

SQL ZATERDAG

Top 10 meest geziene performance
problemen en bijbehorende
oplossingen

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&

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Over André



- SQL Server MVP
- Voorzitter PASS Nederland
- IT'er vanaf mijn 17e
- SQL Server ervaring vanaf 6.5
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- Twitter : [@AndreKamman](https://twitter.com/AndreKamman)

Over Henk

- Mede oprichter Unisys ES7000 Performance Test Centers (2001)
- Workload optimizer & Performance troubleshooter
- 5+ jaar SSIS / SQL product performance testen met de dev teams & SQLCAT
- Spreker op diverse evenementen: NL /EU SQLPass / SQLBits
- Blog: henkvandervalk.com
- Twitter: [@HenkvanderValk](https://twitter.com/HenkVanderValk)

Top 10 (ongeveer)

- Tips uit de praktijk
- Problemen die we veel zien of waar je moeilijk een antwoord via interweb op kunt vinden.

Paging via CTE

```
Declare @From int = 50000, @To int = 50009
```

```
;with trHist
```

```
as
```

```
(
```

```
Select
```

```
    TransactionID,
```

```
    ProductID,
```

```
    TransactionDate,
```

```
    Quantity,
```

```
    ActualCost,
```

```
    row_number() over(order by Quantity desc, TransactionID) as Rownumber
```

```
From Production.TransactionHistoryArchive
```

```
)
```

```
Select *
```

```
From trHist
```

```
Where Rownumber between @From and @To
```

Cross Apply ipv UDF

- Select
- c.CurrencyCode,
- c.Name,
- EUR.AverageRate
- From sales.currency c
- Join sales.currencyrate EUR
- on EUR.FromCurrencyCode = c.CurrencyCode
- and EUR.ToCurrencyCode = 'EUR'
- and EUR.CurrencyRateDate = '20080101'

Cross Apply ipv UDF

```
Create Function getAverageCurrencyRate(  
    @FromCurrencyCode nchar(3),  
    @CurrencyRateDate datetime)  
returns money  
as  
begin  
    declare @AverageRate money  
  
    Select top 1  
        @AverageRate = EUR.AverageRate  
    From sales.currencyrate EUR  
    Where EUR.ToCurrencyCode = 'EUR'  
    And EUR.FromCurrencyCode = @FromCurrencyCode  
    And EUR.CurrencyRateDate <= @CurrencyRateDate  
    Order by EUR.CurrencyRateDate  
  
    return @AverageRate  
end
```

Cross Apply ipv UDF

Select

c.CurrencyCode,

c.Name,

dbo.getAverageCurrencyRate(c.CurrencyCode, getdate())

AverageRate

From sales.currency c

Cross Apply ipv UDF

Select

```
c.CurrencyCode,  
c.Name,  
EUR.AverageRate
```

From sales.currency c

CROSS APPLY

(

```
Select top 1
```

```
    EUR.AverageRate
```

```
From sales.currencyrate EUR
```

```
Where EUR.ToCurrencyCode = 'EUR'
```

```
And EUR.FromCurrencyCode = c.CurrencyCode
```

```
And EUR.CurrencyRateDate <= getdate()
```

```
Order by EUR.CurrencyRateDate desc
```

) EUR

BizTalk Workload Optimization

Challenge

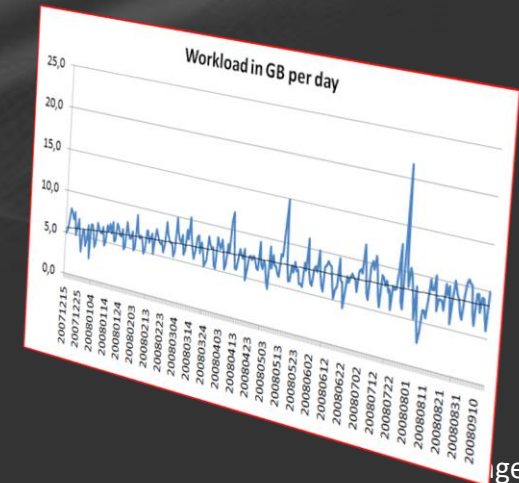
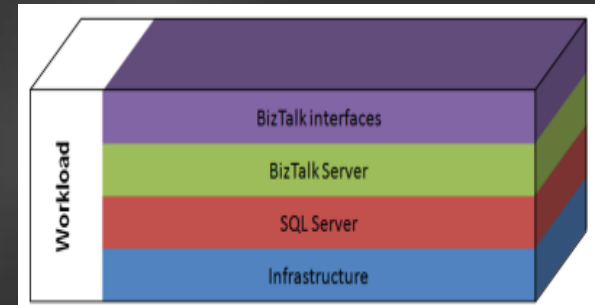
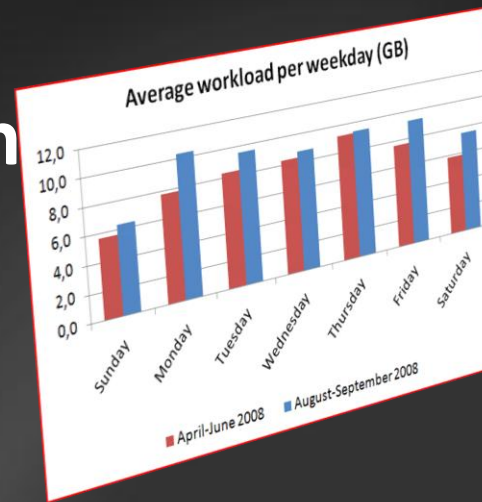
- International Company 24x7
- Can the organisation's BizTalk platform cope with 30% SAP workload increase ?
- Only CPU / Network load was tracked

Solution

- 2 week Onsite review & Analysis Quickscan

Results

- ✓ Workload Analysis / overview of today's capacity
- ✓ Performance tuning advice on all layers implemented
- ✓ Successful SAP integration



BizTalk artifacts

Message Body Tracking

- BizTalk DTA database:

User	Table	rows	reserved KB	data KB	Index KB	unused	A.RowSz	Clust	IX's	Stat's	IX_Depth	RowMod
User	Total	32287723	14743512	9463968	3645752	1633792	300,1	49	38	62	0	0
dbo	dta_DebugTrace	22227131	7426816	4763896	1926328	736592	219,5	1	1	4	4	3368029
dbo	dta_MessageInOutEvents	6324337	4165224	2900680	1218456	46088	469,7	1	2	11	4	251470
dbo	dta_ServiceInstances	2730041	1157176	683208	447936	26032	256,3	1	2	8	4	48451
dbo	Tracking_Parts1	196366	694976	475016	264	219696	2477,1	1	0	1	2	140491
dbo	Tracking_Spool1	39644	508664	13352	3608	491704	344,9	1	1	2	3	128611

The screenshot displays the BizTalk Server 2006 Administration Console with three tracking configuration dialog boxes open. The 'Pipelines' dialog shows tracking options for pipeline processing, with 'Track Message Bodies' and its sub-options checked. The 'Receive Port Tracking Options' dialog shows 'Track Message Bodies' checked, along with options for tracking messages before and after port processing. The 'Orchestration Tracking Options' dialog shows 'Track Message Bodies' checked, with options for tracking messages before and after orchestration processing. Red circles highlight the 'Track Message Bodies' option in each dialog.

The BizTalkMgmtDB Query & Output

```
select
bts_application.nvcName as ApplicationName,
'Pipeline Send' as [Artifact],
bts_pipeline.[name] as [Artifact Name],
bts_sendport.[nvcname] as [Artifact Owner Name],
bts_sendport_transport.nvcAddress as [Artifact Address],
StaticTrackingInfo.ismsgBodyTrackingEnabled as [TrackingBits]
from bts_pipeline
left outer join bts_sendport on bts_sendport.nSendPipelineID = bts_pipeline.[ID]
left outer join bts_sendport_transport on bts_sendport_transport.nSendPortID =
bts_sendport.[nID]
left outer join adm_SendHandler on adm_SendHandler.[ID] =
bts_sendport_transport.nSendHandlerId
left outer join adm_Adapter on adm_Adapter.[ID] = adm_SendHandler.AdapterId
left outer join bts_application on bts_sendport.nApplicationID = bts_application.nID
left outer join StaticTrackingInfo on StaticTrackingInfo.strServiceName = bts_pipeline.[name]
where StaticTrackingInfo.ismsgBodyTrackingEnabled is not null AND
StaticTrackingInfo.ismsgBodyTrackingEnabled <> 0
```

union

```
select
bts_application.nvcName as ApplicationName,
'Pipeline Receive' as [Artifact],
bts_pipeline.[name] as [Artifact Name],
bts_receiveport.[nvcname] as [Artifact Owner Name],
adm_receivelocation.InboundTransportURL as [Artifact Address],
StaticTrackingInfo.ismsgBodyTrackingEnabled as [TrackingBits]
from bts_pipeline
left outer join adm_receiveLocation on adm_receiveLocation.ReceivePipelineID =
bts_pipeline.[ID]
left outer join bts_receiveport on adm_receivelocation.receiveportid = bts_receiveport.nID
left outer join adm_Adapter on adm_Adapter.Id = adm_receivelocation.AdapterID
left outer join bts_application on bts_receiveport.nApplicationID = bts_application.nID
left outer join StaticTrackingInfo on StaticTrackingInfo.strServiceName = bts_pipeline.[name]
where StaticTrackingInfo.ismsgBodyTrackingEnabled is not null AND
StaticTrackingInfo.ismsgBodyTrackingEnabled <> 0
```

```
select
bts_application.nvcName as ApplicationName,
'Orchestration' as [Artifact],
bts_orchestration.nvcName as [Artifact Name],
null as [Artifact Owner Name],
bts_orchestration.nvcFullName as [Artifact Address],
StaticTrackingInfo.ismsgBodyTrackingEnabled as [TrackingBits]
from bts_orchestration
left outer join bts_assembly on bts_assembly.nID = bts_orchestration.nAssemblyID
left outer join bts_application on bts_assembly.nApplicationID = bts_application.nID
left outer join StaticTrackingInfo on StaticTrackingInfo.strServiceName = bts_orchestration.nvcFullName
where StaticTrackingInfo.ismsgBodyTrackingEnabled is not null and
StaticTrackingInfo.ismsgBodyTrackingEnabled <> 0
```

union

```
select
bts_application.nvcName as ApplicationName,
'Send Port' as [Artifact],
bts_sendport.[nvcname] as [Artifact Name],
null as [Artifact Owner Name],
bts_sendport_transport.nvcAddress as [Artifact Address],
nTracking as [TrackingBits]
from bts_sendport
left outer join bts_sendport_transport on bts_sendport_transport.nSendPortID = bts_sendport.[nID]
left outer join adm_SendHandler on adm_SendHandler.[ID] = bts_sendport_transport.nSendHandlerId
left outer join adm_Adapter on adm_Adapter.[ID] = adm_SendHandler.AdapterId
left outer join bts_application on bts_sendport.nApplicationID = bts_application.nID
where nTracking is not null AND nTracking <> 0
```

union

```
select
bts_application.nvcName as ApplicationName,
'Receive Port' as [Artifact],
bts_receiveport.[nvcname] as [Artifact Name],
null as [Artifact Owner Name],
adm_receiveLocation.InboundTransportURL as [Artifact Address],
```

Query also downloadable from:

<http://henkvandervalk.com/it-efficiency-things-to-check-during-your-coffee-break-biztalk-mbt>

Which artifacts have MBT enabled?

- Sample Query output:

ApplicationName	Artifact	Artifact Name	Artifact Owner Name	Artifact Address	TrackingBits
NULL	Pipeline Send	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	NULL	NULL	3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_BCDToetsServices/Services/BCDToetsServices/Services_BCD_NI_DEFCheck_portC		3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_BCDToetsServices/Services/Services/BCD/DEFCheck.asmx		3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_BCDToetsServices/Services/BCDToetsServices/Services_BCD_NI_FGHCheck_portF		3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_BCDToetsServices/Services/Services/DEF/FGHCheck.asmx		3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_Services/ABCv1/BCD_ABC_/Services/ABCv1/BCD_ABC_Check_OrchSyncEcho_prsF		3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_Services/ABCv1/BCD_ABC_/Services/ABCv1/ABCCheck.asmx		3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_Services/ABCv1/BCD_ABC_/Services/ABCv1/SynchronousEcho.asmx		3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_Services/HIJv1/BCD_HIJ_C/Services/HIJv1/BCD_HIJ_Check_OrchSyncEcho_prsFro		3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_Services/HIJv1/BCD_HIJ_C/Services/HIJv1/SynchronousEcho.asmx		3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_Services/HIJv1/BCD_HIJ_C/Services/HIJv1/HIJCheck.asmx		3
BizTalk Application 1	Receive Port	WebPort_Services/ABCv1/BCD_ABC_Check_OrchSyncEcho	NULL	/Services/ABCv1/BCD_ABC_Check_OrchSyncEcho_prsF	128
BizTalk Application 1	Receive Port	WebPort_Services/ABCv1/BCD_ABC_Check_OrchSyncEcho	NULL	/Services/ABCv1/ABCCheck.asmx	128
BizTalk Application 1	Receive Port	WebPort_Services/ABCv1/BCD_ABC_Check_OrchSyncEcho	NULL	/Services/ABCv1/SynchronousEcho.asmx	128
BizTalk Application 1	Send Port	SendPort1	NULL		8
BizTalk Application 1	Send Port	SendPort1	NULL	e:\Temp\%MessageID%.xml	8

Sequence Table

```
Create table seq_Invoice(ID int identity(1,1), a int)
```

```
Create procedure get_seq_Invoice @seq_Invoice int OUTPUT  
as
```

```
    Insert into seq_Invoice(a) values(1)  
    set @seq_Invoice = scope_identity()  
    Delete seq_Invoice
```

```
declare @seq_Invoice int  
exec get_seq_Invoice @seq_Invoice OUTPUT  
select @seq_Invoice
```

IF – Then in Stored Procedures

- 1 executie plan voor de hele stored procedure.
- Beter om andere stored procedures aan te roepen in de IF-THEN structuur.
- Denk aan de statistieken.
- (vullen van tabel en query draaien in dezelfde proc, dan heb je bij compilatie de verkeerde statistieken)

Lock tabel, ACID ?

- Gebruik een aparte tabel om logische locks te plaatsen.
- Voorkomt blocking en deadlocking problemen bij high traffic websites.
- Maak logische sleutels aan in volledig losstaande tabel, vul deze met logische account / login.
- Neem wellicht spid en datetime mee om vergeten locks mee te vinden.

Index op checksum

Create table files(location varchar(1000), fileid int)

Create index ix_file_location on files(location)

Warning! The maximum key length is 900 bytes. The index 'ix_file_location' has maximum length of 1000 bytes. For some combination of large values, the insert/update operation will fail.

Index op checksum

```
ALTER TABLE dbo.files ADD  
    location_checksum AS checksum(location) PERSISTED
```

```
Create clustered index  
    ix_file_location on files(location_checksum)
```

```
declare @location varchar(1000) = 'c:\temp\ditnietweggooienaub.xls'
```

```
Select  
    f.fileid
```

```
From files f
```

```
Where f.location_checksum = checksum(@location)
```

```
And f.location = @location
```



```
Clustered Index Seek (Clustered)  
[files].[ix_file_location] [f]  
Cost: 100 %
```

Like '%whatever'

Select Name

From Person.StateProvince

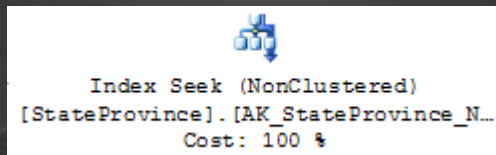
Where Name like 'North%'

North Carolina

North Dakota

Northern Mariana Islands

Northwest Territories



Select Name

From Person.StateProvince

Where Name like '%Land'

England

Maryland

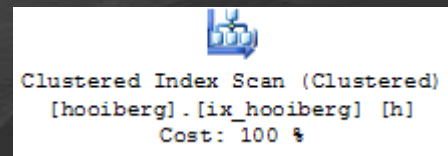
Newfoundland

Prince Edward Island

Queensland

Rhode Island


Saarland



Like '%whatever'

```
ALTER TABLE Person.StateProvince ADD  
    reverse_Name as reverse(Name) PERSISTED  
Create index ix_StateProvince on Person.StateProvince(reverse_Name, Name)
```

```
Select Name  
From Person.StateProvince  
Where reverse_Name like reverse('%Land')
```



```
Index Seek (NonClustered)  
[StateProvince].[ix_StateProvince]  
Cost: 100 %
```

NoExpand

(Indexed views in Standard Edition)

```
SELECT
    Column1,
    Column2, ...
FROM Table1, View1
WITH (NOEXPAND) WHERE ...
```

- Veel voorwaarden aan een indexed view
- Je moet de view noemen in je query, gaat niet automatisch
- Je moet tevens with(noexpand) gebruiken.

Concatenate

Select

```
s.SalesOrderNumber,  
s.Status,  
SUBSTRING(  
(  
Select ',' + cast(OrderQty as varchar(10)) as [text()]  
From sales.salesorderdetail  
Where SalesOrderID = s.SalesOrderID  
FOR XML PATH(''  
) , 2, 100) QtyList
```

From Sales.SalesOrderHeader s

SO43659	5	1,3,1,1,1,2,1,3,1,6,2,4
SO43660	5	1,1
SO43661	5	1,1,2,4,4,2,3,2,2,2,4,2,2,2,5
SO43662	5	3,5,2,4,3,5,3,2,1,1,3,1,6,1,3,1,3,1,1,1,3,1

demo

Loading data from a single
Flat file as fast as possible
into a database...

Functionality	Integration Services		BULK INSERT	BCP	INSERT ... SELECT
	SQL Dest.	OLE DB Dest			
Protocol	Shared Memory	TCP/IP	In Memory	TCP/IP	In Memory
		Named Pipes		Shared Memory	
				Named Pipes	
Speed	Faster / Fastest(4)	Fast / Fastest (1)	Fastest	Fast	Slow / Fastest (2)
Data Source	Any	Any	Data File Only	Data File Only	Any OLE DB
Bulk API Support	Not Native	Not ORDER	All	All	No Hints Allowed
		Not Native			
Lock taken with TABLOCK hint on heap	BU	BU	BU	BU	X
Can transform in transit	Yes	Yes	No	No	Yes
I/O Read block Size	128 KB for text files	Depends(3)	64 KB	64 KB	Up to 512 KB
SQL Server Version	2005 and 2008	2005 and 2008	7.0, 2000, 2005, and 2008	6.0, 7.0, 2000, 2005, and 2008	2008
Invoked from	DTEXEC / BIDS	DTEXEC / BIDS	Transact-SQL	Command Line	Transact-SQL

Single flat file bulk Insert results

- 463 MB / 3750797 rows

Method	Connection manager	Provider	Avg. Bulk copy rows/sec	CPU	Reads	Writes	Duration (millisec)
T-SQL Bulk Insert			150000	33446	165603	52763	50432
Native OLEDB \msft OLEDB provider for sql server (TCP)	localhost. TPCHDest 4 KB	SQLOLEDB.1	143000	29780	167120	53237	38444
Native OLEDB \msft OLEDB provider for sql server (TCP)	localhost. TPCHDest 32 KB	SQLOLEDB.1	160000	31684	167120	53235	37460
Native OLEDB \SQL Server Native client 10.0 (in memory)	DestinationDB - 0	SQLNCLI10.1	159000	30997	167259	53237	37951
Native OLEDB \SQL Server Native client 10.0 (in memory)	DestinationDB 32 KB	SQLNCLI10.1	176000	30825	167197	53233	33914

17% faster

The fastest method: SSIS with In memory connection (SQL Server Native Client + 32 KB packet Size)

The screenshot displays the Microsoft Visual Studio (Administrator) interface for an SSIS package named 'LineItemSOLED...dtsx'. The Data Flow Task 'LineItem' is shown in the Design view, illustrating a data flow from a 'LineItem file' (3,750,797 rows) to a 'LineItem Table'. A table definition for 'LINEITEM_xyzy' is provided, listing columns such as L_SHIPDATE, L_ORDERKEY, L_DISCOUNT, L_EXTENDEDPRICE, L_SUPPKEY, L_QUANTITY, L_RETURNFLAG, L_PARTKEY, L_LINESTATUS, L_TAX, L_COMMITDATE, L_RECEIPTDATE, L_SHIPMODE, L_LINENUMBER, L_SHIPINSTRUCT, and L_COMMENT with their respective data types and nullability constraints.

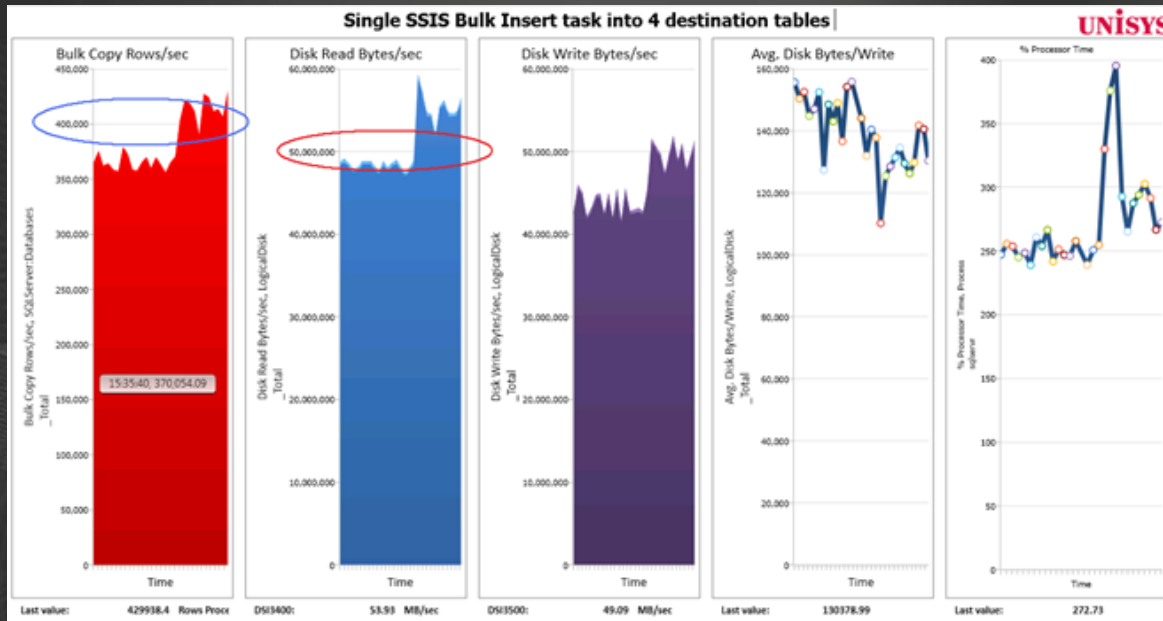
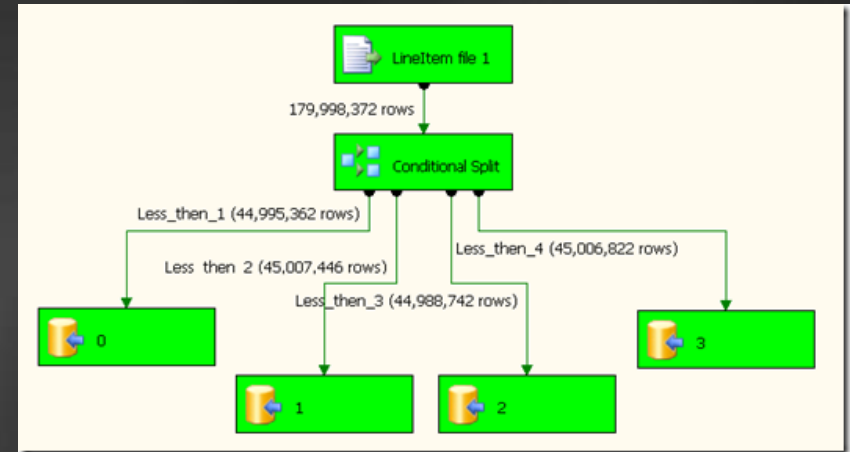
The Connection Manager dialog is open, showing the provider 'Native OLE DB\SQL Server Native Client 10.0' and the 'Packet Size' property set to '32767'. Both the provider name and the packet size value are circled in red. The 'Provider' section at the bottom of the dialog is also highlighted with a red box.

Progress information for the Data Flow Task is shown in a red-bordered box:

- ▶ Progress: Cleanup - 0 percent complete
- ▶ Progress: Cleanup - 50 percent complete
- ▶ Progress: Cleanup - 100 percent complete
- ◀ Finished, 11:37:57 PM, Elapsed time: 00:00:33.914

Or...use a conditional split + modulo

- From 176K rows/sec to 350+ K row/sec
- 5 Cores loaded



Conditional Split Transformation Editor

Specify the conditions used to direct input rows to specific outputs. If an input row matches no condition, the row is directed to a default output.

- Variables
- Columns
- Mathematical Functions
- String Functions
- Date/Time Functions
- NULL Functions
- Type Casts
- Operators

Description:

Order	Output Name	Condition
1	Less_than_1	L_ORDERKEY % 4 < 1
2	Less_than_2	L_ORDERKEY % 4 < 2
3	Less_than_3	L_ORDERKEY % 4 < 3
4	Less_than_4	L_ORDERKEY % 4 < 4

Default output name: Conditional Split Default Output

Configure Error Output... OK Cancel Help

Quiz



- Hoe tel je het snelst het aantal woorden in een varchar.

Select len(vraag) - len(replace(vraag, ' ', '')) + 1 From Quiz

1. (deze heeft wel een nummer !)

Occasion - uitgebreid zoeken

Algemene gegevens:

	1. Occasion	2. Occasion	3. Occasion
Merk	<input type="text" value="Kies..."/>	<input type="text" value="Kies..."/>	<input type="text" value="Kies..."/>
Model	<input type="text" value="Kies..."/>	<input type="text" value="Kies..."/>	<input type="text" value="Kies..."/>
Uitvoering 	<input type="text"/>	<input type="text"/>	<input type="text"/>
Kilometerstand	<input type="text" value="van"/> <input type="text" value="tot"/>		Transmissie <input type="text" value="Kies..."/>
Bouwjaar	<input type="text" value="van"/> <input type="text" value="tot"/>		Vermogen kW (PK) <input type="text" value="van"/> <input type="text" value="tot"/>
Brandstof	<input type="text" value="Kies..."/>	Kleur	<input type="text" value="Kies..."/>
Categorie	<input type="text" value="Alle..."/> 	<input type="checkbox"/> Metallic	
Carrosserievorm	<input type="text" value="Kies..."/>	Schade auto's	<input type="text" value="Niet tonen"/> 
		Vorige eigenaren	<input type="text" value="Kies..."/>

Zoeken

Declare

```
@brandstof varchar(50) = 'Diesel',  
@Transmissie varchar(50) = NULL
```

Select *

From autos

Where (@Brandstof IS NULL OR Brandstof = @Brandstof)

AND (@Transmissie IS NULL OR Transmissie = @Transmissie)

- Altijd SCAN !!

Zoeken

Declare

```
@brandstof varchar(50) = 'Diesel',  
@Transmissie varchar(50) = NULL
```

Select *

From autos

Where Brandstof = COALESCE(Brandstof, @Brandstof)

AND Transmissie = COALESCE(Transmissie, @Transmissie)

- Altijd SCAN !!

Zoeken

```
Declare @dyn_brandstof varchar(50) = 'Diesel', @dyn_Transmissie varchar(50) = NULL
```

```
Declare @sql nvarchar(4000)
```

```
set @sql =
```

```
    N'Select *'  
    + N' From autos'  
    + N' Where 1=1'  
    + case when @dyn_brandstof is not null then N' and brandstof = @brandstof' else N'' end  
    + case when @dyn_transmissie is not null then N' and transmissie = @transmissie' else N'' end;
```

```
EXEC sp_executesql
```

```
    @sql,  
    N'@brandstof as varchar(50), @transmissie as varchar(50)',  
    @brandstof = @dynBrandstof,  
    @transmissie = @dynTransmissie;
```

Vragen !

- Stel ze nu !
 - André :
andrekamman.com/presentations
[@AndreKamman.com](https://twitter.com/AndreKamman)
 - Henk
henkvandervalk.com
[@HenkvanderValk](https://twitter.com/HenkVanderValk)
- Of na de sessies, we blijven wel even hangen...

Thanks !



- Vergeet de feedback formulieren niet !!!