TID (Transaction ID)

Each user performs transactions, and each transaction is given its own ID. The TID (Transaction IDs) are numbered sequentially, i.e. transaction ID 10 was started before the transaction with the ID 11.

The TIPs contain all transactional information in an array of bits, two per transaction, which indicate the state of the transaction. The transaction ID is an index into this array.

When the transaction number is allocated to a transaction, the user also receives a copy of the TIP (Transaction Inventory Page), which comprises the status of all transactions. If a data set is inserted or modified, the TID is entered next to the alteration. These simple rules are all that is needed to implement the Firebird/InterBase® versioning.

A transaction can only see those transactions with a lower TID than its own. Furthermore, all other transactions that were still active at that point in time when the transaction was started, are invisible to the transaction.

The TIP copy, provided when the TID number is allocated, can be used to monitor the status of all other transactions at the point in time when the transaction was started. The only way to obtain a newer, more up-to-date TIP is to request a new TID.

For example, user A has a TID 10, user B has a TID 11 or higher. He could also have a TID 9 or lower, when his transaction was still active at the point in time when user A began his transaction with the TID 10. Otherwise he would not be able to alter the data set X. User B modifies the data set with his active transaction.

Now user A modifies data set X. When the transaction is posted, User A receives a deadlock error or an update conflict, providing the Transaction Isolation Level is set at *repeatable read*. this message informs user A that his modification cannot be carried out, as another user - in this case user B - has modified the data set. The programmer can decide at this point, how the program reacts to this situation.

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