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Advanced Databases

Specification of semi - structured extensions of database

Extensions in data model

1. We will create an XML file of Payment table. This data will stored as CLOB, XMLType and CHAR and inserted into 3 different tables called clob_payment, xml_payment and char_payment. In each table there will be an attribute of corresponding xml data type.
2. We will create an XML file of Passenger table. This data will be stored as a CLOB. They will be inserted into clob_passenger table with CLOB type attribute.
3. We will create an XML of Reservation table. This data will be stored as an XMLType. They will be inserted into xml_reservation table with XMLType attribute.

Operations on semi – structered data
We will use the same transactions as in SQL workload.

1. Tool: xQuery
   This query returns first / last name, country name and favorite carrier name of passengers who:
   - have departure from one of German's airports
   - have taken a flight between 01 – 01 – 2014 and 01 – 01 – 2017
   - have at least three reservations for flights in this period of time

2. Tool: xQuery
   This query prepares a statistic about payment methods. It returns a sum of payments done by card / cash, number of each type of payments and an average amount of each type of payments. This payments concern passengers who:
   - have taken a flight between 01 – 01 – 2015 and 01 – 01 – 2016
   - have traveled by the most convenient airplanes (BMW or Audi)
3. Tool: DOM / xQuery
   This query returns first / last names, telephone numbers and the country of origin of passengers from one country with the highest number of passengers who:
   - have paid for the reservation by a card
   - the amount of payment was higher than 6000
   - have a total number of taken flights greater than 4

   All passengers who meet the criteria are grouped by country name and ordered by descending number of passengers in each country. Only the first country is selected and only passengers from this country are returned.

   We will compare the execution times in DOM and xQuery.

4. Tool: xQuery
   This transaction inserts two new flights. Because of the deletion of all flights between 01 – 01 – 2016 and 01 – 02 – 2016 all passengers of cancelled flights get 10 additional loyalty points(update) and their favorite carrier changes to the carrier with the highest rating (update). The reservations for all flights between 01 – 01 – 2016 and 01 – 02 – 2016 need to be updated – the flight ID changes to one of new created flights. For all reservations between 01 – 01 – 2016 and 15 – 01 – 2016 the flight's ID changes to the ID of first newly created flights and for all reservations between 16 – 01 – 2016 and 01 – 02 – 2016 it changes to the ID of the second flight.
   All flights between 01 – 01 – 2016 and 01 – 02 – 2016 are deleted from the table of available flights.
5. Tool: xQuery
   All airplanes assigned to flights of brands such as Fiat, Opel, Ford, Citroen, Renault are replaced by airplanes of brand Mercedes(update). It is caused by a high risk of failure.
   Additionally, airplanes of two Japanese brands – Nissan and Toyota are also dangerous in use. Because of that all airplanes of this two brands which are not assigned to any flight are deleted from a table of available planes. For those carriers who had at least one airplane of brand Mercedes there is a reward – the rating is increased by 10 points(update). For those carriers who still use possibly dangerous planes of brand Toyota and Nissan the rating is decreased by 10 points(update). The passengers who have to fly with one of unsafe planes (Toyota / Nissan) get additional 10 loyalty points (update).