage area to another operator's coverage., Home operator pays marginal charges to the foreign operator to provide services to their customers. These charges are settled through roaming billing. (Uses TAP3 protocol)

5.2.1. Billing System Types

- **Convergent Billing:** Is the integration of all service charges onto a single customer invoice. (creating a unified view of the customer and all services (Mobile, Fixed, IP, etc.,)).

Telecom Billing System Architecture



- ➔ **CRM** Customer Relationship Management
- ➔ **OMOF** Order Management and Order Fulfilment
- ➔ **DWH** Data Ware House
- ➔ **ERP** Enterprise Resource Planning

5.3.1. Typical Billing Process

- **CRM system** keeps customer-related information along with product and services
- **Provisioning System:** This system takes commands either from the Billing System or CRM/OMOF System to activate, deactivate and suspend the services.
- **Network Inventory System (NIS):** maintains all the network identifiers like phone numbers, MSISDN, IP addresses, e-mail addresses, etc.

5.3.1. Typical Billing Process

- **Network Switches:** Responsible for providing services to the customers based on what services subscribed. They are responsible for controlling calls, data download, SMS transfer, etc., and generating Call Details Records (CDR).
- **Mediation System** collects CDRs from different network elements in different formats and converts them into a format compatible a Billing System

5.3.1. Typical Billing Process

- **DWH:** keeps historical data related to the customers; this information includes service usage, invoices, payments, discounts and adjustments, etc.
- **ERP** provides modules to handle Financials, Human Resources, Supply Chain Management, etc.
- **Payment Gateway:** sits in between the Billing System and different payment channels like banks, credit card gateway, shops and retailers, etc.

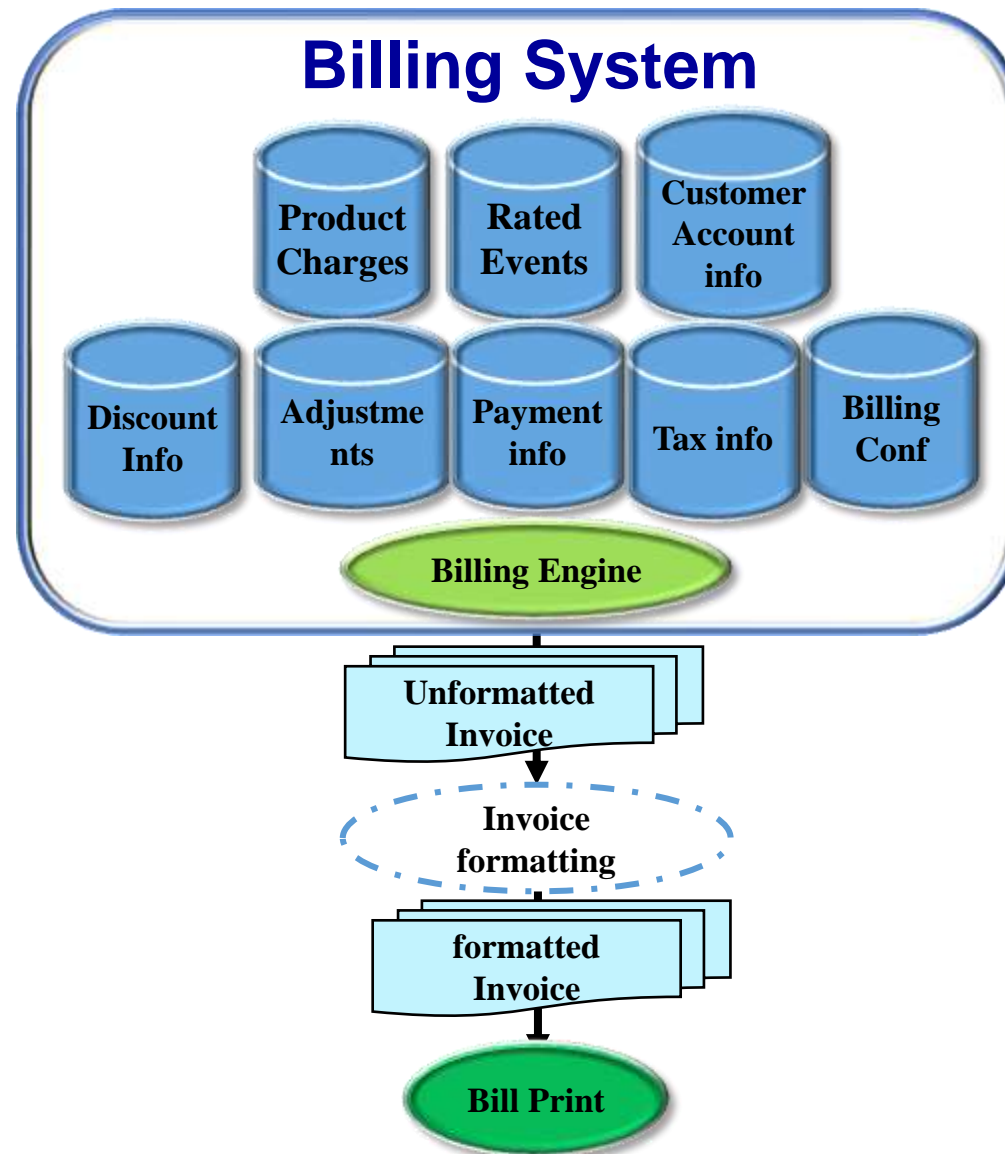
5.3.1. Typical Billing Process

- Once call/service is generated, the mediation system gathers usage data from the network switch and builds a CDR which contains 'call and Called numbers, and the start and the end time stamps.
- The CDR is stored for rating. To rate the call, the CDR is examined to see for type (local call, international call, or a toll call), time of the call was placed and city code or country codes in order to calculate the rate for the call.

5.3.1. Typical Billing Process

- Rated Call information is stored for invoicing at month. non-usage charges, such as discounts or monthly fees, are applied to the bill or during invoicing.
- Different payments done by the customers, adjustments etc. contribute to the final invoice generation.
- This information is then converted in a format, which can be printed in a readable form. The envelope is printed, stuffed with enclosures, and mailed to the end customer.

5.3.1. Typical Billing Process



5.3.2: Billing System Requirements

- **Customer-interface Management:** Handles customer-initiated contact, oversee outbound customer contact, and manage the contact life cycle.
- **Order Management:** captures product & service order and manage the order-entry life cycle, and completion life cycle.
- **Sales and Marketing:** handles commissions, provide sales support, track prospects, manage campaigns, analyze product performance, etc

5.3.2: Billing System Requirements

- **Rate Plans and Rating:** manages a variety of products and services, different rate plans associated with those products and services.
- **Discounting:** capable of providing various types of discounts on different usages and rentals.
- **Invoicing:** It performs billing inquiry, generates bills, processes deposits, performs account administration, maintains tax and fee information, and processes financial information.

5.3.2: Billing System Requirements

- **Credit Control & Collection:** control usage and revenue by assigning different credit classes to different customers and support payment collection.
- **Multilingual Support:** Providing invoices and customer care services in multiple languages.
- **Multiple Currencies:** Capable of recording and processing in units of multiple currencies.

5.3.2: Billing System Requirements

- **Problem Handling:** Manage trouble ticket, i.e. tracking, resolution progress and closure.
- **Partner revenue management:** Partner revenue management are the sharing of revenue between carriers that provide services to each other's customers.
- **Performance Reporting:** Provide performance, quality-of-service, management, and regulatory reports.

5.3.2: Billing System Requirements

- **Installation and Maintenance:** provide workforce scheduling and manage activities performed at the customer premises.
- **Auditing & Security:** Perform data audits and integrity checks.
- Accelerating time-to-market for new service launches.
- Enabling convergent view of customers and products.
- Supporting cost-efficient architectural scalability.
- Enabling partner relationship management and settlement.
- Reducing total cost of ownership.

Products & Services

5.3. Products & Services

- **A Product** is a logical or physical entity, which a SP sells out to a customer. (mobile phone, internet, Voice, VPN, Video on demand, etc.). Products are in two categories
- **Usage/event generating product**, For example, voice internet service, VPN, VoD etc).
- **Non-usage/event generating product**, For example a phone set without a connection, Modem/Dongle etc.)

5.3. Products & Services

- **A Service** from marketing point of view, as such there is no difference in between products and services because most of the times both are used interchangeably. However, Simply an operator uses their product to provide services (voice, data, internet, etc) to their customers

5.3.1. Product Families

- Products can be grouped together into a product family. Multiple levels of products are possible, meaning a product can be both a parent and a child at the same time. Each product family can have more than one parent product if required.

Examples of product families are:

- ➡ Telephony services
- ➡ Cable TV
- ➡ Internet
- ➡ Leased Line

5.3.2. Group of Products (Packages)

- Bundling of more than one product into a single group and sell them as complete package. These bundling can be offered at discounted price ie BoomPack for TTCL Dar Super UNI – VODACOM etc.
- Packages allow a product to be offered to a customer at a reduced price if it is taken as part of a package.

5.3.2. Group of Products (Packages)

- Each package can consist of any number of products and these products can be taken from more than one product family.
- Package price plan for a product is usually different to, nonpackage price plan, This is how the SP offers a discount to the customer however, SP increase usage hence profit.

5.3.3. Products Attributes

- Allow information about individual product instances to be held where the relevant information differs between types of product.
- For example, a pay TV product may have an attribute recording its set-top box number.
- A product can have a number of attributes associated with them.
- Further, a mobile phone product may need attributes to record the International Mobile Subscriber Identity (IMSI) and Mobile Station International ISDN Number (MSISDN).

5.3.4. Product Event Types

- A product can have a number of event types associated with it. These event types govern the events that can be generated by the product.
- For example, a mobile phone product could have event types such as voice calls and messaging services.
- There could be many more event types associated with a single phone device and operator can charge end customer for each of the event generated by the customer.

5.3.5. Billing System Perspective

- Once marketing department finalized all the products, services, packages, and associated prices, they are configured in the billing system.
- Different billing systems provide different levels of flexibilities of defining products and their hierarchies in terms of parent, child, and grandchild products.

5.3.5. Billing System Perspective

- Some systems keep product catalogues separately from the price catalogues to provide better modular approach and some billing systems combine products descriptions, their features, and associated prices altogether.
- Once all the products, services, packages, and their events are configured in the billing system, next step is to define their rental and usage prices,

Tariff Planning

5.4. Tariff Planning

- Marketing department define rental & usage charges for different products and services.
- These charges are defined keeping other competitors in Consideration as well as meeting and regulatory (TCRA) requirement
- There are two type of tariffs, (rate or price plans, depending terminology used in different billing system.
- There could be different types of charges to be applied for a product and associated services.

5.4. Tariff Planning

- There could be different types of charges to be applied for a product and associated services. following are common telecom charges,
 - ➡ **Product Initiation Charges:** These are one-time charges, taken from the customer as a part of installation, activation, service or initiating a connection.
 - ➡ **Product Periodic Charges:** These are the charges, applied on monthly or bimonthly or yearly basis as a rental of the product and service provided.

5.4. Tariff Planning

- **Product Termination Charges:** These are the charges, which can be applied on termination of the product and service.
- **Product Suspension Charges:** These are the charges, applied if a product is suspended because of some reason; for example, non-payment.
- **Product Suspension Periodic Charges:** There could be a requirement to charge a customer periodically even if a customer is suspended because of some reason.

5.4. Tariff Planning

- ➡ Product Re-Activation Charges: an operator can apply re-activation charges for service reconnection.
- ➡ Product Suspension Charges: These are the charges, applied if a product is suspended because of some reason; for example, non-payment.
- ➡ Product Suspension Periodic Charges: There could be a requirement to charge a customer periodically even if a customer is suspended because of some reason.

5.4. Tariff Planning

- ➡ Product Re-Activation Charges: an operator can apply re-activation charges for service reconnection.
- ➡ Product Usage Charges: a charge applied based on the usage of the service. ie, call per minute or per second, data download per MB, etc.

5.4.1. In-Advance & In-Arrear Charges

- There may be situation, when an operator would like to charge their customers in advance for some services and in the end of every month for some services.
- **In-Advance:** Charges taken in advance before providing the services are called in-advance charging and charges taken after providing the services are called in-arrear charges.
- **In-arrears charging:** the product charges are applied for a period up to at least the day before the current nominal bill date.

5.4.2. Proratable & Non-Proratable Charges

■ non-proratable

- ➡ Consider a situation, when a customer takes phone connection in the middle of the month and his invoice needs to be generated on 1st of every month. If prices are non-proratable, billing system would charge the customer for the whole month which would not be fair with the customer.
- ➡ Same apply at the termination, if customer terminates a service in the middle of the month, then operator will not charge the customer for rest of the month.

5.4.2. Proratable & Non-Proratable Charges

■ Pro-ratable

- pricing apply only for the number of days customer is going to use the service. For example, if monthly product rental is 30 and customer used this product for 10 days only, then billings system should charge the customer only 10 for those 10 days.

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End of Lecture 07

Any Questions ?

Thank you Class for your Attention