SQLZaterdag

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
- Blog : andrekamman.com
- Twitter : @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

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

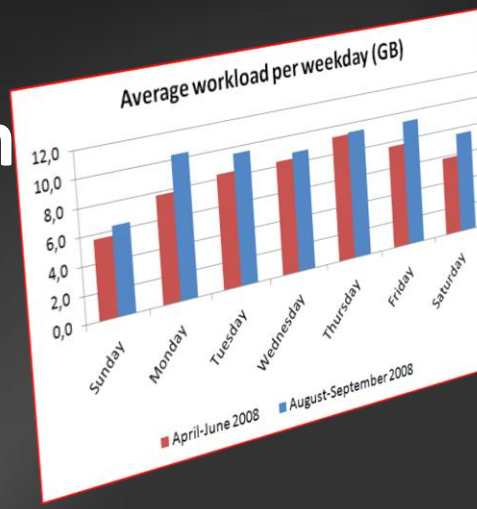
- International Company 24x7
- Can the organisation's BizTalk platform cope with 30% SAP workload increase ?
- Only CPU / Network load was tracked

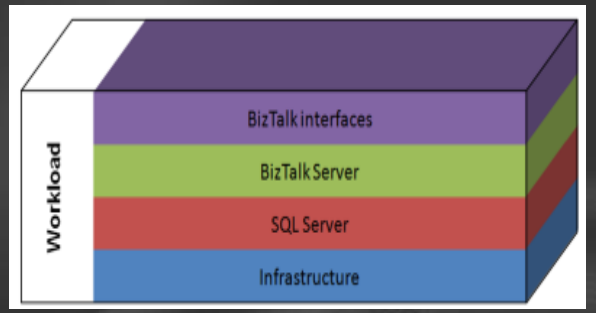
Solution

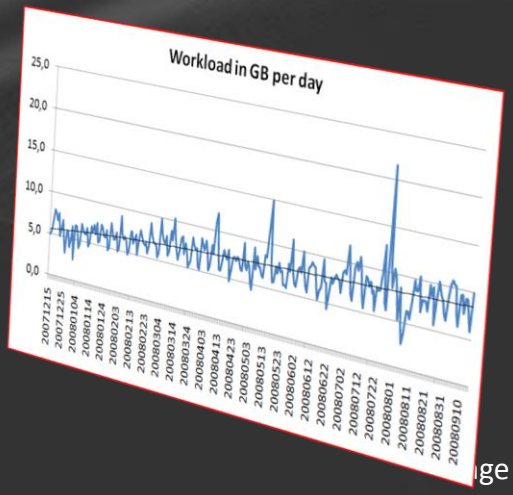
- 2 week Onsite review & Analysis Quickscan

Results

- √ Workload Analysis / overview of todays capacity
- √ Performance tuning advice on all layers implemented
- √ Succesful SAP integration



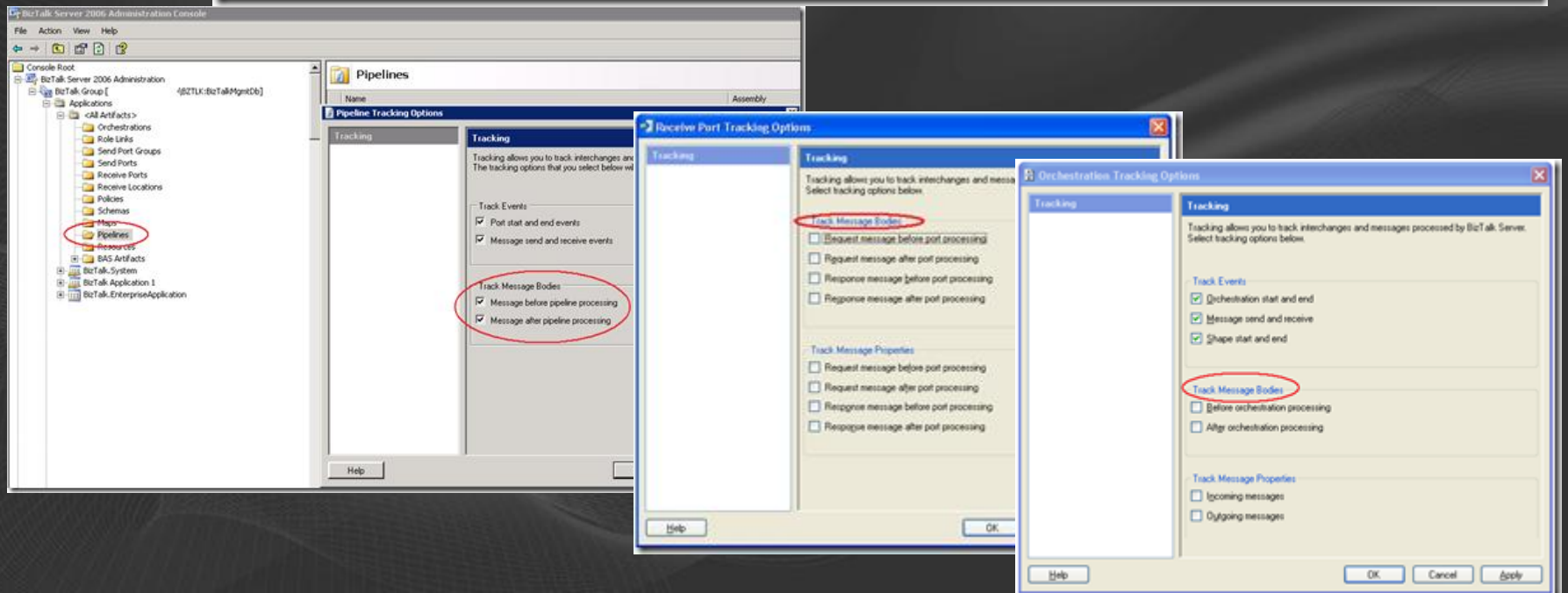




BizTalk artifacts
Message Body Tracking

- 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 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

union

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/Service	/BCDToetsServices/Services_BCD_NI_DEFCheck_portD	3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_BCDToetsServices/Service	/Services/BCD/DEFCheck.asmx	3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_BCDToetsServices/Service	/BCDToetsServices/Services_BCD_NI_FGHCheck_portF	3
BizTalk Application 1	Pipeline Receive	Microsoft.BizTalk.DefaultPipelines.PassThruReceive	WebPort_BCDToetsServices/Service	/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

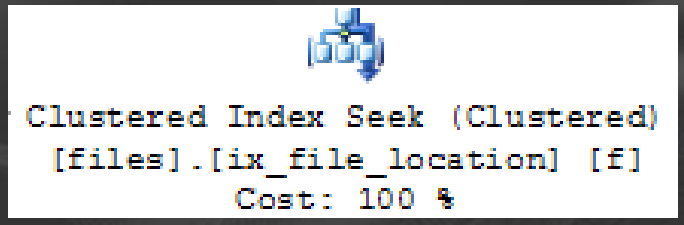
Create table files(location varchar(1000), fileid int)

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

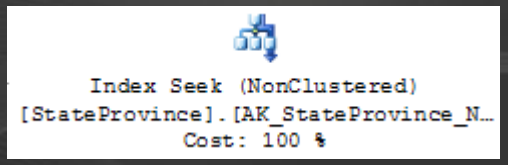
```
ALTER TABLE dbo.files ADD
        location_checksum  AS checksum(location) PERSISTED

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
```



Like ‘%whatever’

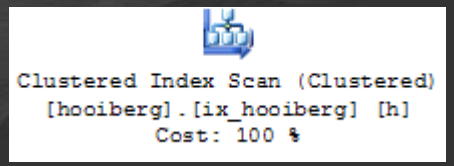
```
Select Name
From Person.StateProvince
Where Name like 'North%'
```

North Carolina
North Dakota
Northern Mariana Islands
Northwest Territories




```
Select Name
From Person.StateProvince
Where Name like '%Land‘
```

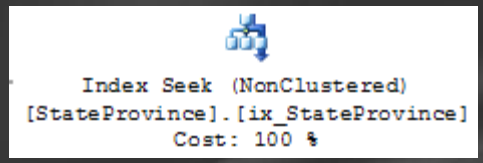
England
Maryland
Newfoundland
Prince Edward Island
Queensland
Rhode Island
Saarland



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')
```



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 Named Pipes	In Memory	TCP/IP Shared Memory Named Pipes	In Memory
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 Not Native	All	All	No Hints Allowed
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

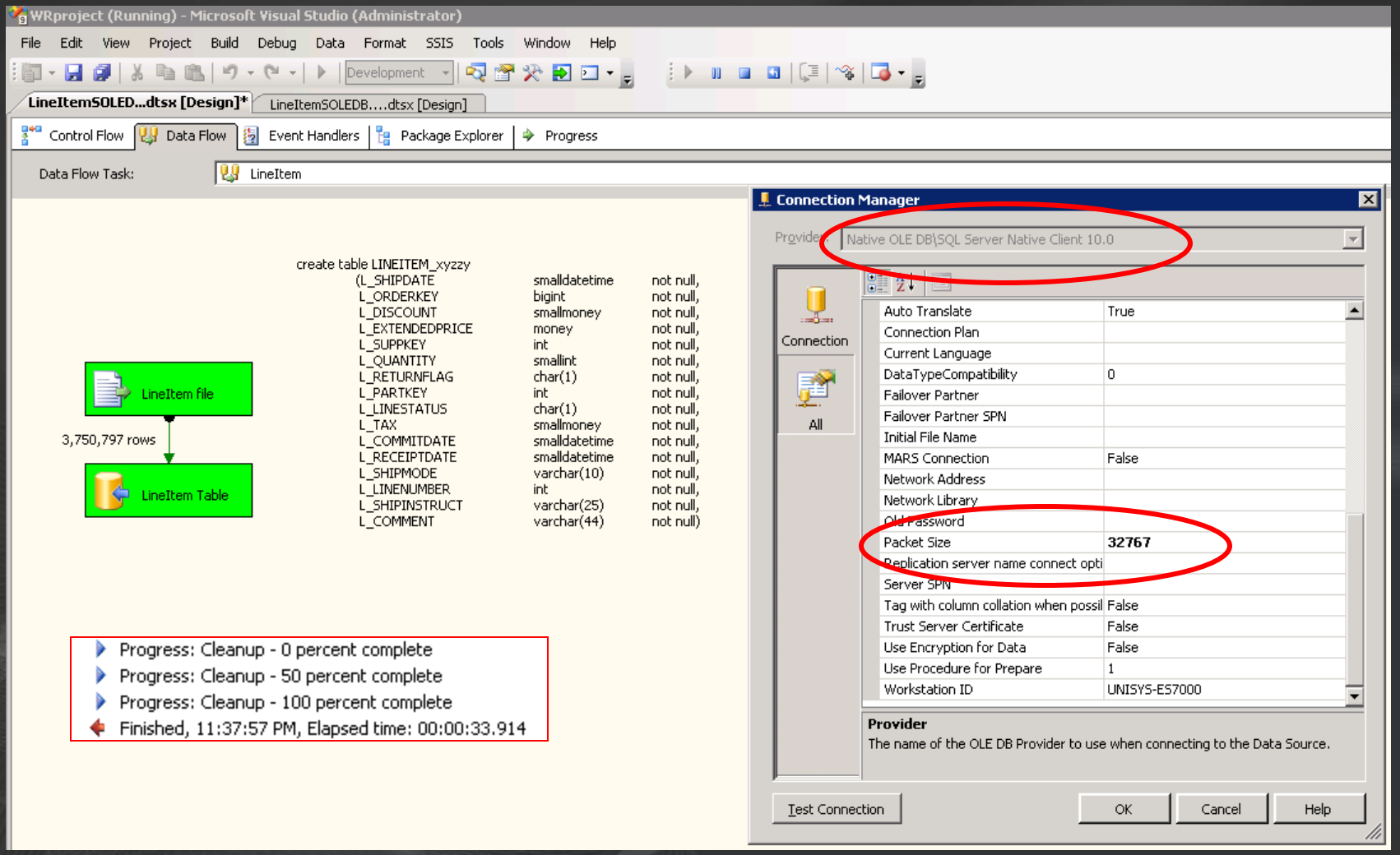
Single flat file bulk Insert results

- **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

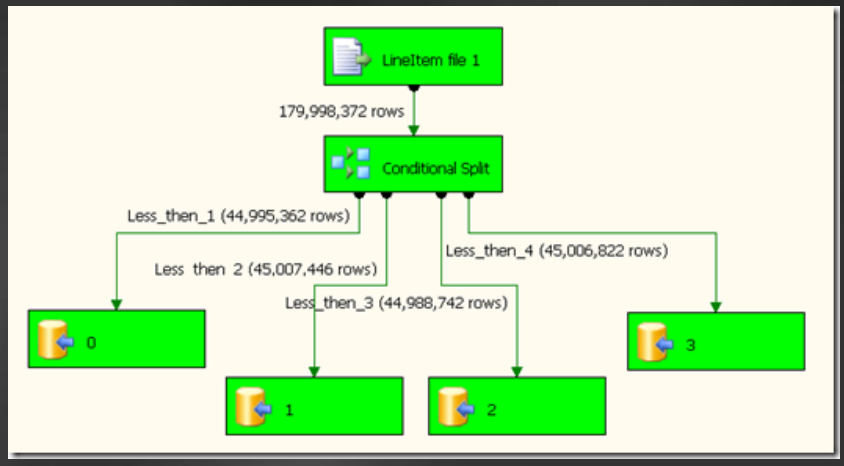
17% faster

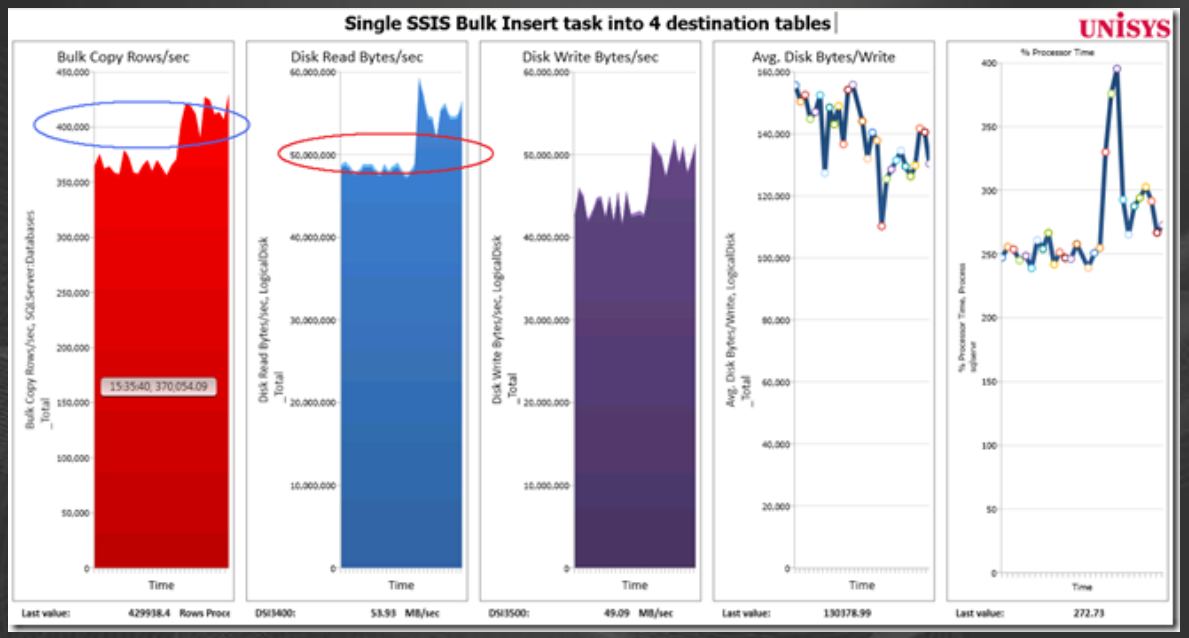
The fastest method: SSIS with In memory connection (SQL Server Native Client + 32 KB packet Size)

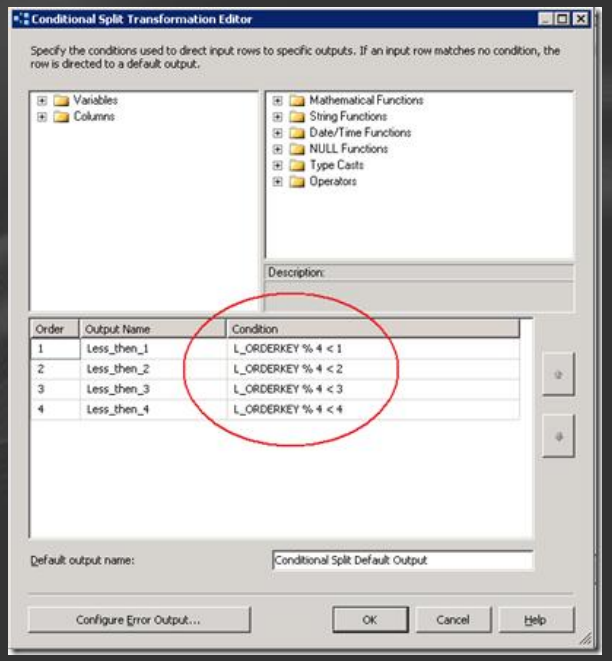


Or...use a conditional split + modulo

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







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 !)

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

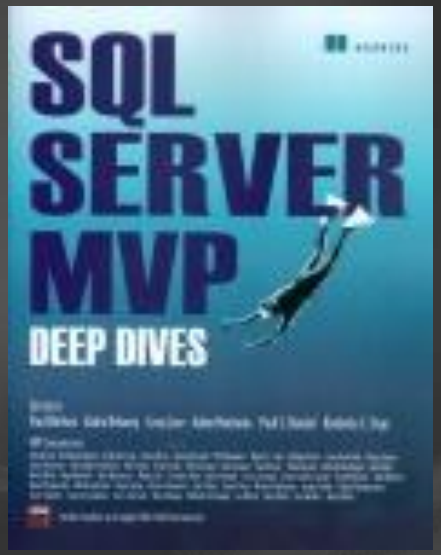
```
Declare @dyn_brandstof varchar(50) = 'Diesel', @dyn_Transmissie varchar(50) = NULL
Declare @sql nvarchar(4000)

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
  - Henk
    henkvandervalk.com
    @HenkvanderValk

- Of na de sessies, we blijven wel even hangen…

Thanks !



- Vergeet de feedback formulieren niet !!!