**Describe Oracle database's physical and logical structure ?**

  Physical : Data files, Redo Log files, Control file.

  Logical : Tables, Views, Tablespaces, etc.

**Can a view be updated/inserted/deleted? If Yes - under what conditions ?**

 A View can be updated/deleted/inserted if it has only one base table if the view is based on columns from one or more tables then insert, update and delete is not possible.

**What is explain plan and how is it used ?**  
 The EXPLAIN PLAN command is a tool to tune SQL statements. To use it you must have an explain\_table generated in the user you are running the explain plan for. This is created using the utlxplan.sql script. Once the explain plan table exists you run the explain plan command giving as its argument the SQL statement to be explained. The explain\_plan table is then queried to see the execution plan of the statement. Explain plans can also be run using tkprof.

**What is a mutating table error and how can you get around it ?**

This happens with triggers. It occurs because the trigger is trying to update a row it is currently using. The usual fix involves either use of views or temporary tables so the database is selecting from one while updating the other.

**Describe the use of %ROWTYPE and %TYPE in PL/SQL ?**

 %ROWTYPE allows you to associate a variable with an entire table row. The %TYPE associates a variable with a single column type.

|  |  |  |
| --- | --- | --- |
| **Explain the difference between a data block, an extent and a segment ?**   A**data block** is the smallest unit of logical storage for a database object. As objects grow they take chunks of additional storage that are composed of contiguous data blocks. These groupings of contiguous data blocks are called **extents**. All the extents that an object takes when grouped together are considered the **segment** of the database object.   |  |  | | --- | --- | | **Explain the difference between a FUNCTION, PROCEDURE and PACKAGE ?**  A function and procedure are the same in that they are intended to be a collection of PL/SQL code that carries a single task. While a procedure does not have to return any values to the calling application, a function will return a single value. A package on the other hand is a collection of functions and procedures that are grouped together based on their commonality to a business function or application.   |  | | --- | | **Explain materialized views and how they are used ?**   Materialized views are objects that are reduced sets of information that have been summarized, grouped, or aggregated from base tables. They are typically used in [data warehouse](javascript:void(0);) or decision support systems. The **JobQueue process** refresh the materialized view data. | | |

**Explain Database Pessimistic and Optimistic locking?**

Transactional isolation is usually implemented by locking whatever is accessed in a transaction. There are two different approaches to transactional locking:

1. Pessimistic locking
2. Optimistic locking

      The disadvantage of pessimistic locking is that a resource is locked from the time it is first accessed in a transaction until the transaction is finished, making it inaccessible to other transactions during that time. If most transactions simply look at the resource and never change it, an exclusive lock may be overkill as it may cause lock contention, and optimistic locking may be a better approach. With pessimistic locking, locks are applied in a fail-safe way. In the banking application example, an account is locked as soon as it is accessed in a transaction. Attempts to use the account in other transactions while it is locked will either result in the other process being delayed until the account lock is released, or that the process transaction will be rolled back. The lock exists until the transaction has either been committed or rolled back.

      With optimistic locking, a resource is not actually locked when it is first is accessed by a transaction. Instead, the state of the resource at the time when it would have been locked with the pessimistic locking approach is saved. Other transactions are able to concurrently access to the resource and the possibility of conflicting changes is possible. At commit time, when the resource is about to be updated in persistent storage, the state of the resource is read from storage again and compared to the state that was saved when the resource was first accessed in the transaction. If the two states differ, a conflicting update was made, and the transaction will be rolled back. This is very important for application performance to use Optimistic locking.

**Difference in Inner join and  Outer join?**

**Inner Joins**

   An **inner join** (sometimes called a **simple join**) is a join of two or more tables that returns only those rows that satisfy the join condition.

**Outer Joins**

   An **outer join** extends the result of a simple join. An outer join returns all rows that satisfy the join condition and also returns some or all of those rows from one table for which no rows from the other satisfy the join condition.

* To write a query that performs an outer join of tables A and B and returns all rows from A (a **left outer join**), use the LEFT [OUTER] JOIN syntax in the FROM clause, or apply the outer join operator (+) to all columns of B in the join condition in the WHERE clause. For all rows in A that have no matching rows in B, [Oracle Database](javascript:void(0);) returns null for any select list expressions containing columns of B.
* To write a query that performs an outer join of tables A and B and returns all rows from B (a **right outer join**), use the RIGHT [OUTER] JOIN syntax in the FROM clause, or apply the outer join operator (+) to all columns of A in the join condition in the WHERE clause. For all rows in B that have no matching rows in A, Oracle returns null for any select list expressions containing columns of A.

To write a query that performs an outer join and returns all rows from A and B, extended with nulls if they do not satisfy the join condition (a **full outer join**), use the FULL[OUTER]JOIN syntax in the FROM clause.

* **Self Join**

    This is a particular case when one table joins to itself with one or two aliases to avoid confusion. A self join can be of any type, as long as the joined tables are the same. A self join is rather unique in that it involves a relationship with only one table. The common example is when company has a hierarchal reporting structure whereby one member of staff reports to another. Self Join can be Outer Join or Inner Join.

**Why Group by is only used with having clause and aggregative functions example?**

HAVING is used to perform an action on groups created by GROUP BY similar to that of the WHERE clause on rows in a basic SQL statement. The WHERE clause limits the rows evaluated. The HAVING clause limits the grouped rows returned.

* [AVG](http://psoug.org/definition/AVG.htm): returns the variance or variability of an expression.
* [COUNT](http://psoug.org/definition/COUNT.htm): returns the number of rows returned by a query.
* [FIRST](http://psoug.org/definition/FIRST.htm): returns the first value from an ordered sequence.
* [LAST](http://psoug.org/definition/LAST.htm): returns the last value from an ordered sequence.
* [MAX](http://psoug.org/definition/MAX.htm): returns the maximum value of a column.
* [MIN](http://psoug.org/definition/MIN.htm): returns the minimum value of a column.
* [STDDEV](http://psoug.org/definition/STDDEV.htm): returns the standard deviation of a set of numbers.
* [SUM](http://psoug.org/definition/SUM.htm): returns the sum or total the values of a column.
* [VARIANCE](http://psoug.org/definition/VARIANCE.htm): returns the variance or *variability* of an expression

HAVING can be used only with the SELECT statement. HAVING is typically used in a GROUP BY clause. When GROUP BY is not used, HAVING behaves like a WHERE clause.

A HAVING clause is like a WHERE clause, but applies only to groups as a whole, whereas the WHERE clause applies to individual rows. A query can contain both a WHERE clause and a HAVING clause. The WHERE clause is applied first to the individual rows in the tables . Only the rows that meet the conditions in the WHERE clause are grouped. The HAVING clause is then applied to the rows in the result set. Only the groups that meet the HAVING conditions appear in the query output. You can apply a HAVING clause only to columns that also appear in the GROUP BY clause or in an aggregate function.  **Example of HAVING and WHERE in one query:**

***SELECT titles.pub\_id, AVG(titles.price) FROM titles INNER JOIN publishers ON titles.pub\_id = publishers.pub\_id WHERE publishers.state = 'CA' GROUP BY titles.pub\_id HAVING  AVG(titles.price)  > 10;***

Sometimes you can specify the same set of rows using either a WHERE clause or a HAVING clause. In such cases, one method is not more or less efficient than the other. The optimizer always automatically analyzes each statement you enter and selects an efficient means of executing it. It is best to use the syntax that most clearly describes the desired result. In general, that means eliminating undesired rows in earlier clauses.

**What is a Stored Procedure?**

A [stored procedure](javascript:void(0);) is a named group of SQL statements that have been previously created and stored in the server database. Stored procedures accept input parameters so that a single procedure can be used over the network by several clients using different input data. And when the procedure is modified, all clients automatically get the new version. Stored procedures reduce network traffic and improve performance. Stored procedures can be used to help ensure the integrity of the database.

e.g. sp\_helpdb, sp\_renamedb, sp\_depends etc.

**What is a Trigger?**

A trigger is a SQL procedure that initiates an action when an event (INSERT, DELETE or UPDATE) occurs. Triggers are stored in and managed by the DBMS. Triggers are used to maintain the referential integrity of data by changing the data in a systematic fashion. A trigger cannot be called or executed; DBMS automatically fires the trigger as a result of a data modification to the associated table. Triggers can be considered to be similar to stored procedures in that both consist of procedural logic that is stored at the database level. Stored procedures, however, are not event-drive and are not attached to a specific table as triggers are. Stored procedures are explicitly executed by invoking a CALL to the procedure while triggers are implicitly executed. In addition, triggers can also execute stored procedures.

*Nested Trigger*: A trigger can also contain INSERT, UPDATE and DELETE logic within itself; so when the trigger is fired because of data modification, it can also cause another data modification, thereby firing another trigger. A trigger that contains data modification logic within itself is called a nested trigger.

**What are the Different Types of Triggers?**

There are two types of Triggers.

1)      DML Trigger

There are two types of DML Triggers

    1.Instead of Trigger  
        Instead of Triggers are fired in place of the triggering action such as an insert, update, or delete.

    2. After Trigger  
        After triggers execute following the triggering action, such as an insert, update, or delete.

2)      DDL Trigger

This type of trigger is fired against Drop Table, Create Table, Alter Table or Login events. DDL Triggers are always After Triggers.

**What is a View?**

A simple view can be thought of as a subset of a table. It can be used for retrieving data as well as updating or deleting rows. Rows updated or deleted in the view are updated or deleted in the table the view was created with. It should also be noted that as data in the original table changes, so does the data in the view as views are the way to look at parts of the original table. The results of using a view are not permanently stored in the database. The data accessed through a view is actually constructed using standard T-SQL select command and can come from one to many different base tables or even other views.

**What is an Index?**

An index is a physical structure containing pointers to the data. Indexes are created in an existing table to locate rows more quickly and efficiently. It is possible to create an index on one or more columns of a table, and each index is given a name. The users cannot see the indexes; they are just used to speed up queries. Effective indexes are one of the best ways to improve performance in a database application. A table scan happens when there is no index available to help a query. In a table scan, the SQL Server examines every row in the table to satisfy the query results. Table scans are sometimes unavoidable, but on large tables, scans have a terrific impact on performance.

**What is a Cursor?**

A cursor is a database object used by applications to manipulate data in a set on a row-by-row basis, instead of the typical SQL commands that operate on all the rows in the set at one time.

In order to work with a cursor, we need to perform some steps in the following order:

* Declare cursor
* Open cursor
* Fetch row from the cursor
* Process fetched row
* Close cursor
* Deallocate cursor.

**What is the Correct Order of the Logical Query Processing Phases?**

The correct order of the Logical Query Processing Phases is as follows:

1. FROM  
2. ON  
3. OUTER  
4. WHERE  
5. GROUP BY  
6. CUBE | ROLLUP  
7. HAVING  
8. SELECT  
9. DISTINCT  
10. TOP  
11. ORDER BY

**Difference in clustered and unclustered index?**

**Clustered Index**

* Only one per table
* Faster to read than non clustered as data is physically stored in index order

**Non Clustered Index**

* Can be used many times per table
* Quicker for insert and update operations than a clustered index

Both types of index will improve performance when select data with fields that use the index but will slow down update and insert operations.

Because of the slower insert and update clustered indexes should be set on a field that is normally incremental ie Id or Timestamp.

SQL Server will normally only use an index if its selectivity is above 95%.

**What are the Different Index Configurations a Table can have?**

A table can have one of the following index configurations:

* No indexes
* A clustered index
* A clustered index and many non-clustered indexes
* A non-clustered index
* Many non-clustered indexes

**What’s the Difference between a Primary Key and a Unique Key?**

Both primary key and unique key enforce uniqueness of the column on which they are defined. But by default, the primary key creates a clustered index on the column, whereas unique key creates a non-clustered index by default. Another major difference is that primary key doesn’t allow NULLs, but unique key allows one NULL only.

**What is Difference between DELETE and TRUNCATE Commands?**

Delete command removes the rows from a table on the basis of the condition that we provide with a WHERE clause. Truncate will actually remove all the rows from a table, and there will be no data in the table after we run the truncate command.

**TRUNCATE**

* TRUNCATE is faster and uses fewer system and transaction log resources than DELETE. (Read all the points below)
* TRUNCATE removes the data by deallocating the data pages used to store the table’s data, and only the [page](javascript:void(0);) deallocations are recorded in the transaction log.
* TRUNCATE removes all the rows from a table, but the table structure, its columns, constraints, indexes and so on remains. The counter used by an identity for new rows is reset to the seed for the column.
* You cannot use TRUNCATE TABLE on a table referenced by a FOREIGN KEY constraint.
* Using T-SQL – TRUNCATE cannot be rolled back unless it is used in TRANSACTION. OR TRUNCATE can be rolled back when used with BEGIN … END TRANSACTION using T-SQL.
* TRUNCATE is a DDL Command.
* TRUNCATE resets the identity of the table.

**DELETE**

* DELETE removes rows one at a time and records an entry in the transaction log for each deleted row.
* DELETE does not reset Identity property of the table.
* DELETE can be used with or without a WHERE clause
* DELETE activates Triggers if defined on table.
* DELETE can be rolled back.
* DELETE is DML Command.
* DELETE does not reset the identity of the table.

**What are Different Types of Locks?**

* Shared Locks: Used for operations that do not change or update data (read-only operations), such as a SELECT statement.
* Update Locks: Used on resources that can be updated. It prevents a common form of deadlock that occurs when multiple sessions are reading, locking, and potentially updating resources later.
* Exclusive Locks: Used for data-modification operations, such as INSERT, UPDATE, or DELETE. It ensures that multiple updates cannot be made to the same resource at the same time.

**What are Pessimistic Lock and Optimistic Lock?**

**Optimistic Locking** is a strategy where you read a record, take note of a version number and check that the version hasn’t changed before you write the record back. If the record is dirty (i.e. different version to yours), then you abort the transaction and the user can re-start it.

**Pessimistic Locking** is when you lock the record for your exclusive use until you have finished with it. It has much better integrity than optimistic locking but requires you to be careful with your application design to avoid Deadlocks.

**When is the use of UPDATE\_STATISTICS command?**

This command is basically used when a large amount of data is processed. If a large amount of deletions, modifications or Bulk Copy into the tables has occurred, it has to update the indexes to take these changes into account. UPDATE\_STATISTICS updates the indexes on these tables accordingly.

**What is the Difference between a HAVING clause and a WHERE clause?**

They specify a search condition for a group or an aggregate. But the difference is that HAVING can be used only with the SELECT statement. HAVING is typically used in a GROUP BY clause. When GROUP BY is not used, HAVING behaves like a WHERE clause. Having Clause is basically used only with the GROUP BY function in a query, whereas WHERE Clause is applied to each row before they are part of the GROUP BY function in a query.

**What is CHECK Constraint?**

A CHECK constraint is used to limit the values that can be placed in a column. The check constraints are used to enforce domain integrity.

**What is NOT NULL Constraint?**

A NOT NULL constraint enforces that the column will not accept null values. The not null constraints are used to enforce domain integrity, as the check constraints.

**What is the difference between UNION and UNION ALL?**

**UNION**

Remove duplicate rows.

The UNION command is used to select related information from two tables, much like the JOIN command. However, when using the UNION command all selected columns need to be of the same data type. With UNION, only distinct values are selected.

**UNION ALL**

Doesn’t remove duplicate rows.

The UNION ALL command is equal to the UNION command, except that UNION ALL selects all values.

The difference between UNION and UNION ALL is that UNION ALL will not eliminate duplicate rows; instead it just pulls all rows from all the tables fitting your query specifics and combines them into a table.

**What is B-Tree?**

The [database server](javascript:void(0);) uses a B-tree structure to organize index information. B-Tree generally has following types of index pages or nodes:

* *Root node: A root node contains node pointers to only one branch node.*
* *Branch nodes: A branch node contains pointers to leaf nodes or other branch nodes, which can be two or more.*
* *Leaf nodes: A leaf node contains index items and horizontal pointers to other leaf nodes, which can be many.*

**What are the Advantages of Using Stored Procedures?**

* *Stored procedure can reduced network traffic and latency, boosting application performance.*
* *Stored procedure execution plans can be reused; they staying cached in SQL Server’s memory, reducing server overhead.*
* *Stored procedures help promote code reuse.*
* *Stored procedures can encapsulate logic. You can change stored procedure code without affecting clients.*
* *Stored procedures provide better security to your data.*

**What is BCP? When is it Used?**

BCP or BulkCopy is a tool used to copy huge amounts of data from tables and views. BCP does not copy the complete structures from source to destination. BULK INSERT command helps to import a data file into a database table or view in a user-specified format.

**What is SQL Injection? How to Protect Against SQL Injection Attack?**

SQL injection is an attack in which malicious code is inserted into strings that are later passed to an instance of SQL Server for parsing and execution. Any procedure that constructs SQL statements should be reviewed for injection vulnerabilities because SQL Server will execute all syntactically valid queries that it receives. Even parameterized data can be manipulated by a skilled and determined attacker.

Here are few methods which can be used to protect again SQL Injection attack:

* Use Type-Safe SQL Parameters
* Use Parameterized Input with Stored Procedures
* Use the Parameters Collection with Dynamic SQL
* Filtering Input parameters
* Use the escape character in LIKE clause
* Wrapping Parameters with QUOTENAME() and REPLACE()

**What is CHECKPOINT Process in the SQL Server?**

CHECKPOINT process writes all dirty pages for the current database to disk. Dirty pages are data pages that have been entered into the buffer cache and modified, but not yet written to disk.

**What special Oracle feature allows you to specify how the cost based system treats a SQL statement?**

The COST based system allows the use of HINTs to control the optimizer path selection. If they can give some example hints such as FIRST ROWS, ALL ROWS, USING INDEX, STAR, even better.

**What is a Hint?**

Hints are options and strong suggestions specified for enforcement by the SQL Server query processor on DML statements. The hints override any execution plan the query optimizer might select for a query

There are three different types of hints. Let us understand the basics of each of them separately.

**Join Hint**

This hint is used when more than one table is used in a query. Two or more tables can be joined using different types of joins. This hint forces the type of join algorithm that is used. Joins can be used in SELECT, UPDATE and DELETE statements.

**Query Hint**

This hint is used when certain kind of logic has to be applied to a whole query. Any hint used in the query is applied to the complete query as opposed to a part of it. There is no way to specify that only a certain part of a query should be used with the hint. After any query, the OPTION clause is specified to apply the logic to this query. A query always has any of the following statements: SELECT, UPDATE, DELETE, INSERT or MERGE (SQL 2K8); and this hint can be applied to all of them.  
  
Example:

SELECT /\*+ INDEX(idcf\_vol\_prospect\_ids\_idx)\*/

/\*+ LEADING(ivol) \*/

/\*+ ALL\_ROWS \*/

i.id\_number,

...

FROMi\_tablei

JOINvol\_tablevolonvol.id\_number = i.id\_number

JOINto\_a\_bunch\_of\_other\_tables...

WHEREi.solicitor\_id = '123'

ANDvol.solicitable\_ind = 1;

**What is Database Partitioning?**

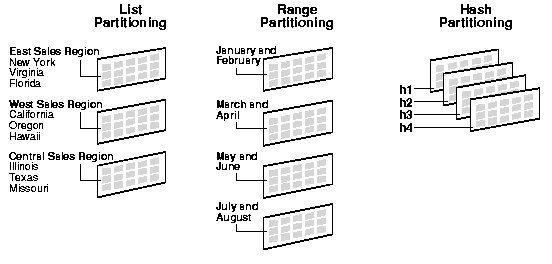
**Partitioning** addresses key issues in supporting very large tables and indexes by letting you decompose them into smaller and more manageable pieces called **partitions**. SQL queries and DML statements do not need to be modified in order to access partitioned tables. However, after partitions are defined, DDL statements can access and manipulate individuals partitions rather than entire tables or indexes. This is how partitioning can simplify the manageability of large database objects. Also, partitioning is entirely transparent to applications.

Each partition of a table or index must have the same logical attributes, such as column names, datatypes, and constraints, but each partition can have separate physical attributes such as pctfree, pctused, and tablespaces.

Partitioning is useful for many different types of applications, particularly applications that manage large volumes of data. OLTP systems often benefit from improvements in manageability and availability, while [data warehousing](javascript:void(0);) systems benefit from performance and manageability.

Oracle provides the following partitioning methods:

* [Range Partitioning](http://docs.oracle.com/cd/B10501_01/server.920/a96524/c12parti.htm#459659)
* [List Partitioning](http://docs.oracle.com/cd/B10501_01/server.920/a96524/c12parti.htm#460945)
* [Hash Partitioning](http://docs.oracle.com/cd/B10501_01/server.920/a96524/c12parti.htm#462530)
* [Composite Partitioning](http://docs.oracle.com/cd/B10501_01/server.920/a96524/c12parti.htm#459754)

[](http://docs.oracle.com/cd/B10501_01/server.920/a96524/cncpt158.gif)

Example:

create table Book (  
   ID                number not null,

   TITLE         varchar2,

   PUBID        char,

   PUBDATE date,

    constraint lab6\_pk primary key(ID))

    Partition by range (pubdate)(  
*Partition p1 values less than (to\_date('01-JAN-2000','DD-MON-YYYY')),*

*Partition p2 values less than (to\_date('01-JAN-2010','DD-MON-YYYY')),*

*Partition p3 values less than (MAXVALUE)*

)

  You would insert and select data just the same way that you would for a non-partitioned table

*INSERT INTO Book( id, title, pubid, pubdate )VALUES( 1, 'Something', 'FOO', sysdate );*

SELECT rowid, id, title, pubid, pubdat FROM Book;

Q 1- How to Enable/Disable Indexes?

A - Disable Index

   ALTER INDEX [IndexName] ON TableName DISABLE GO

Enable Index

   ALTER INDEX [IndexName] ON TableName REBUILD

**Q 2- What is max number of columns in index?**

 A-  32

 Q 3- **How many maximum columns in partitions can be used?**  
**A -  16**

**Q  4- How to replace specific values from query result? i.e. how query return 'M' and 'F' can be converted into 'Male' and Female'.**  
 A - This can be done using Oracle Decode function the syntax will be like

SELECT employee\_name,

DECODE(type,'M', 'Male',

'F', 'Female')type

FROM employee;

**Q 5 - If the column of the table is having case sensitive data like 'Abc' and 'ABC'  and we want to do case sensitive search on table. How we can improve performance of case sensitive search?**  
A- In this case we can define case sensitive index on table so that each search is restricted to particular value compare to full table scan. You can force all your data to be the same case by using UPPER() or LOWER():  
  select \* from my\_table where upper(column\_1) = upper('my\_string');  
or  
  select \* from my\_table where lower(column\_1) = lower('my\_string');  
  
If column\_1 is not indexed on upper(column\_1) or lower(column\_1), as appropriate, this may force a full table scan. In order to avoid this you can create a function-based index.  
  
**create index my\_index on my\_table ( lower(column\_1) );**  
  
If you're using LIKE then you have to concatenate a % around the string you're searching for.  
  
select \* from my\_table where lower(column\_1) = lower('my\_string') || '%';

**Q 5 - What are Synonyms?**

A Synonyms give you the ability to provide alternate names for database objects. You can alias object names; for example, using the Employee table as Emp. You can also shorten names. This is especially useful when dealing with three and four part names; for example, shortening server.database.owner.object to object.

**Q 6 - What is the Difference between Update Lock and Exclusive Lock?**

A -When Exclusive Lock is on any process, no other lock can be placed on that row or table. Every other process have to wait till Exclusive Lock completes its tasks.

Update Lock is a type of Exclusive Lock, except that it can be placed on the row which already has Shared Lock on it. Update Lock reads the data of the row which has the Shared Lock as soon as the Update Lock is ready to change the data it converts itself to the Exclusive Lock.

**Q 7 -What is a Surrogate Key?**

A - A surrogate key is a substitution for the natural primary key. It is just a unique identifier or number for each row that can be used for the primary key to the table. The only requirement for a surrogate primary key is that it should be unique for each row in the table. It is useful because the natural primary key can change and this makes updates more difficult. Surrogated keys are always integer or numeric.

**A 8 - Design the Database process which can handle 1 million requests at same time and What should be DB consideration?**

A - All the major databases and operating systems will work in [1 million](javascript:void(0);) requests at same time; provided sufficient hardware with sufficient bandwidth to memory, disk, and network are provided.

      All databases are built for this kind of scenario -- that is, where you need to update lots of rows from different clients all the time. This is what indexes and primary keys are used for, and the database is optimized for updating in this manner. (i.e., UPDATE your\_table SET your\_column=your\_value where your\_key=12)

The hardware requirements are going to be your biggest issue, and I suspect you will need to think about quite a lot here, including:

Failover (what happens when your main server fails?)

Clustering (You may simply need to have more than one [database server](javascript:void(0);) to handle your load)

Processors (2? 4? 8? 16? Multi-core? Does the db provide multi-core support that is well optimized?)

Memory (The faster the better, but your chipset must be able to handle the bandwidth as well)

Disk (Faster I/O the better. eSATA/SATA or Fiber, etc.)

Network (You'll need lots of bandwidth to handle this kind of traffic)

Virtualization (Does it make sense to build this as real hardware? Why not as virtual servers in the cloud? Amazon / Rackspace / etc.?)

Thankfully a good majority of the scaling issues are handled either at the hardware or db level. That is, you can start your database now on a slow server and as traffic increases you can adjust accordingly with minimal changes to your code or your db structure. What will change is your hardware and your db configuration. Most database servers will support failover/clustering with little to no change to your existing code or structures. (But be sure to research possible costs and the efficiency thereof first)

**Q 11 - Database Query Optimisation tips with JDBC:**

**A : Use prepared statement pooling**

Database supports prepared statement pooling for pooled connections, as discussed in the JDBC 3.0 specification, through the TimesTenObservableConnectionDS class. Note that statement pooling is transparent to an application. Use of the PreparedStatement object, including preparing and closing the statement, is no different.

**Use arrays of parameters for batch execution**

You can improve performance by using groups, referred to as *batches*, of statement executions, calling the addBatch() and executeBatch() methods forStatement or PreparedStatement objects.

A batch can consist of a set of INSERT, UPDATE, DELETE, or MERGE statements. Statements that return result sets, such as SELECT statements, are not allowed in a batch. A SQL statement is added to a batch by calling addBatch() on the statement object. The set of SQL statements associated with a batch are executed through the executeBatch() method.

For PreparedStatement objects, a batch consists of repeated executions of a statement using different input parameter values. For each set of input values, create the batch by using appropriate set*XXX*() calls followed by the addBatch() call. The batch is executed by the executeBatch() method.

// turn off autocommit

conn.setAutoCommit(false);

Statement stmt = conn.createStatement();

stmt.addBatch("INSERT INTO employees VALUES (1000, 'Joe Jones')");

stmt.addBatch("INSERT INTO departments VALUES (260, 'Shoe')");

stmt.addBatch("INSERT INTO emp\_dept VALUES (1000, 260)");

// submit a batch of update commands for execution

int[] updateCounts = stmt.executeBatch();

conn.commit ();

**Bulk fetch rows of data**

Oracle provides an extension that allows an application to fetch multiple rows of data. For applications that retrieve large amounts of data, fetching multiple rows can increase performance greatly. However, when using Read Committed isolation level, locks are held on all rows being retrieved until the application has received all the data, decreasing concurrency. For more information on this feature, see ["Fetching multiple rows of data"](http://docs.oracle.com/cd/E13085_01/doc/timesten.1121/e13068/writing_app.htm#BABIFHFA).

Use the ResultSet method getString() sparingly

Because Java strings are immutable, the ResultSet method getString() must allocate space for a new string in addition to translating the underlying C string to a Unicode string, making it a costly call.

In addition, you should not call getString() on primitive numeric types, like byte or int, unless it is absolutely necessary. It is much faster to call getInt()on an integer column, for example.

**Avoid data type conversions**

TimesTen instruction paths are so short that even small delays due to [data conversion](javascript:void(0);) can cause a relatively large percentage increase in transaction time.

Use the appropriate get*XXX*() method on a ResultSet object for the data type of the data in the underlying database. For example, if the data type of the data is DOUBLE, to avoid data conversion in the [JDBC driver](javascript:void(0);) you should call getDouble(). Similarly, use the appropriate set*XXX*() method on thePreparedStatement object for the input parameter in an SQL statement. For example, if you are inserting data into a CHAR column using aPreparedStatement, you should use setString().  
  
**Q 12: What should be strategy to minimise the impact on external system which is using our table's data for processing?**  
Answer : Best strategy should be using database views to minimize the impact on external system, If we are changing our table structure or columns and if we are able to populate same data using View then there should not be any impact on external system and they will not require any change.

# ACID Property

ACID Properties in SQL Server ensures Data Integrity during a transaction. The SQL ACID is an acronym for Atomicity, Consistency, Isolation, Durability.

In our previous article we already explained about the [Transaction](https://www.tutorialgateway.org/sql-transaction/), and [Nested Transactions](https://www.tutorialgateway.org/nested-transactions-in-sql-server/). So, I suggest you to refer the same. In this article, Let me define each and every ACID property in [SQL](https://www.tutorialgateway.org/sql/):

* **Atomicity :** The atomicity acid property in Sql means, either all the operations (insert, update, delete) inside a transaction are takes place or none. Or you can simply say, all the statements (insert, update, delete) inside a transaction is either successfully completed or they were rolled back.
* **Consistency :** This SQL ACID property ensures the database consistency. It means, whatever happens in the middle of the transaction, this property will never leave your database in half-completed state.
  + If the transaction is completed successfully then it will apply all the changes to the database.
  + If there is any error in a transaction then all the changes that are already made will be rolled back automatically. It means, database will be restored to its state that it had before the transaction started.
  + If there is a system failure in the middle of the transaction then also, all the changes that are already made will automatically rolled back.
* **Isolation :** Every transaction is individual, and One transaction can’t access the result of other transaction until the transaction is completed. Or, you can’t perform same operation using multiple transaction at the same time. We will explain this SQL acid property in a separate article.
* **Durability :** Once the transaction is successfully completed, then the changes it has made to the database will be permanent. Even if there is a system failure, or any abnormal changes also, it will safeguard the committed data.