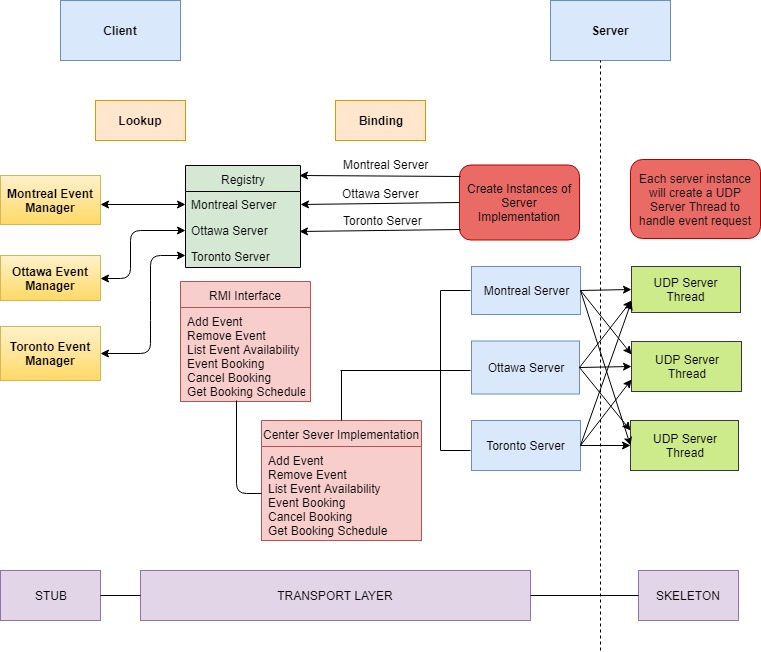
**Distributed Event Management System**

**Prepared By**: Himen Siddhpura (40091993) & Jenny Mistry (40092281)

**Overall Description:**

Event management is implemented as a distributed system to book and manage events across different branches of a corporate event management company. The system is built using Java RMI architecture and the users can see a single system handling user requests providing location and access transparency. It also manages simultaneous requests with adequate synchronization.

**Design Architecture:**

****

**RMI Interface(managerInterface):**

* addEvent(String managerId, String eventId, String eventType, String eventCapacity)
* removeEvent(String managerId, String eventId, String eventType)
* listEventAvailability(String managerId, String eventType)
* eventBooking(String customerId, String eventId, String eventType)
* cancelBooking(String customerId, String eventId, String eventType)
* getBookingSchedule(String customerId)

**RMI Server (EventManagerClient):**

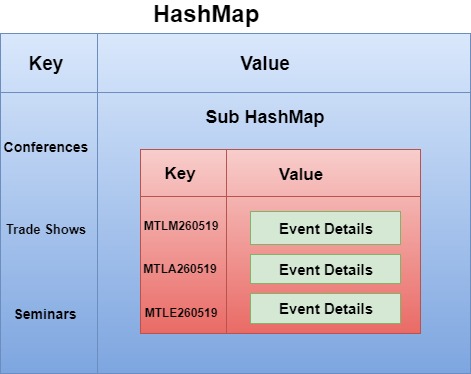
* This Class implements the RMI interface.
* Three instances of RMI server implementation are created. One each for branches: MTL, OTW, TOR.

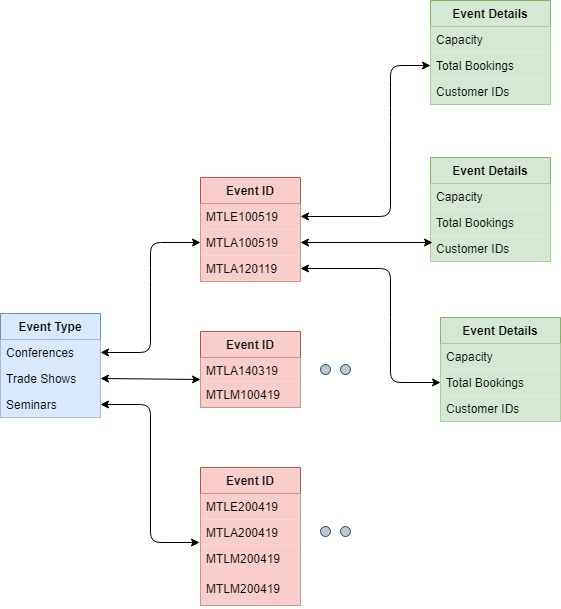
**RMI Registry:**

Instances of EventManagerClient is bound to the registry with three different strings to expose the objects to the client.

* reg.bind("Toronto M", toronto);
* reg.bind("Montreal M", montreal);
* reg.bind("Ottawa M", ottawa);

**Data Models:**

****

****

**Logs:**

To perform logging for troubleshooting on both server and client end, we have utilized the logger functionality of Java (java.util.logging).

**Log Format:**

Each log data comprises of the below mentioned details:

* Date and time the request was sent.
* Request type (book an event, cancel an event, etc.).
* Request parameters (clientID, eventID, etc.).
* Request successfully completed/failed.
* Server response for the particular request.

**Center Server:**

Each server log (Montreal, Ottawa, Toronto) will be saved in their respective folder

* logs/mtl.log
* logs/otw.log
* logs/tor.log

These logs include:

* Event added
* Event cancelled
* Availability of events

**Client:**

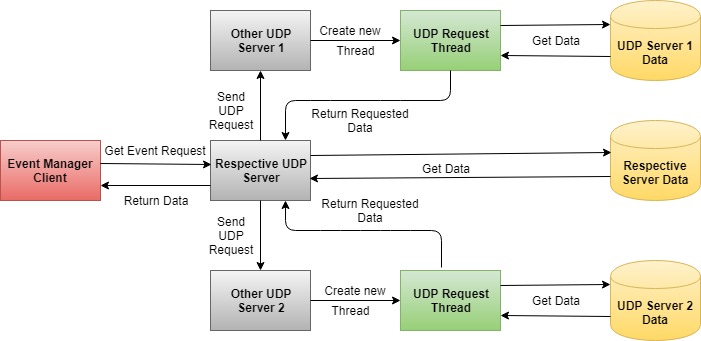
For every action performed by the client, a log file with clientID is created such as:

* Booking an event
* Canceling an event
* Retrieving booking schedule

**Implementation:**

* We have created a separate logger file for each of the three servers.
* To save contents of the corresponding log file, we have used a file handler.
* Various server responses are recorded using levels like WARNING, ERROR etc.

**UDP Server Design:**

****

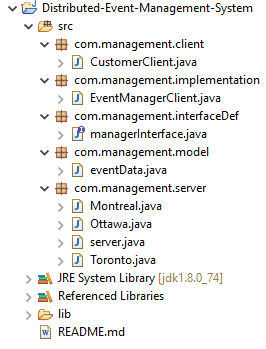
**Flow:**

* The event manager client sends event request to the respective server.
* The server fetches the requested data.
* It forks new requests to send the event request to the other servers located at various locations.
* The UDP servers at these locations receives the request and creates new threads to process the request.
* The newly created threads fetches the respective data and responds to the request.
* The server which received the request responds to the manager client with appropriate data.

**Concurrency:**

The manager client creates new thread to communicate to each of servers to handle requests for same or different events at the same time.

**Code Structure:**



**Challenges:**

Implementation of synchronization while managing multiple event requests at the same time has been challenging.

**Test Scenarios:**

* If the availability of an event is full, more customers cannot book the event.
* A customer can book as many events in his/her own city, but only at most 3 events from other cities overall in a month.
* A customer can perform only customer operation and cannot perform any event manager operation but an event manager can perform all operations for its own branches.
* If the user tries to add an event with an event id already added, then event details get updated.
* The user gets an error message “No events available”, if he/she tries to add an event which is not created by manager.
* All the user and manager event requests have been synchronized to handle multiple concurrent event requests for the same/different branches.

**References:**

* <https://www.geeksforgeeks.org/multithreading-in-java/>
* `<https://www.tutorialspoint.com/java_rmi/java_rmi_introduction.htm>
* <https://www.javatpoint.com/RMI>
* <https://systembash.com/a-simple-java-udp-server-and-udp-client/>
* <https://www.geeksforgeeks.org/synchronized-in-java/>