

# Transactions adaptation for mobile computation environment

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Keywords: mobile transactions, adaptation, mobile database

According to Silberschatz et al (2006), a transaction is a logical job unit, composed by a conjunct of selection or actualization of data items of a system database. There are some ways to carry out a transaction with the transactional models, they must be in accordance with the architecture of database installation, for instance, the centralized architecture, distributed among others.

The popularization of the wireless net and the miniaturization of the portable computers fitted out with wireless interface allowed that the data of a system database could be stored in mobile devices with intermittent access to the fixed net. The transactions in this scenery are known as mobile transactions and they required new efforts in the search for transactions model that could work in this complex environment.

The complexity is related to the architecture, that associates mobile devices with limited capacity and it uses a high variable communicating way, but it does not guarantee that the communication among its components will be continuous due to the mobility of the mobile devices.

The centralized and distributed transactions models which obey the ACID proprieties assure that all data manipulation must be atomic, must keep the data consistence, and can not interfere in the performance of the concurrent transactions and also have its results stored after its end. The mobile transactions models proposed in the literature and commented on by Alvarado (2004), found difficulties to follow the traditional ACID proprieties, since they have to sustain the mobile stations disconnections that brings about long duration transactions, and to attend the mobility of the mobile stations during the transaction processing, to respect the local autonomy of the mobile devices when there is temporary disconnections, to sustain the reflection of the atualizations carried out in the fixed network data of the mobile station in order to keep the mutual consistence of the replication data, among other things.

These requirements when are not attended they carry away the data management to the failure occurrence, mainly those related to the transactions, in such case, it was possible to verify that the dynamics of the mobile environment is not fulfilled by only one execution transaction format, but that every transaction occurrence needs an evaluation of the momentary characteristics to adapt the transactions to the mobile scenery. A mobile transaction can get success if the questions related to its execution will be duly evaluated and the transaction adapted to the format of less cancellation chance.

The aim of this study is to propose the responsible job for the adaptation of the transactions in the mobile environment, all the elements were verified those that work in this scenery and those that performs straight influence in the execution of the transactions, such as the mobile devices, wireless communication, fixed net and the mobility too. The table 1 shows these characteristics and the possible values took on by each one.

Characteristics	Value	Feature
Connection status	Connected-Disconneted	Wireless communication
Transfer rate	Enough – Intermediate – insufficient	
Signal force	Enough – Intermediate – insufficient	Mobility
Data	Hold – do not hold	Autonomy
Data complete	complete- incomplete - undefined	
data validity	Valid – unvalid - undefined	
Battery	Enough – Intermediate – insufficient	Mobile devices resources
Hardware capacity	Enough – Intermediate – insufficient	

Table 1 – Dimensions for the transaction adaptation in mobile computation environment.

After the requirement of the adaptation job the application will receive as a return the execution transaction strategy to be employed at this moment. Among the execution strategies of a transaction there is the execution of a mobile transaction in a totally fixed net, totally in the mobile unity or with the distributed processing between the fixed net and the mobile unity.

The Figure 1 shows the architecture proposed for the transactions adaptation job in mobile environment.

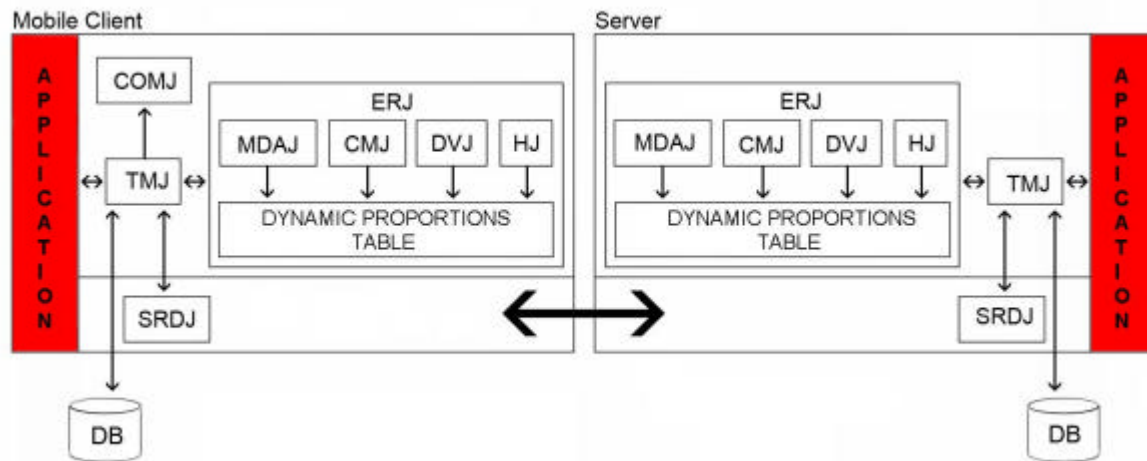


Figure 1 : Transactions adaptation job in mobile environment

The proposed architecture job identify some divisions of functions attributed to the jobs that collaborate with the general purpose, such as, transaction management job (TMJ) that coordinates the transactions execution, the control operation mode job (COMJ) that changes the operation mode of the mobile unity aiming the resources economy, the sending and receipt data job (SRDJ) that makes possible the exchange between the mobile station and the fixed net, beside the jobs which collaborate for the adaptation.

The following modules are in charge of to feed the dynamic dimensions table used by the evaluation resources job (ERJ) in order to interpret and to indicate the most suitable transaction processing strategy, the communication management job (CMJ) recognizes the wireless communication environment, the mobile device acknowledgement job (MDAJ) checks all the mobile client characteristics, the data verification job (DVJ) checks the available data in the mobile device, the historical job is obtained by the storage of the results.

The possible dimensions identified in the table 1 are not handled properly by simple algorithms, then the TMJ uses the decision trees to classify the best strategy of transaction execution.

Aiming to validate the job performance was developed a Java prototype responsible only to point out the classification result, that is, only the resources evaluation job. The prototype was drilled initially by a conjunct of cases and after its drilling it got to show the classification regarding the simulated entrances to the elements variations that made up the dynamic dimension table. The next step is the development of a complet environment for the evaluation of the generalizations carried out by the tree.

In this research was possible to verify as the portability and the wireless environment influence the execution of a transaction in a mobile scenery. Aiming to minimize the number of the transactions cancel and to increase the confiability of the transactions in the database systems in mobile environment, was proposed an adaptation job that can take decisions based in the environment configuration where the transaction will be executed.

## REFERENCES

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