Understanding Database Transactions

The ACID Model – the four goals of all database management systems!

- **<u>Atomicity</u> – a transaction either occurs or not; if any part of the transaction fails, the entire transaction fails (is rolled back).**
- **<u>Consistency</u> – only data that is valid will be written to the database; if a transaction executes and found to violate the database rules for consistency, then the transaction will not commit, but be rolled back.**
- **<u>Isolation</u> – each transaction that is executing (at the same time) must not have an impact on the ability of the other executing transactions to be processed; each transaction must be isolated from the others.**
- **<u>Durability</u> – all committed transactions will not be lost; through the practice of backups and transaction log shipping, the ability to restore any committed transactions in the event of hardware failure is possible.**

- A transaction is considered a "logical unit of work" that is performed by the database.

- Transactions are expensive to run because the server must allocate resources to handle successful and failed transactions.

- Transactions should only be used in cases where you would want the chance to "undo" the steps performed.

STATE OF A TRANSACTION