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Marek Maśko

Troubleshoot SQL Server performance problems like a Microsoft Engineer

About the Author

Marek Maśko

- Principal Database Analyst at Sabre
- Working with SQL Server for ~7 years
- SQL DBA, Dev & Architect
- MCP since 2012

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Scenario

- Users report performance issue
- You know nothing about the server and the database

What do you do?

Microsoft Customer Support Service

- Users report performance issue
- You open the MS Support Case
- MS CSS gives you PSSDiag package and asks you to run it
- You run it and collect the data
- Than you upload collected data to the MS workspace
- MS CSS returns with:
  - Comprehensive report about your SQL Server state
  - Issue's root cause explanation
  - Solution and/or list of recommendations

How they do it?

Tools

Data collection

- PSSDiag / SQLDiag
- DiagConfig / DiagManager

Data analysis

- SQL Nexus
- PAL Tool

PSSDiag

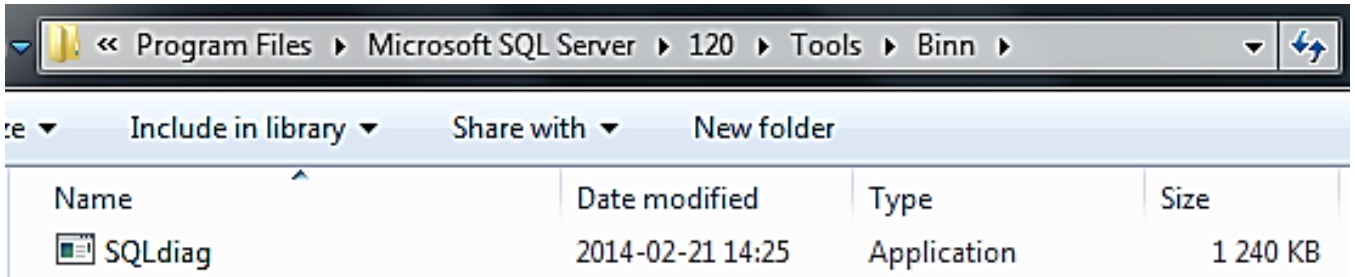
PSSdiag

- Developed as a side project at Microsoft
- Mainly used by CSS and PSS teams
- Wrapper on other MS tools
- Based on **SQLDiag**
- Two versions:
  - Internal
  - External

- Dramaticaly simplifies performance data collection

SQLDiag

- It's a command line utility delivered with SQL Server
- Located in the installation Binn directory



- It's main purpose is to collect diagnostic data

PSSDiag > SQLDiag > Collectors

What does it collect?

- Event Logs
- Performance Monitor Counters
- Server Configuration
- Error Logs
- Profiler Trace
- Blocking information
- PerfStat Scripts
- Spinlocks, query statistics, query hashes
- **There is a possibility to add your own custom collectors!**



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How to run it?

Security

- Windows authentication is default
- SQL authentication
  - Prompt for password
- The account used to run it
  - Must be able to login into target instances
  - Must be a member of the sysadmin role
  - Must be a member of Administrators

Configuration

- Requires an XML configuration file (specifies what to collect)

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Resource hit

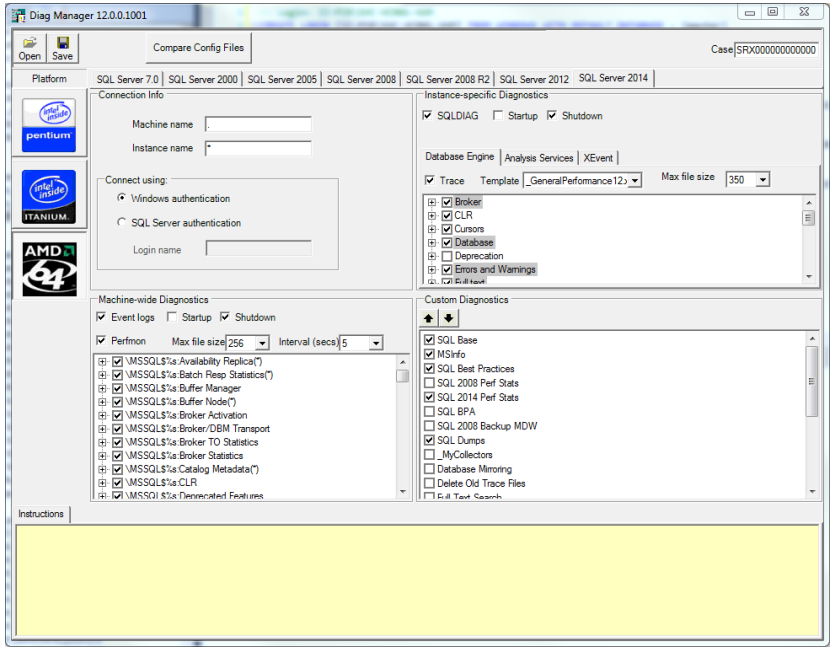
- PSSDiag itself is negligible
- Collectors are efficient
- Profiler tracing is expensive
- Select output folder carefully
- Do not capture more than you need

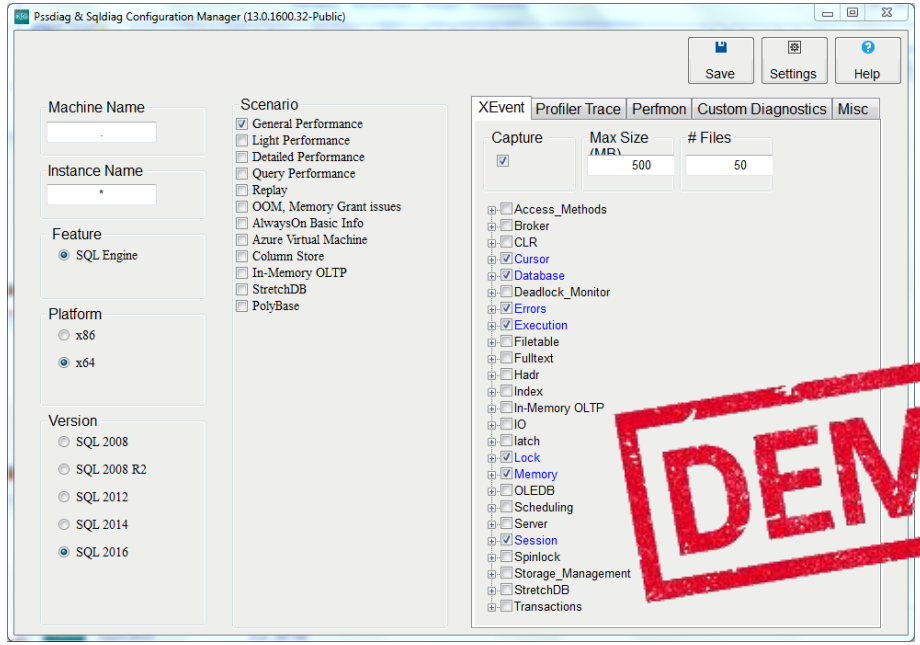
- **Always test and monitor!**

Diag Manager

Diag Manager

- GUI tool used to create configuration files
- Can be downloaded for free from: https://github.com/Microsoft/DiagManager





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SQL Nexus

SQL Nexus

- Created as a side project at SQL Support Escalation team
- Process the output of PSSDiag/SQLDiag into a database and runs Reporting Services reports on top of it
- Allows users to create own collections and reports
- Can be downloaded for free from: https://github.com/Microsoft/SqlNexus

Key Features

- Fast data loading and processing
- SQL Trace data aggregation using advanced logic and pattern recognition for intelligent statement execution grouping
- Supports multiple databases to store several performance analysis data sets
- Visualize loaded data via reports
- Extensibility!

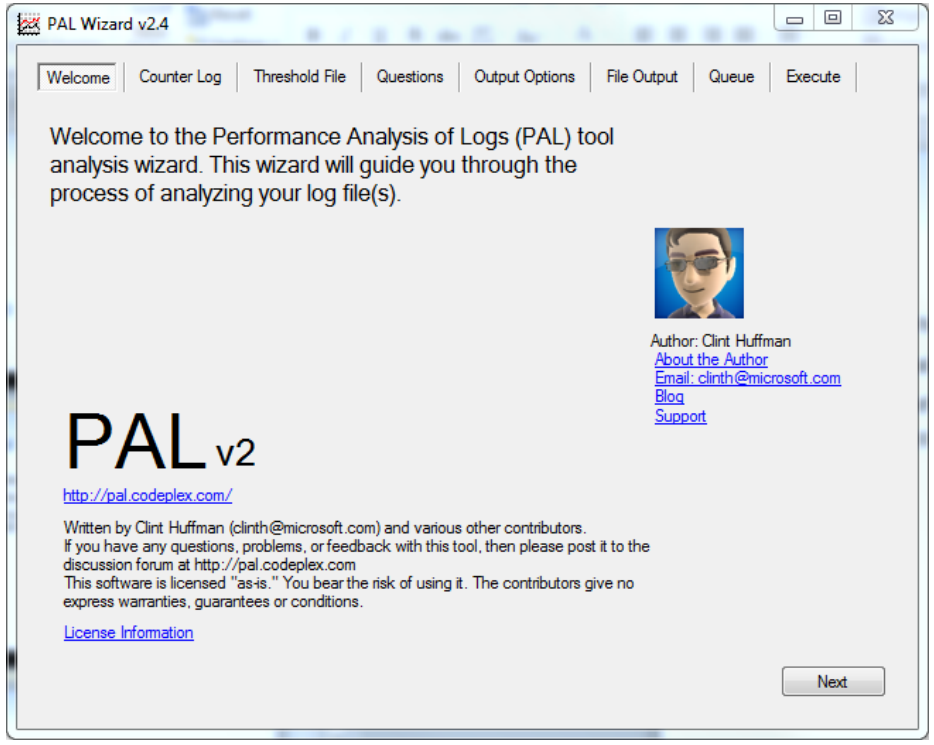
SQL Nexus reports

- Built-in reports for:
  - Environment configuration
  - Blocking
  - Wait statistics
  - Resource utilization
  - Interesting events
  - Missing indexes
  - Data Statistics
  - Virtual file stats

PAL Tool

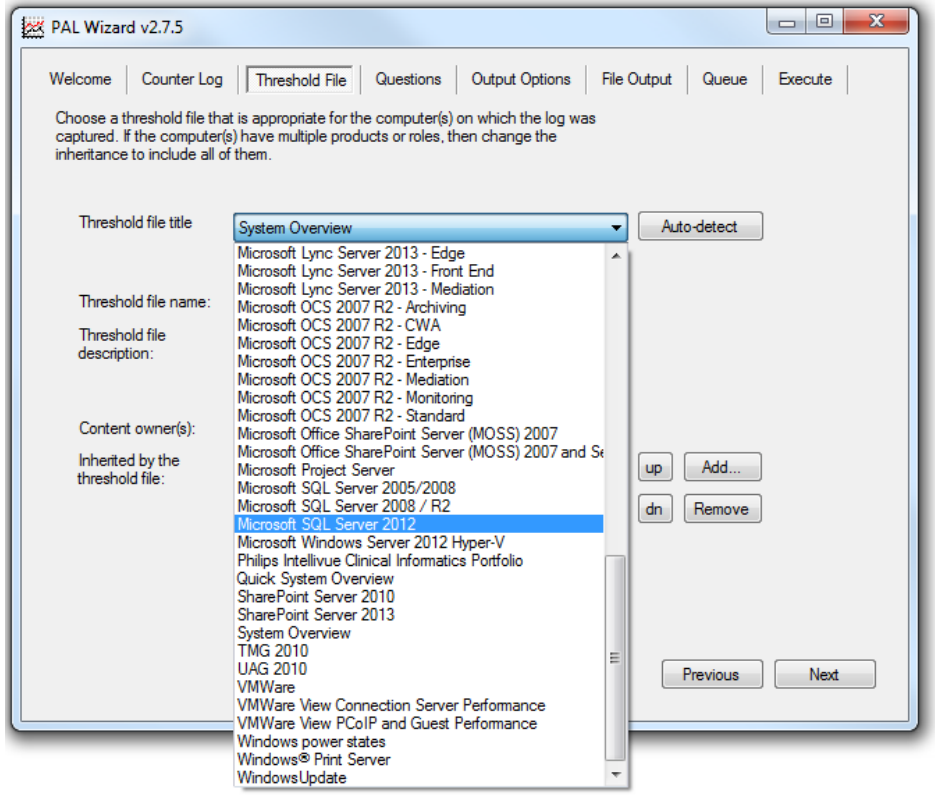
PAL Tool

- PAL – Performance Analysis of Logs
- Can be downloaded for free from: https://github.com/clinthuffman/PAL
- Allows you to set custom thresholds or use threshold already configured for your workload



PAL Wizard

- Carefully choose options and answer questions
- Processing will take time



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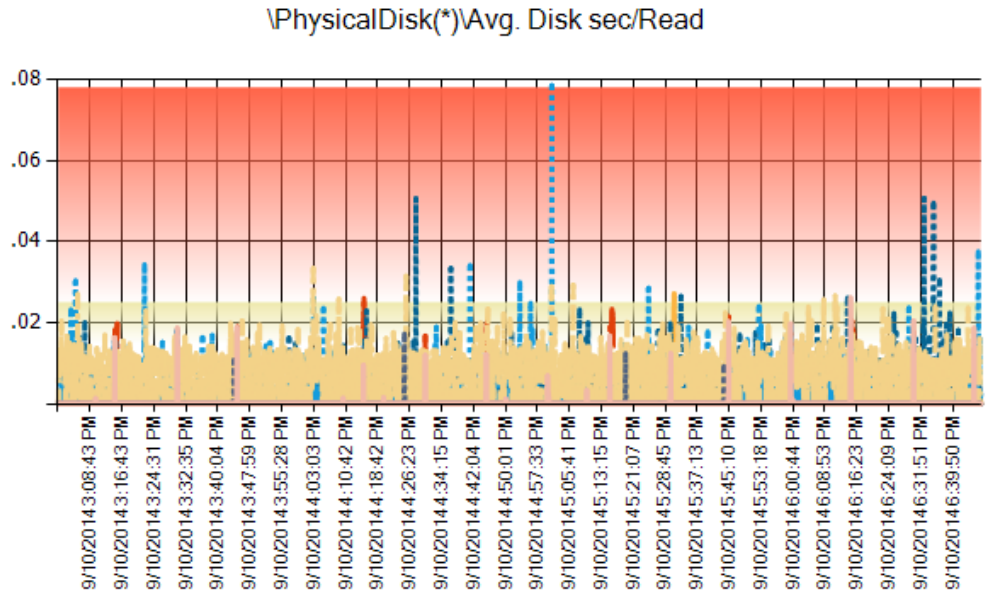
PAL Output

- Graphs with thresholds
- Alerts summarized in time slices



Alerts

Time Range						
9/10/2014 3:01:04 PM - 9/10/2014 3:08:43 PM	**Condition**	**Counter**	**Min**	**Avg**	**Max**	**Hourly Trend**
	Greater than 15 ms physical disk READ response times	\\VOPCDCGPSQLFPDB\PhysicalDisk(11 E:)\Avg. Disk sec/Read	0	.003	.02	0
	Greater than 25 ms physical disk READ response times	\\VOPCDCGPSQLFPDB\PhysicalDisk(4 N:)\Avg. Disk sec/Read	0	.003	.03	0
	Greater than 25 ms physical disk READ response times	\\VOPCDCGPSQLFPDB\PhysicalDisk(7 F:)\Avg. Disk sec/Read	0	.008	.027	0
9/10/2014 3:08:43 PM - 9/10/2014 3:16:15 PM	**Condition**	**Counter**	**Min**	**Avg**	**Max**	**Hourly Trend**
	Greater than 15 ms physical disk READ response times	\\VOPCDCGPSQLFPDB\PhysicalDisk(10 I:)\Avg. Disk sec/Read	0	.002	.02	0
	Greater than 15 ms physical disk READ response times	\\VOPCDCGPSQLFPDB\PhysicalDisk(7 F:)\Avg. Disk sec/Read	0	.007	.017	0
	Greater than 15 ms physical disk READ response times	\\VOPCDCGPSQLFPDB\PhysicalDisk(9 J:)\Avg. Disk sec/Read	0	0	.016	0
9/10/2014 3:16:15 PM - 9/10/2014 3:23:44 PM	**Condition**	**Counter**	**Min**	**Avg**	**Max**	**Hourly Trend**
	Greater than 25 ms physical disk READ response times	\\VOPCDCGPSQLFPDB\PhysicalDisk(4 N:)\Avg. Disk sec/Read	0	.003	.034	0

PAL Output

- The output is color coded to let you know the areas to focus on
  - You do have some control over this through the threshold files
  - Not everything in red actually means something

- You must know what to look for

Overall Counter Instance Statistics

Condition	\PhysicalDisk(*)\Avg. Disk sec/Read	Min	Avg	Max	Hourly Trend	Std Deviation
OK	VOPCDCGPSQLFPDB/0 C:	0	0	.014		.01
Greater than 25 ms physical disk READ response times	VOPCDCGPSQLFPDB/1 D:	0	0	.027		

When to Use Which Tool?

PSSDiag / SQL Nexus

- More targeted performance analysis
- Need to view SQL internal resources (waits, blocking chains, query plans)
- Short timespan for collection

PAL

- Great for overall system performance
- Benchmarks
- Long timespan for collection

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Thank you!

Session just ended ☺

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