

A Choice Performance Tuning

Jason Wong,
SQL Saturday 514, May 14th, 2016



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- Speaking my view and experiences
- Not representing any organization
- No conflict of interest on presentation
- This is not giving medical advice

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Jason Wong has many years of experience working as programmer, apps admin, IT Applications Manager, Sr. DBA in the greater Houston area. He has been a volunteer PASS speaker since 2008. Other interests include: tennis, car repair, photos in National Parks, Health, cholesterol and Vitamin K2, D and Calcium His career profile, education, publication, travel experiences, along with other interests can be found on his web site. Education: MS Rice, MBA UH. Personal web site:

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“Tech support says the problem is located somewhere between the keyboard and my chair.”

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Server Problem



REBOOT!



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CPU usage:

CPU pressure? when?

Caused by activities such as big query

wait type - CXPacket

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CPU - CPU pressure:

```
Select signal_wait_time_ms=sum(signal_wait_time_ms)
      ,'%signal (cpu) waits' = cast(100.0 * sum(signal_wait_time_ms) /
sum (wait_time_ms) as numeric(20,2))
      ,resource_wait_time_ms=sum(wait_time_ms -
signal_wait_time_ms)
      ,'%resource waits'= cast(100.0 * sum(wait_time_ms -
signal_wait_time_ms) / sum (wait_time_ms) as numeric(20,2))
From sys.dm_os_wait_stats;
```

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Memory:

Page Life Expectancy (Buffer Manager)

Free List Stalls /sec (Buffer Manager)

Free Memory (Memory Manager)

Memory Grants Outstanding (Memory Manager)

Memory Grants Pending (Memory Manager)

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IO:

Logical VS Physical

ms per read/write

Avg. reads/writes per sec

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Storage:

In-memory (2014)

SSD

Hard-disk

(with RAID)

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SQL Server Default configuration:

Max memory

Isolation level

File Growth size and VLF

Recovery model

Database version compatibility setting

Collation

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Isolation side-effect

Isolation Level	Dirty Read	Nonrepeatable Read	Phantom Read
Read Uncommitted	Yes	Yes	Yes
Read Committed (locking)	No	Yes	Yes
Read Committed_S napshot (RowVersioning)	No	Yes	Yes
Repeatable Read	No	No	Yes
Snapshot	No	No	No
Serializable	No	No	No

(Kalen Delany, SQLServer)

(Thomas Kyte, Oracle)

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Development Design:

Datatype

varchar() VS nvarchar()

Null

Soft-delete

(Materialized View)/Indexed View

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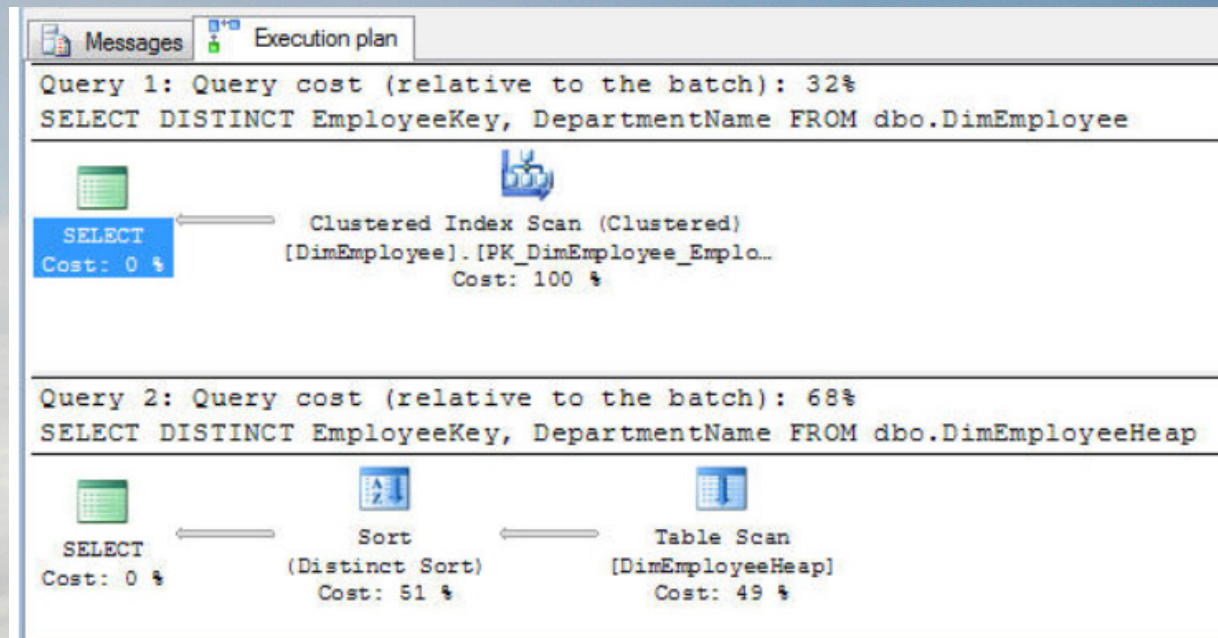
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Index:

Column store Index (OLAP)
Clustered Index
Unique Index
B-tree Index
Fill_factor, Pad_index
Index Defragmentation
Statistics Update
missing indexes, unused indexes

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Performance T-SQL:

Isolation level and blocking
In-line function/Implicit conversion
In Operator
Like operation, SELECT *, Order by, group by
Recompile, Ad-hoc query (dynamic sql)
Union, Cartesian join
Unfiltered delete
Query hint
4 part naming convention
newID() VS newsequentialid()
HEAP table

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```
Declare @CTN nvarchar(25);

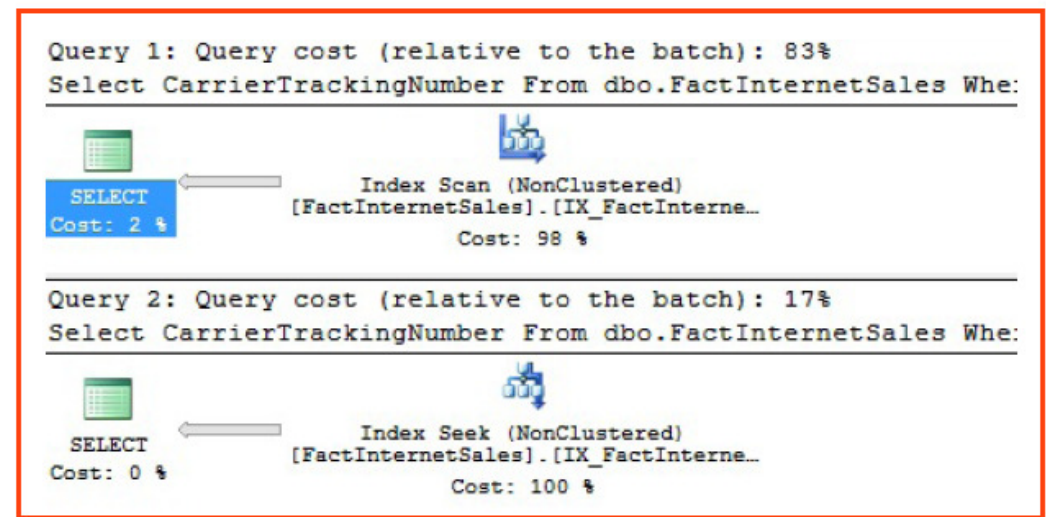
Set @CTN = NULL;

-- Function on column
Select CarrierTrackingNumber
From dbo.FactInternetSales
Where ISNULL(CarrierTrackingNumber, '') = ISNULL(@CTN, '');

-- Function on constant
Select CarrierTrackingNumber
From dbo.FactInternetSales
Where CarrierTrackingNumber = @CTN
or (CarrierTrackingNumber Is Null And @CTN Is Null);|
```

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(25398 row(s) affected)
Table 'FactInternetSales'. Scan count 1, logical reads 430, physical reads 0, read-ahead reads 0, lob logical reads 0, lob physical reads 0, lob read-ahead reads 0.

(25398 row(s) affected)
Table 'FactInternetSales'. Scan count 1, logical reads 92, physical reads 0, read-ahead reads 0, lob logical reads 0, lob physical reads 0, lob read-ahead reads 0.

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Example,

Change this block : `INSERT INTO #tmpMinMax SELECT DISTINCT S.BillOid, MIN(S.servicedate),MAX(S.servicedate) FROM orders S WITH (NOLOCK) left outer join Bills B WITH (NOLOCK) on B.Oid=S.BillOid WHERE B.Oid NOT IN (SELECT isnull(BillOid,0) FROM #tmpMinMax) AND ISNULL(B.IsDeleted,0) = 0 AND (B.billtypeid=5) GROUP BY S.BillOid`

To the following block : `INSERT INTO #tmpMinMax SELECT DISTINCT S.BillOid, MIN(S.servicedate),MAX(S.servicedate) FROM orders S WITH (NOLOCK) left outer join Bills B WITH (NOLOCK) on B.Oid=S.BillOid left outer join #tmpMinMax tem WITH (NOLOCK) on S.BillOid = tem.BillOid WHERE ISNULL(B.IsDeleted,0) = 0 AND (B.billtypeid=5) AND tem.BillOid is null GROUP BY S.BillOid`

This statement inside a stored procedure is reduced from 10-11 minutes to 6-8 seconds execution, i.e. improvement by 8250%.

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Example,

Change:

```
SELECT OrderID FROM myDB.dbo.Orders WHERE DATEADD(day, 15, OrderDate) = '07/23/1996'
```

To:

```
SELECT OrderID FROM myDB.dbo.Orders WHERE OrderDate = DATEADD(day, -15, '07/23/1996')
```

Example,

```
INSERT INTO @Invoices
SELECT pid.InvoiceNumber, SUM(TotCost) Sump, Value - SUM(TotCost) Pickup, Value
FROM ABC_PreviewInvoiceDetail pid INNER JOIN ABC_PreviewInvoices pi on pi.InvoiceNumber = pid.InvoiceNumber
LEFT OUTER JOIN ABC_ServiceOrders so ON so.ServiceOrderNumber = pid.SOrder
LEFT OUTER JOIN ABC_CorporateServiceTypes cst ON cst.Oid = so.ServiceTypeOid
WHERE
(
    (Profile LIKE 'homesump%' OR Profile LIKE 'homeflash%') OR ISNULL(cst.ServiceType, '') = 'Sump-
Vacuum'
)
```

The use of the LEFT function in the search predicate may prevent the query optimizer from generated execution plans that use index seeks as well as from effectively evaluating string statistics.

The function or expression "substring" in a query can cause index suppression resulting in poor performance due to a scan being performed instead of a seek.

Hard-coded date is bad unless there is a reason that cannot be overcome.

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Monitoring and debugging:

Active Session History

Server Waits

System Top * queries finding

Extended Events

MDW or DIY performance history

3rd party software

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Demo – Texas Two Steps

- Active Sessions (and history)
- Incremental Wait Stats (and history)

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A Choice Performance Tuning Take-away:



“Never let a good
crisis go to waste.”

- Winston Churchill

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- Questions?
- Discussions?



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