NAV SQL Trace Analysis

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Introduction

This tool analyzes a SQL Trace created from a Microsoft Dynamics NAV database using SQL Server Profiler.

It will show how many times each table has been read and written to. I will also show each transaction in detail, including the values used for INSERT and UPDATE statements.

Based on the table License Permission (2000000043), it will also check if the transactions in the trace pass the Limited User write test. When the license contains add-on(s) with special Limited User write permissions, these are taken into account.

About the Developer/Author

Peter Tijsma started as a NAV Developer for a Microsoft Gold Partner in 2004. From 2004 until 2010 he's been heavily involved in customizations to standard NAV and vertical Add-ons. In 2011 he made the decision to start working for an ISV. He started working for the ISV NovaVision Software A/S which is based in Denmark. The company NovaVision Software A/S started developing the vertical Add-on PrintVis (www.printvis.com) in 1994 and as such is the perfect environment for doing real base-development.

Because NovaVision Software A/S is a TAP Partner with Microsoft Dynamics NAV, it always has firsthand knowledge of the latest developments in Dynamics NAV.

The main areas of interest for Peter are: Integrations with other systems using standardized structures (i.e. For the Printing Industry there's JDF/JMF), Building Repeatable solutions, Being the front-runner with new technologies like .Net Interop, C#, JavaScript Add-ins, JQuery etc.

For more information or questions regarding the NAV SQL Trace Analysis, contact: pt@printvis.com
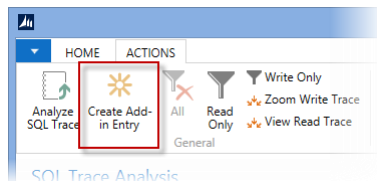
Setup

Contents
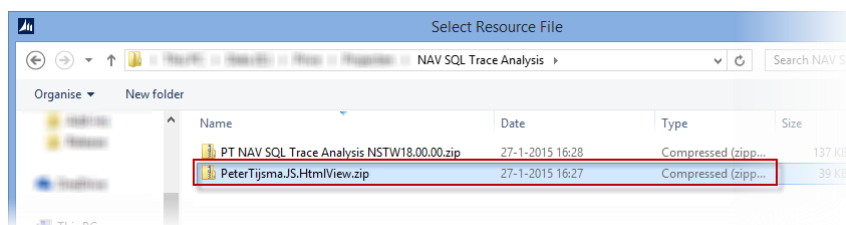
The installation package contains the following files:

- **PeterTijsma.JS.HtmlView.dll** (Class Library needed for development purposes only)
- **PeterTijsma.JS.HtmlView.zip** (Resource file containing the JavaScript Add-in to display xml trace info)
- **PT NAV SQL Trace Analysis NSTW18.00.00.fob** (Objects needed to run the tool)
- **PT NAV SQL Trace Analysis NSTW18.00.00.txt** (Same objects as in the fob, but in text format)
- **SQL2012 Trace Template NSTW18.00.00.tdf** (SQL Profile Trace Template)
- **NAV SQL Trace Analysis NSTW18.00.00.docx** (This document)
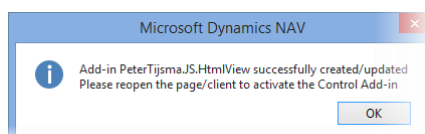
Installation

1. Copy the file *"PeterTijsma.JS.HtmlView.dll"* to folder:
   "C:\Program Files (x86)\Microsoft Dynamics NAV\80\RoleTailored Client\Add-ins\PeterTijsma"
2. Import the file *"PT NAV SQL Trace Analysis NSTW18.00.00.fob"* to your NAV Database
3. Run page 51000 PT NAV SQL Trace Analysis and click "*Create Add-in Entry*"

4. Select the file *"PeterTijsma.JS.HtmlView.zip"* and click "Open"

5. A message will inform you that the Control Add-in Entry has been created. Please reopen the client.

Trace Analysis Options

Anonymous Tracing

When running SQL Profiler, all transactions from the SQL Server are captured. The problem is that all transactions from NAV are processed using the credentials that are used to setup the NST (Service-tier). Individual user transactions are in fact anonymous or non-traceable to a specific user.

When using Anonymous Tracing, make sure that there is only one user logged into the NAV Database being traced to get a complete and non-polluted picture.
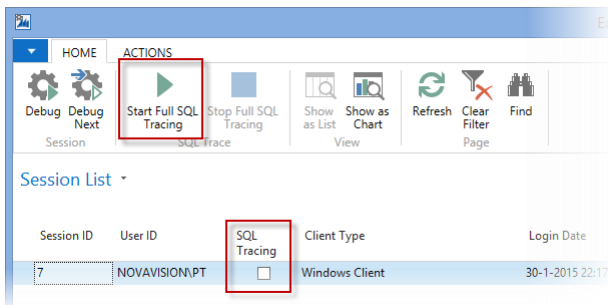
Identified Tracing

When using the SQL Trace Flag from the NAV Debugger, all SQL Transactions are started with a "Get Connection" informational message and ended with a "Return Connection" informational message.

This functionality makes it possible to isolate individual transactions for certain users. The *NAV SQL Trace Analysis* tool uses this functionality.
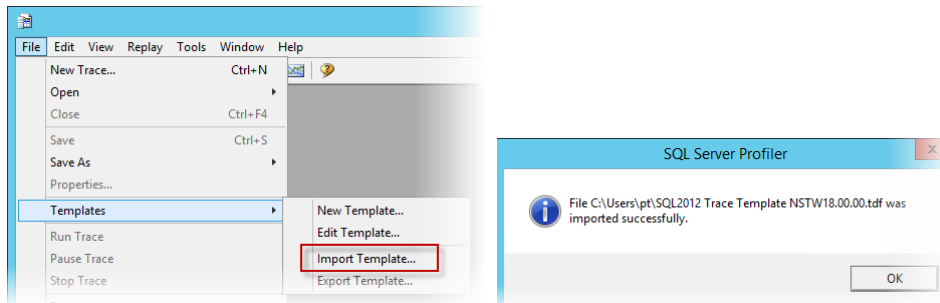
How to Enable Identified Tracing

Start the NAV Debugger from either the Development Environment or start *Sessions* from Departments/Administration/IT Administration/General

From there select either a single session to identify and check the checkbox in the column "*SQL Tracing*", or if you want to identify all sessions, simply select "*Start Full SQL Tracing*" from the Action Ribbon.
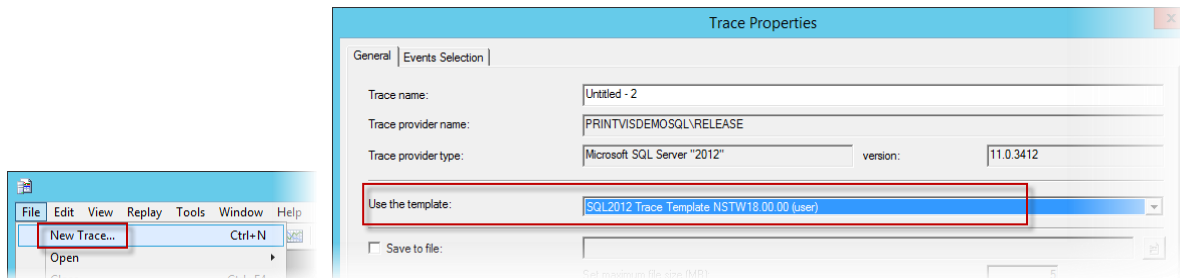
Creating a SQL Profiler Trace XML File

First, import the supplied template file (*SQL2012 Trace Template NSTW18.00.00.tdf*) to your SQL Server Profiler
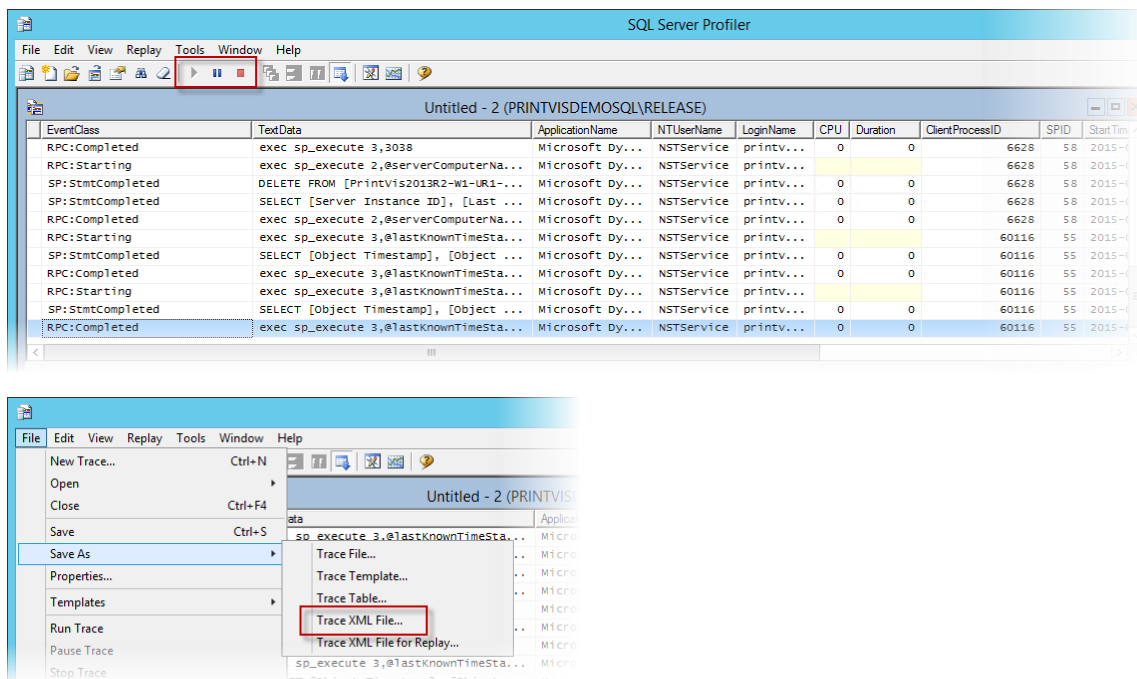

Next, simply start a new trace and select "*SQL2012 Trace Template NSTW18.00.00 (user)*" as template.

Once the trace is running, numerous entries will appear in the trace window.

When done, stop the trace using the "*Stop*" button and save the trace to an XML file

Using the NAV SQL Trace Analysis tool

To start the tool, simply run page 51000 PT NAV SQL Trace Analysis from the NAV 2015 Development Environment.

Main Window

The main window has an upper lines part which shows the Tables found and per table the reads / writes and other summary info.

When selected, the "Show more fields" option will display more info about the number of tables read from and written to, and it will also show if tables are included, excluded or optional based on the Limited User Write Tables in the License.

If the current trace complies with the Limited User definition in the license, the field "Limited User Test Passed" will be checked. If more than 3 tables are written to, or if there are write actions to tables that are excluded, this field will not be ticked. The number of violation tables can be found in the fields "Excluded" and "Full User Write Req."

The lower part of the main window is divided into 2 parts: 1 part to display the summarized SQL statements used for all reads, and 1 part to display the summarized SQL statements used for all writes.

The **"Home"** tab of the Ribbon has the following actions:

-   **Analyze Trace**
    Used to start analyzing a trace.

-   **"Zoom Read Trace"**
    Used to zoom in on all reads for the selected table. The summary only shows the TextData nodes, but when zoomed in, it will show all information available from the Profiler Trace, including the NAV Debugger SQL Trace info (Including C/AL Call Stack)

-   **"Zoom Write Trace"**
    Used to zoom in on all writes for the selected table. The summary only shows the TextData nodes, but when zoomed in, it will show all information available from the Profiler Trace, including the NAV Debugger SQL Trace info (Including C/AL Call Stack)

-   **Filtering options "All", "Read Only" & "Write Only"**
    These filtering options are used to filter down the list of found tables in the trace. By default only tables where write actions have occurred are shown.

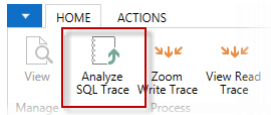The **"Action"** tab of the Ribbon has the following additional option:

-   **"Create Add-in Entry"**
    When the tool is used for the first time, the Add-in entry needs to be created. Use this option to create the entry.
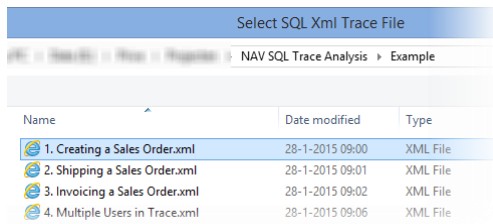
Analyzing a SQL Trace
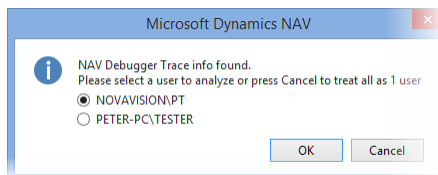
Start Analysis

To start analyzing a trace, simply click on the "Analyze SQL Trace" button.

The system will then ask for a SQL Trace XML file. Simply select your trace file and click open:

If more users are found in the trace file (as in the supplied example "*4. Multiple Users in Trace.xml*", the system will ask which user to run the analysis on. Simply select a user and press OK.

When the system has finalized the trace, the results are shown in the main window.

Interpreting the Analysis

Initial View

The following screenshot shows the result of the example with multiple users when the user "NOVAVISION\PT" has been selected:

In this example the "Show more fields" has been selected to show the detailed information. When this option is not selected, more records will be displayed in the middle part.

As can be seen in this example, the activities for this user will not pass the Limited User Test since there are 7 more tables written to than the allowed 3 for a Limited User.

To see for example the write statements for the Purchase Line (which is outside of the Limited User Write range), simply select the line and take a quick glance at the lower right part of the window.
This will show you the summary of all write statements to this Purchase Line.

In order to see all details of these write statements, click on the "Zoom Write Trace" button in the ribbon.

Since the NAV Debugger "Full Tracing" option was selected when starting this trace, the NAV C/AL Code is also shown in the detailed info in the node "ptnavsqlanalysis".

This will give you the opportunity to find out where a certain write transaction occurred from, and to find out if there is anything you can do to exclude this table from being written to (Setup-wise) in order to pass the Limited User Test.

Depending on the columns selected in the SQL Profiler, all these columns will also been shown in the Zoom.

Column "Write Sequence"

The column "Write Sequence" is used to display in what order (from the start of the trace) the tables have been written. This is to define which tables fall outside of the 3 Limited User write tables.

Table ID	Table Name	Write Transac...	Reads	Writes	Write Sequen...	Database Name	License Read Permission	License Modify Permission	License Insert Permission	License Delete Permission
5765	Warehouse Request	☑	0	0	0	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
309	No. Series Line	☑	12	4	1	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
38	Purchase Header	☑	79	5	2	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
39	Purchase Line	☑	37	2	3	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
46	Item Register	☑	0	5	4	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
5802	Value Entry	☑	1	2	5	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
27	Item	☑	2	2	6	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
83	Item Journal Line	☑	6	2	7	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
32	Item Ledger Entry	☑	0	1	8	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
5811	Post Value Entry to G/L	☑	0	1	9	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
339	Item Application Entry	☑	0	1	10	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes
2000000080	Page Data Personalization	☑	2	1	11	Demo Database NAV (8-0) RTM	Yes	Yes	Yes	Yes

Columns "License Read Permission", "License Modify Permission", "License Insert Permission" & "License Delete Permission".

These columns are there for informational use only to show what the current license permissions are for these tables. This could be useful when running the NAV SQL Trace Analysis tool with a Customer License. It will then show if the analyzed trace will work in an environment with a customer license loaded.

Revision List:

Date	Name	Description
30-01-2015	Peter Tijsma	Initial Document
01-02-2015	Michael Bradley	English Grammar Checking