

PlanInspector



**Your query plans are talking to you.
Let PowerShell listen.**

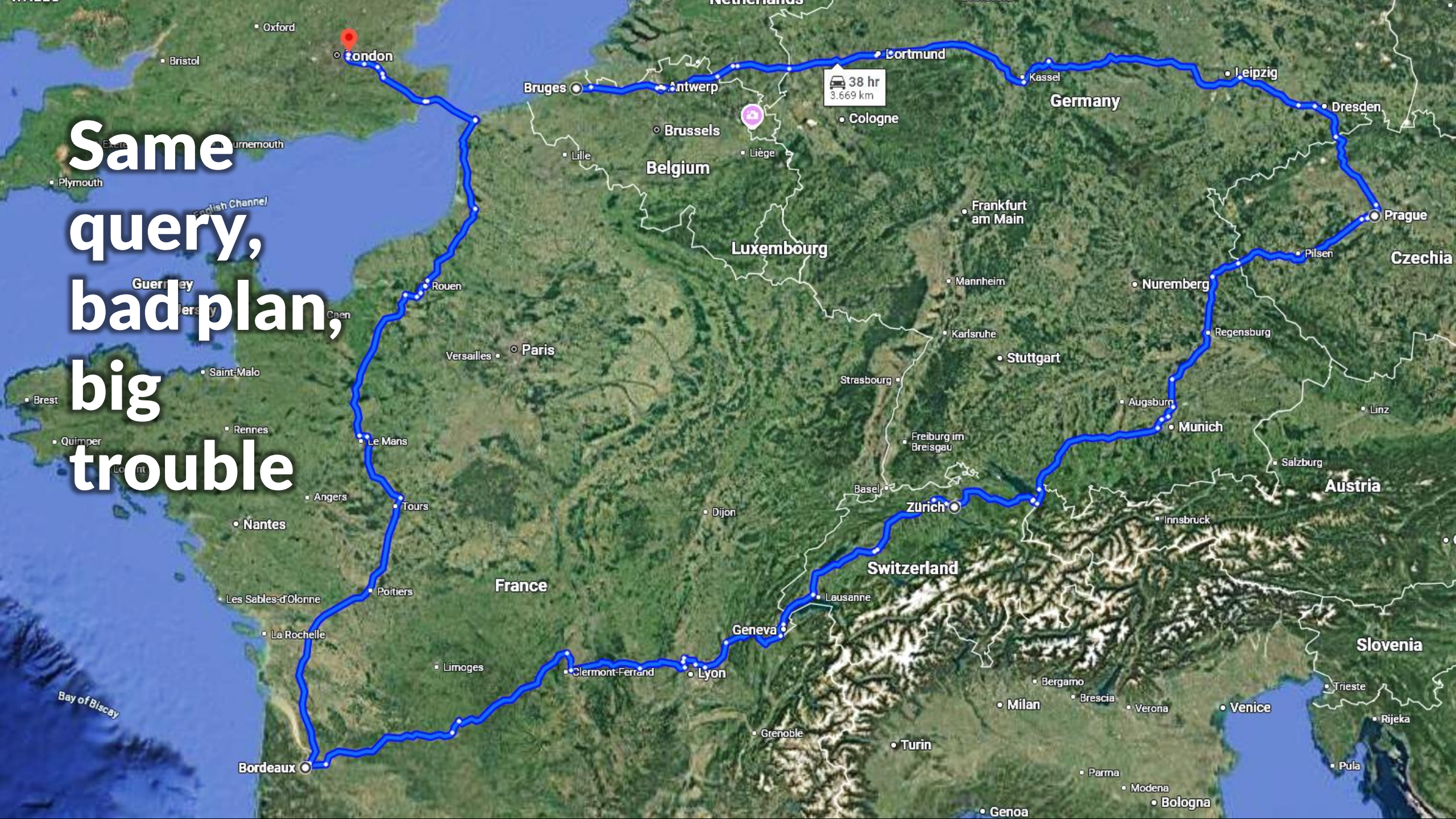
**Automate SQL Server plan
analysis with PowerShell**



The optimizer nailed it



Same
query,
bad plan,
big
trouble

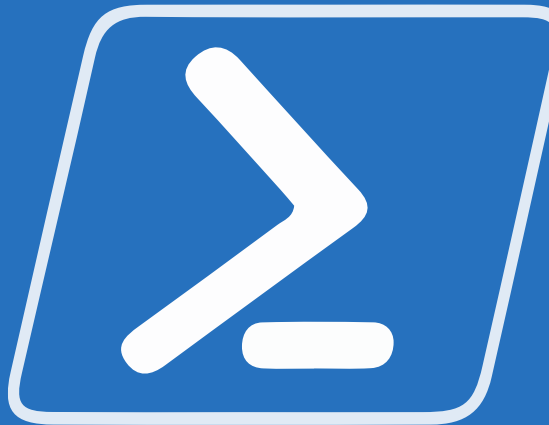




The Good

What this session will give you

```
<IndexScan Ordered="false" ForcedIndex="false" ForceScan="false" NoExpansions="false">
  <DefinedValues>
    <DefinedValue>
      <ColumnReference Database="[MDB]" Schema="[dbo]" Table="[configurations]" Column="ID">ID</ColumnReference>
    </DefinedValue>
    <DefinedValue>
      <ColumnReference Database="[MDB]" Schema="[dbo]" Table="[configurations]" Column="Name">Name</ColumnReference>
    </DefinedValue>
    <DefinedValue>
      <ColumnReference Database="[MDB]" Schema="[dbo]" Table="[configurations]" Column="Value">Value</ColumnReference>
    </DefinedValue>
    <DefinedValue>
      <ColumnReference Database="[MDB]" Schema="[dbo]" Table="[configurations]" Column="Order">Order</ColumnReference>
    </DefinedValue>
    <DefinedValue>
      <ColumnReference Database="[MDB]" Schema="[dbo]" Table="[configurations]" Column="Index">Index</ColumnReference>
    </DefinedValue>
  </DefinedValues>
  <Object Database="[MDB]" Schema="[dbo]" Table="[configurations]" Index="[Index]">Index</Object>
</IndexScan>
```



The Bad

What this session won't cover



Solving issues

About Me



Bart Vernailen



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MSSQL Process Automation Expert
Simplifying the complex
Speaker





Happy to Stay in Touch

Have a follow-up question?

I share practical tips on

- SQL Server automation
- query tuning
- ...



PlanInspector Workflow



Capture Plans

Extended Event:

query_post_execution_plan_profile

Does not capture

- Wait statistics

Store as .xel files

- Portable
- Reduce overhead

[Want to know more? learn.microsoft.com](https://learn.microsoft.com)

The Query Plan XML

```
<?xml version="1.0" encoding="utf-16"?>
<ShowPlanXML xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" Version="1.564" Build="16.0.4155.4">
  <BatchSequence>
    <Batch>
      <Statements>
        <StmtSimple StatementCompId="1" StatementEstRows="1000" StatementId="1" StatementOptmLevel="TRIVIAL" CardinalityEstimationModelVersion="160"
          <StatementSetOptions ANSI_NULLS="true" ANSI_PADDING="true" ANSI_WARNINGS="true" ARITHABORT="true" CONCAT_NULL_YIELDS_NULL="true" NUMERIC_ROUNDABORT="false" />
          <QueryPlan DegreeOfParallelism="1" CachedPlanSize="24" CompileTime="1" CompileCPU="1" CompileMemory="176">
            <MemoryGrantInfo SerialRequiredMemory="0" SerialDesiredMemory="0" GrantedMemory="0" MaxUsedMemory="0" />
            <OptimizerHardwareDependentProperties EstimatedAvailableMemoryGrant="307200" EstimatedPagesCached="307200" EstimatedAvailableDegreeOfParallelism="1" />
            <WaitStats>
              <Wait WaitType="ASYNC_NETWORK_IO" WaitTimeMs="84" WaitCount="98" />
              <Wait WaitType="MEMORY_ALLOCATION_EXT" WaitTimeMs="2" WaitCount="4913" />
            </WaitStats>
            <QueryTimeStats CpuTime="17" ElapsedTime="101" />
            <RelOp AvgRowSize="8277" EstimateCPU="0.0001" EstimateIO="0" EstimateRebinds="0" EstimateRewinds="0" EstimatedExecutionMode="Row" EstimatedRows="1000" />
            <OutputList>
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="BusinessEntityID" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="PersonType" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="NameStyle" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="Title" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="FirstName" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="MiddleName" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="LastName" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="Suffix" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="EmailPromotion" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="AdditionalContactInfo" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="Demographics" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="rowguid" />
              <ColumnReference Database="[AdventureWorks2017]" Schema="[Person]" Table="[Person]" Column="ModifiedDate" />
            </OutputList>
            <RunTimeInformation>
              <RunTimeCountersPerThread Thread="0" ActualRows="1000" Batches="0" ActualEndOfScans="1" ActualExecutions="1" ActualExecutionMode="Row" />
            </RunTimeInformation>
            <Top RowCount="false" IsPercent="false" WithTies="false">

```

```
<MemoryGrantInfo SerialRequiredMemory="0" />
```

Element /
Table

Attribute /
Column

Value

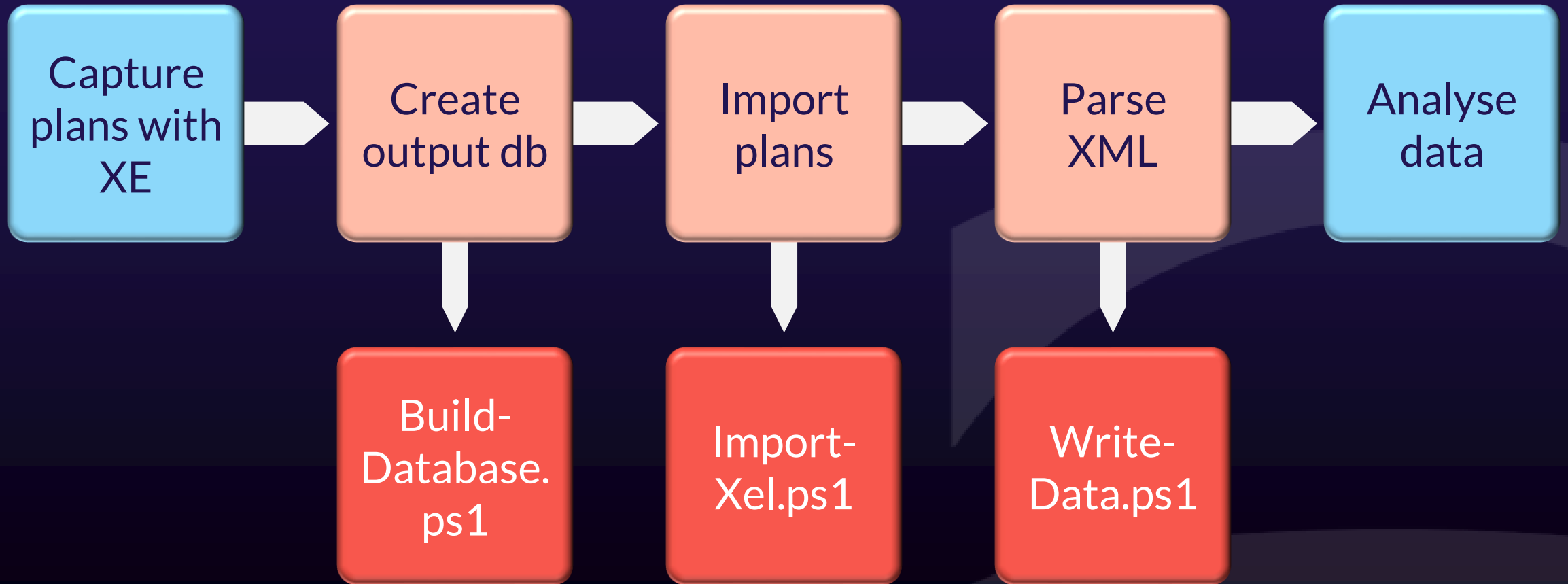
XML Schema definition

```
<MemoryGrantInfo SerialRequiredMemory="0" />
```

```
<xsd:element name="MemoryGrantInfo" type="shp:MemoryGrantType" minOccurs="0" maxOccurs="1"/>
```

```
-<xsd:complexType name="MemoryGrantType">
  -<xsd:annotation>
    +<xsd:documentation></xsd:documentation>
  </xsd:annotation>
  <xsd:sequence/>
  <xsd:attribute name="SerialRequiredMemory" type="xsd:unsignedLong" use="required"/>
  <xsd:attribute name="SerialDesiredMemory" type="xsd:unsignedLong" use="required"/>
  <xsd:attribute name="RequiredMemory" type="xsd:unsignedLong" use="optional"/>
  <xsd:attribute name="DesiredMemory" type="xsd:unsignedLong" use="optional"/>
  <xsd:attribute name="RequestedMemory" type="xsd:unsignedLong" use="optional"/>
  <xsd:attribute name="GrantWaitTime" type="xsd:unsignedLong" use="optional"/>
  <xsd:attribute name="GrantedMemory" type="xsd:unsignedLong" use="optional"/>
  <xsd:attribute name="MaxUsedMemory" type="xsd:unsignedLong" use="optional"/>
  <xsd:attribute name="MaxQueryMemory" type="xsd:unsignedLong" use="optional"/>
  <xsd:attribute name="LastRequestedMemory" type="xsd:unsignedLong" use="optional"/>
  <xsd:attribute name="IsMemoryGrantFeedbackAdjusted" type="shp:MemoryGrantFeedbackInfoType" use="optional"/>
</xsd:complexType>
```

PlanInspector Process



Why PowerShell?

```
9      relop.value('@EstimateIO','float') AS EstimateIO,
10     relop.value('@EstimateRebinds','float') AS EstimateRebinds,
11     relop.value('@EstimateRewinds','float') AS EstimateRewinds,
12     relop.value('@EstimatedExecutionMode','varchar(5)') AS EstimatedExecutionMode,
13     relop.value('@GroupExecuted','bit') AS GroupExecuted,
14     relop.value('@EstimateRows','float') AS EstimateRows,
15     relop.value('@EstimateRowsWithoutRowGoal','float') AS EstimateRowsWithoutRowGoal,
16     relop.value('@EstimatedRowsRead','float') AS EstimatedRowsRead,
17     relop.value('@LogicalOp','varchar(32)') AS LogicalOp,
18     relop.value('@NodeId','int') AS NodeId,
19     relop.value('@Parallel','bit') AS Parallel,
20     relop.value('@RemoteDataAccess','bit') AS RemoteDataAccess,
21     relop.value('@Partitioned','bit') AS Partitioned,
22     relop.value('@PhysicalOp','varchar(32)') AS PhysicalOp,
23     relop.value('@IsAdaptive','bit') AS IsAdaptive,
24     relop.value('@AdaptiveThresholdRows','float') AS AdaptiveThresholdRows,
25     relop.value('@EstimatedTotalSubtreeCost','float') AS EstimatedTotalSubtreeCost,
26     relop.value('@TableCardinality','float') AS TableCardinality,
27     relop.value('@StatsCollectionId','int') AS StatsCollectionId,
```

	AvgRowSize	EstimateCPU	EstimateIO	EstimateRebinds	EstimateRewinds	EstimatedExecutionMode	GroupExecuted	EstimateRows	EstimateRowsWithoutRowGoal
1	11	1E-07	0	0	0	Row	NULL	1	NULL
2	9	4,18E-06	0	0	0	Row	NULL	1	NULL
3	9	1,157E-06	0	0	0	Row	NULL	1	NULL
4	9	0,000159748	0,003125	0	0	Row	NULL	1	2,49835
5	11	1E-07	0	0	0	Row	NULL	1	NULL
6	9	4,18E-06	0	0	0	Row	NULL	1	NULL
7	9	1,157E-06	0	0	0	Row	NULL	1	NULL
8	9	0,000159748	0,003125	0	0	Row	NULL	1	2,49835
9	11	1E-07	0	0	0	Row	NULL	1	NULL
10	9	4,18E-06	0	0	0	Row	NULL	1	NULL
11	9	1,157E-06	0	0	0	Row	NULL	1	NULL
12	9	0,0001581	0,003125	0	0	Row	NULL	1	NULL
13	11	1E-07	0	0	0	Row	NULL	1	NULL
14	9	4,18E-06	0	0	0	Row	NULL	1	NULL
15	9	1,157E-06	0	0	0	Row	NULL	1	NULL

Query executed successfully. AUTOMAGICALLY (16.0 RTM) AzureAD\BartVermaellen... master 00:00:28 7,103 rows

28
secs

Schema	Name	
dbo	StatementSetOptions	0
dbo	WaitStats	0
dbo	TraceFlag	
dbo	MissingIndex	1
dbo	Warnings	24
dbo	StmtSimple	1,361
dbo	QueryTimeStats	1,361
dbo	QueryPlan	1,361
dbo	MemoryGrantInfo	1,361
dbo	OptimizerHardwareDependentPro...	1,361
dbo	CapturedPlans	1,361
dbo	ParameterList	2,020
dbo	StatisticsInfo	4,212
dbo	Relop	7,103
dbo	RunTimeCountersPerThread	17,044

7
secs





**DEMO
TIME**



Q&A

Today's Slides



[https://github.com/
D-BArt-com/PlanInspector](https://github.com/D-BArt-com/PlanInspector)

