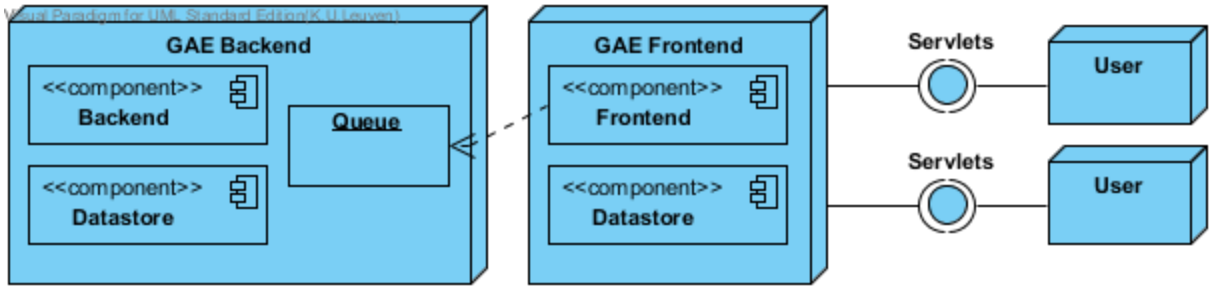
GAE session 2-3 design report

GAE Exercise 3.2

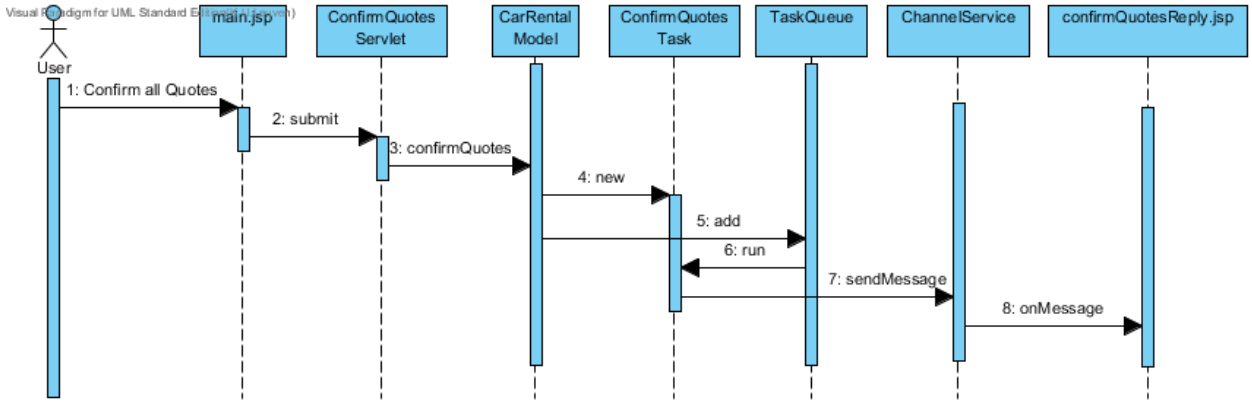
Quotes can be easily created and put in a collection, these should be visible to the user moments after they're made. The most work-intensive part is checking whether a reservation can be made. That's why we will do this last task in the back end, so no further delay in the frontend will occur. To do so a DefferedTask (a DefferedTask is Runnable and Serializable because it is sent to the backend and run there) is created in the front end, and is sent to the default push queue in the back end. The back end will process all tasks and confirm (or cancel) all quotes in each task. We could persist all quotes that need to be confirmed, and then pass references to the back end. But those quotes are no longer needed after they're confirmed (or cancelled). The first method eliminates using unnecessary storage space, and is also easier to implement, so we prefer that one.

Deployment diagram



The users will communicate with the Google App Engine through jsp web pages which in turn communicate with the server through servlets. Google App Engine has a front end, which delivers user interaction. This front end sends DefferedTasks to the queue in the back end. This back end will then process all tasks. The datastore, where all data is persisted, is located in both the front and the back end. Obviously this datastore contains the same data for both.

Sequence diagram



This interaction happens whenever the user wants to confirm his quotes. CarRentalModel will make a new ConfirmQuotesTask and add it to the queue. This is the moment when confirmQuotesServlet will redirect to confirmQuotesReply.jsp so the user experience won't be slow whenever there are more tasks to process still. The task will be executed whenever its it's turn in the queue. When the backend is done processing these quotes. A message will be sent using Google App Engine's Channel API. This message gets picked up by confirmQuotesReply.jsp and this web page will tell the user whether the quotes got confirmed.

GAE Exercise 3.3

The quotes to the last available car could get confirmed to both users. This happens whenever they both ask in parallel for its availability before one of them makes the reservation. The car would seem available to both so they could both confirm its quote. A solution to this problem is to make the code-block which checks a cars availability and then enters the reservation to the cars reservation set synchronized. Because this code can be run on different machines, a simple synchronized block does not suffice. We've tried to implement a transaction like in Java EE, but this is not supported in GAE. A semaphore in the GAE memcache is also an option, but this doesn't scale up. GAE supports transactions on EntityManagers, but this only applies to operations on the EntityManager, and in the method that should be transactional, we don't do these operations. A solution would be to have a task execute and then check whether the current datastore state is consistent. If it's not, assume you've done something wrong, and rollback all reservations.

Google App Engine

Our application is deployed at http://carrentalts.appspot.com/.