CDR

Scope

This document specifies charging functionality and charging management for cellular service providers.
Specifically, this document describes the handling of CDR files that contain CDR records.
Each CDR record contains descriptions of charging events such as voice calls and SMS messages with all relevant data.

Offline Charging

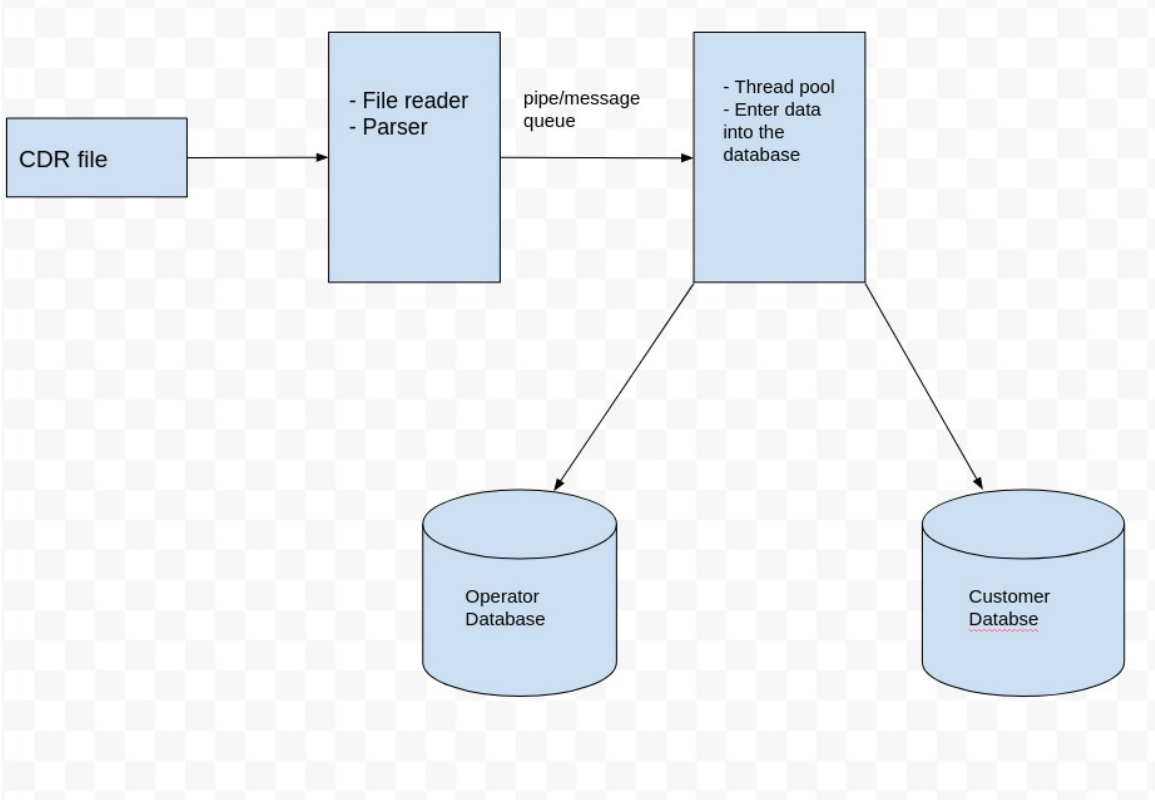
Offline charging is a process where charging information for network resource usage is collected concurrently with that resource usage. The charging information is then passed through a chain of logical charging functions. At the end of this process, CDR files are generated by the network, which are then transferred to the network operator's BD(Billing domain) for the purpose of subscriber billing and inter-operator accounting.

CDR File Format

The CDR files contain a header section followed by a variable sized CDR data section. The CDR data section contains zero or more concatenated CDR records. Each CDR record is encoded on a single line.

CDR record is composed of the following fields separated by |

- MSISDN: unique number identifying a subscription in a mobile network maximum length of an MSISDN to 7 digits.
- Operator Brand Name: a string maximum 64 chars. Such as "Cellcom Israel".
- Operator MMC/MNC: mobile country code and mobile network code maximum 6 digits.
- Call type: call type one of:
    - MOC: outgoing voice call.
    - MTC: incoming voice call.
    - SMS-MO: outgoing message.
    - SMS-MT: incoming message.
    - GPRS: internet
- Duration: in seconds
- Download: MB downloaded if type is GPRS
- Upload: MB uploaded if type is GPRS
- Third party MSISDN: corresponding third party in this call, empty for GPRS
- Third party operator MMC/MNC: corresponding third party's mobile operator in this call.



Processing Functions
The CDR files are usually large files (1-5 MB) processor will read and process files in order to fulfill the following functions:

Customer Billing
For each customer, identified by MSISDN and aggregate information will be produced that will contain the total of:

- Outgoing voice calls duration to a subscriber within the mobile operator.
- Incoming voice calls duration to a subscriber within the mobile operator.
- Outgoing voice calls duration to a subscriber outside the mobile operator.
- Incoming voice calls duration to a subscriber outside the mobile operator.
- SMS messages sent within the mobile operator.
- SMS messages received within the mobile operator.
- SMS messages sent outside the mobile operator.
- SMS messages received outside the mobile operator.
- MB downloaded.
- MB uploaded.

Inter Operator Settlement
For each mobile operator identified by Operator MMC/MNC we will aggregate all:

- Incoming voice call durations.
- Outgoing voice call durations
- Incoming SMS messages
- Outgoing SMS messages
- MB downloaded.
- MB uploaded.

Print results

- Print each customer aggregated data.
- Print for each operator aggregated data.
- Exit properly after finishing.

Notes:

- Suggested language C++
- One Thread/process should read the CDR file.
- Database should be implemented as a hash table.
- A pool of 5 threads updates the database with the parsed data.
- Notice that the SW should be thread safe and function in a synchronized manner not lose any data.

GOOD LUCK!