11th International Research/Expert Conference
"Trends in the Development of Machinery and Associated Technology"
TMT 2007, Hammamet, Tunisia, 05-09 September, 2007.

ESSENTIAL FACETS OF DATABASE PERFORMANCE

Rodica M. Cadareanu, Sorin C. Zamfira
Transilvania University
B-dul Eroilor 29, RO-500036, Brasov
Romania

ABSTRACT
In the paper are presented some aspects related to database performance in engineering process. The secret of great database performance can lies on research to help SQL Server more rapidly save or retrieve data and reduce the time response query. Constructing and operating a performance SQL Server based application involve strong process and engineering discipline. The life of query is a fundamental key to great performance helping SQL Server to minimize the overall of retrieve data and the time it takes the server to save or retrieve data. Minimizing the full amount of time reduce the resource used and response time. The performance area is based on statistics, maintenance, and indexing and database design. This can be applied on development, testing but can prove also in production. You can apply a data model technique. The discrepancy exists for the reason that many techniques are inclined to be database agnostic, but the performance relies on technique to leverage the features provided by underling technology.
Optimum portability is ensured when a package can be executed properly on any virtual server. Storing business logic in a different location ensures availability.
For a better solution you must consider constraint. If a record is updated or deleted from the reference tables SQL can perform inverse lookup.
Several approaches to performance engineering and techniques apply only after the system has been developed, when it's more demanding and costly to address design problems. Instead if you create an ongoing performance – engineering process, you can anticipate certain behaviours and characteristics, applying a variety of design techniques and monitoring and verification methods that will ensure proper design as well as smooth running operations.
Keywords: database performance, SQL server, life of query.

1. INTRODUCTION
A solution to improve the database performance resides on performing query with a minimal time response and the question is leveraging the points in execution process. One of the strength of modern relational database management server (DBMS) is server-based query optimizer. Client/server DBMSs have changed this by making the server an equal partner with developer in ensuring database access is as efficient as possible. The science behind query optimization has evolved over the years to the point that the optimizer is usually able to tune a query better and more quickly than a human counterpart. Some optimize based on heuristic – internally reordering and reorganizing based on a predefined set of algebra rules [3]. Query trees are dissected and associative and cumulative rules are applied in a predominated order until a plan for satisfying the entire query emerges [5]. In this effort, we show that it is possible to combine the advantage of reducing the time response query using the logical query processing phase details. We use the concept of aberration based on the fact that same dimension of data used for populating scope can contain fields with immense sizes (or infinites) or very small sizes but not negligible. Our outcome show that using this study can perform considerably better for query results and accomplish comparable performance in the worst case scenario by concept outside of the semantic vocabulary.

2. STUDY METHODOLOGY

2.1. Discussions

A Cartesian product (a cross join or an unrestricted join) is performed between the first two tables that appear in the FROM clause and as a result, virtual table A is generated. B contains one row for each every possible combination from the left table and a row from the right table [3].

If A, B represent two different points on space E and the pairs (A, $\vec{AB}$) and (A, B) are respectively one Cartesian afin reference to AB line and α, β are two real numbers with the SUM not NULL , the system baricentral for points (A, α) (B, β) is the point defined by:

$$\vec{AB} = \frac{1}{\alpha + \beta}(\vec{A\vec{A}} + \beta\vec{AB}) = \frac{\beta}{\alpha + \beta} AB \quad (1)$$

and the result is that M is the point of AB with the abscise in the (A, $\vec{AB}$).

We can observe that if we admit to know how to construct a point for one line when we identify this abscise within a Cartesian of this line, then we can build a baricentre of two distinct points.

By reciprocity, if M is a point designed on AB line and t is the abcise of point M in **(A**, $\vec{AB}$), then:

$$\vec{AM} = t\vec{AB},\ (1-t)\vec{MA} + t\vec{MB} = 0. \quad (2)$$

Then the point M is the baricenter of (A, 1-t), (B,t).

2.2. Performing

Inner join are used to match rows between two tables based on some criterion. Out of first three query logical processing phases, inner join apply the first two-namely, Cartesian product and on filter [3]. There is a common misconception by many developers advanced and beginner alike- that SQL is unsuitable for performing complex computations. The perception was that it's really a data retrieval facility was that any heavy calculation work must be performed in a 3rd Generation Structured Query Language (3GL) or short [5]. In some situations the we are confronted with Variance and standard deviations and using the sample standard deviation function (STDDEV) can compute standard population and deviation while sample variance function (VAR) can compute simple variance and population variance.

We consider a case when we need to identify the behaviour of various Dynalloy materials samples for used on a study and we have enormous differences within same properties of this data.

2.3. Implementation

The present study was conducted using intelligent solution for data acquisition on board intelligent and system integration Rackmount instrumentation including DAPL 2000 and one of the specialized data acquisition processor board (DAP 803) for higher-frequency at energy levels that our sensors can detect and another a lower cutoff frequencies as a Eurocard-format expansion board for DAP. DasyLab application - the tool utilized for extract the data – is easy to configure a DAP board for higher performance application on Windows. The onboard operating system supports over 100 easy-to-use commands optimized for data acquisition and control. This complete application includes the following command application: DSP-filtering, DSP-Spectral Analysis, Sensor Conditioning, Software Triggering and Process Control. The system allows users to make measurements of characteristics for Dynalloy materials. Also the user can control this from any Windows systems or can exercise monitoring remotely from any other windows systems.

3. EXPERIMENT DESIGN

3.1. Analysis at the operation level

There are two extreme situations that can appear on the study representing one object(y) very small and the values of parameters are infinite ((s), ($2\sigma_0$)) or one objects enormous and the parameters

(s = $-\infty$) representing the characteristics are very small (σ_p).

If field object 2y, parameter $2\sigma_0$ and s are large values we experience errors.

Vectors rods on coordinate systems are used on the situations when the parameters s is infinite [6]. In this case one aberration take place. Considering a deformation of sample starting from point P(object) which is located on front plan xy and meridian y0z, as plan traversing through P and having the axe zz'. On emergency because of aberrations materialized the line considered didn't go through point P of Gausian image, but through a different point P'1 $(dx', dy + y'_0)$. The length of aberration vector is

$$d\bar{u}' = P'\vec{P}'1. \tag{3}$$

This aberration can be expressed by function of φ. The coordinate of point P'1 depend on: the dimension parameters, y coordinate of point object P, $2\sigma_0$, incident H$\circ$, the angle φ of aberration vector $d\bar{u}'$ with meridian plan z'o'x'.

Maintained the parameters y and H at constant values and varying the angle φ between 0 and 2π, the P'1 point describes a curve with 0'y' as symmetry axis. This is the aberration curve for H zone. For each angle $2\sigma\circ$ exists a curve aberration.

Because the function dx' and dy' detain a high grad of complexity might have to proceed at series expansion:

$$f(x) = \sum_{n=0}^{\infty} \frac{1}{n!} f^n(0) x^{n,0!=1} \tag{4}$$

This presented Dynalloy system measurement been a revolution system is sufficient to research only the dy' component of aberration vector. As a result we can write:

$$\begin{aligned} dy = f(H,y) = f(0,0) + A_1H^1 + B_1yH^0 + A_2H^2 + B_2yH^1 + C_2y^2 + A_3H^3 + B_3yH^2 + C_3Hy^2 + D_3y^3 + \\ A_4H^4 + B_4yH^3 + C_4H^2y^2 + D_4Hy^3 + E_4y^4 + ... \end{aligned} \tag{5}$$

Because of symmetry all the members with even exponents and unitary are nulls [6].

The problems with are confronted with appears also on the spherical deformation of Dynalloy even if we need to measure the elongation. In this case all the terms in mathematical expression of these aberrations are all the terms which contain y nulls. The aberration transversal is determined by uneven power of H properties:

$$dy' = f_1(H) = A_3H^3 + A_5H^5 + A_7H^7 + ... \tag{6}$$

and the aberration for axial position contain the terms with H even exponent :

$$ds'_H = \tilde{S}' - s' = s'_H - s'_0 = A_3H^3 + A_4H^4 + A_6H^6 + ... \tag{7}$$

Pivoting allows to rotate a rows to column value and at this scenario we bring into play open schema storing all data on a single table where each attribute value reside in its own entities.

4. RESULTS

A total number of 12 samples studied more than 360 hours over six month were performed in the experiment sessions. Topics were SQL performance, endomorphism of Vector space study.

When data acquisition was complete and all scripts had been analyzed, we assembly evidences for each properties and pivot the findings into following results chat (Figure1).

Table 1: the dynalloy study

Diamter in Inches	*0.001*	*0.002*	*0.003*	*0.004*	*0.006*	*0.008*	*0.01*	*0.012*	*0.02*
Maximum Pull Force (grams)	*7*	*35*	*80*	*150*	*330*	*590*	*930*	*1250*	*3562*
Current at Room Temp(mA)	*20*	*50*	*100*	*180*	*400*	*610*	*1000*	*1750*	*4000*
Resistance	*45*	*12*	*5*	*3*	*1.3*	*0.8*	*0.5*	*0.33*	*0.16*
*70° C Wire** /sec*	*0.1*	*0.3*	*0.5*	*0.8*	*2*	*3.5*	*5.5*	*8*	*17*
*90° C Wire** /sec*	*0.06*	*0.1*	*0.2*	*0.4*	*1.2*	*2.2*	*3.5*	*6*	*14*

Each sample was measured one day using Dasylab application but exporting data into SQL database making use of DLL application future. The goal of this practice was to construct a database for Dynalloy study purposes.

4.1. Defining

With respect of data flow Figure 1 illustrates that output were influenced by the types of query used.
For aggregate value we can use :

max(case when rn= 1 then val else 1 end) (8)

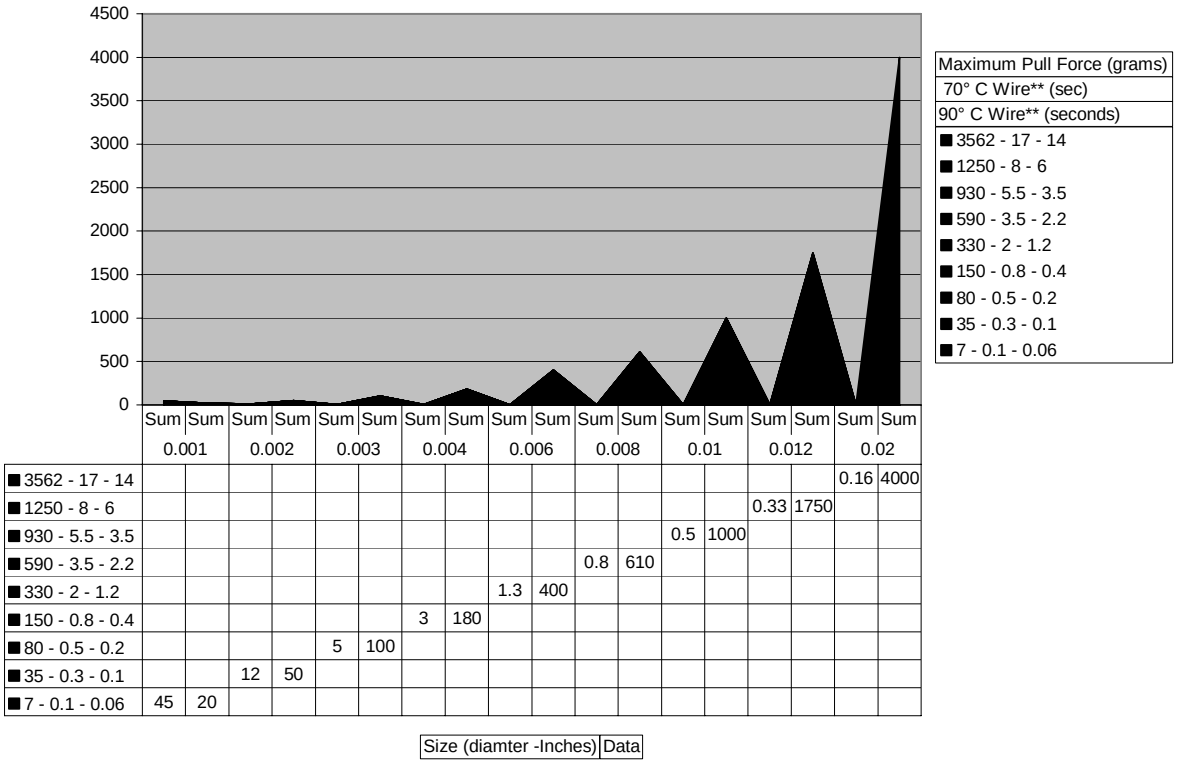

Figure 1: Example of the flexinol actuator wire when obtaining motion for several times for billions of cycles using pivot table with SQL custom aggregations based on dynalloy study table.

5. CONCLUSION

In our research we learn that we can use query for aggregate Medians as well as histograms to perform a report but we can also we have to resolve the tolerance issues and find out those values.We therefore come up with the recommendation that for data manipulation when the perfection is a key functionality need to leverage the tolerance attributes in a way to address users requirements.

6. REFERENCES

[1] Rozenshtein, David, Anatoly Aabramovich, and Eugene Birger, Optimizing Transact-SQL: Advanced Programming Techniques. SQL Forum, 1995

[2] Alan, Dickman : Designing Application with MSMQ, Addison-Wesley Longman, Inc., 1998

[3] Itzik Ben-Gan, Lubor Kollar and Dejan Sarka : T-SQL Quering, Microsoft 2005 Edition, 2005

[4] Teo Lachev ,Applied Microsoft Analysis Services 2005 and Microsoft Business Intelligence Platform., 2005

[5] Ken Henderson , The Guru Guide to Transact-SQL , Addison-Wesley Longman, Inc., 2005

[6] C.Gautier,G. Girard, D. Gerll, C. Thierce, A. Warusfel, Elemente de Geometrie Afina si Euclidiana,1974

[7] Constantin, Sorin Zamfira :Prelucrarea semnalelor, Editura Universitatii Transilvania din Brasov, 2003