

Guerrilla Warfare?

Guerrilla Tactics - Performance Testing
MS SQL Server Applications

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About Me

- Working with RDBMSs since the late 80s
(MS SQLServer, Oracle, Ingres and MySQL)
- Started as software developer
- Spent time as DBA and Systems administrator
- Consultant working with developers to improve application performance

Agenda

- Why Guerrilla Tactics?
- Getting to know the terrain – Testing & Monitoring
- Capturing & Analysing SQL Statements
- Indexing & Statistics
- Locking & Row versioning
- Questions (at any point)

Why Guerrilla Tactics?

- Ideally
 - Performance is designed in from day one
 - You know the max and median load
 - You have full size hardware for testing
 - You have a full size database
 - You have good monitoring software

Why Guerrilla Tactics?

- Who lives in the Ideal World?
 - No new software on servers
 - No money for monitoring software
 - Not much help/documentation
 - Not much time

Why Guerrilla Tactics?

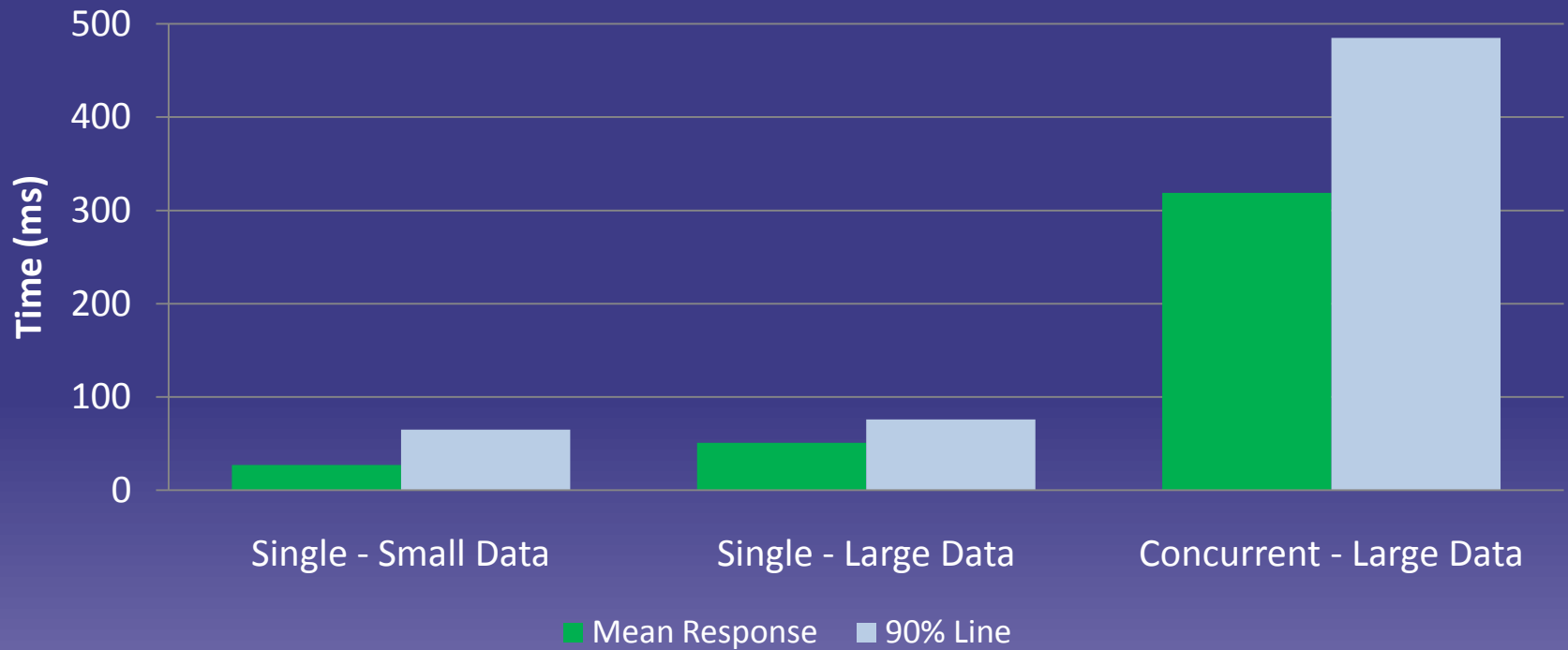
- Planning the Campaign
 - Aim – What is the system suppose to achieve?
 - Spies – Users, developers, DBAs & Sysadmins
 - Intelligence – Tracing & monitoring tools
 - Weapons – Development & testing tools

Know the Terrain

- Data Volume
 - Get as close to real data as possible
- Hardware
 - Find out difference in behaviour between test and production
- Threads
 - Get as close to production load as is reasonable on the hardware

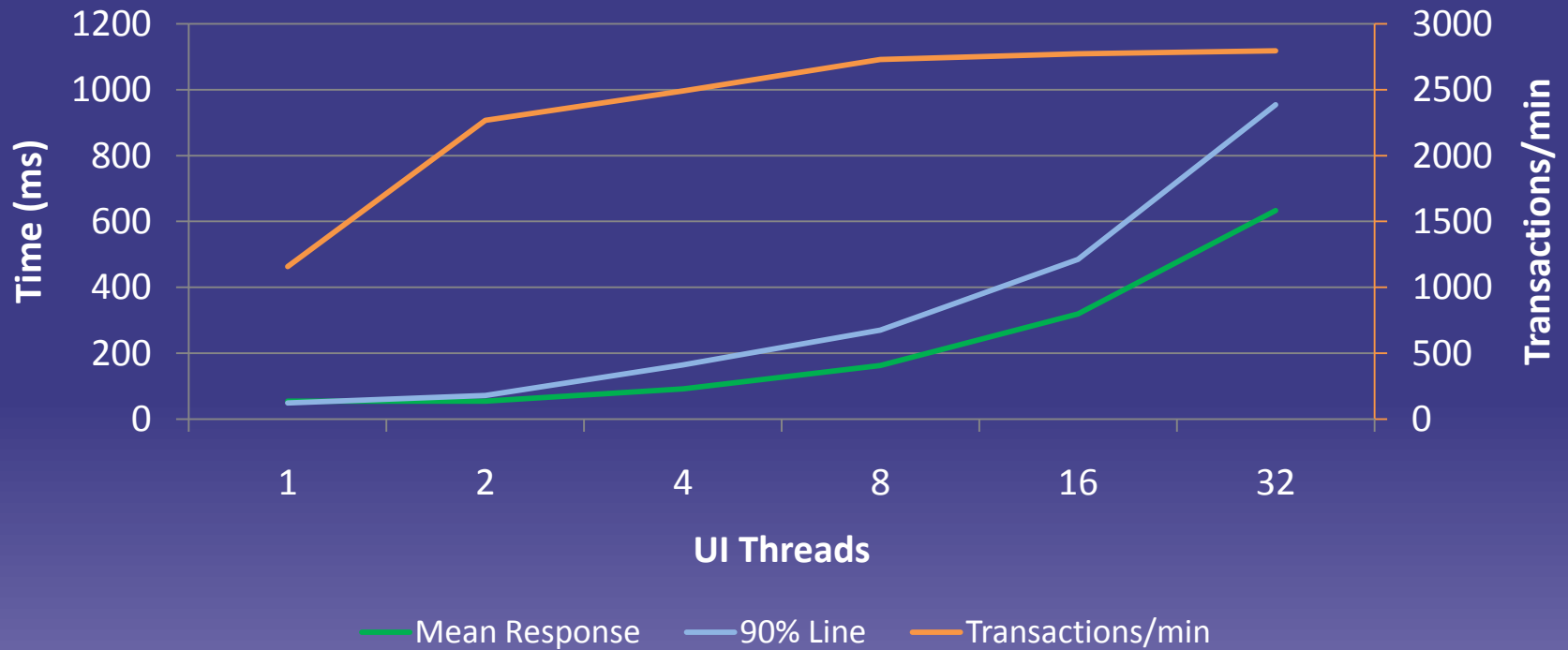
Why It Matters

Response Time (ms)



Why It Matters

Response Time VS Transaction Throughput



Testing & Monitoring

- Demo
 - Perfmon
 - Activity Monitor
 - Dynamic Management Views & Dynamic Management Functions

Testing & Monitoring

- OS - Perfmon:
 - Must be member of Performance Log Users group
 - And assign 'Log on as a batch job' to that group
- Database – Activity Monitor, DMVs & DMFs
 - Counters cleared on SQLServer restart (or CLEAR)
 - Requires VIEW SERVER STATE permission
 - Some DMVs/DMFs can be limited to VIEW DATABASE STATE permission

Choosing your Battles

- Poor code
- Database set-up
- Application server set-up
- Hardware and Infrastructure
- All of the above?

Capturing & Analysing SQL Statements

- Demo
 - SQLServer Profiler

Capturing & Analysing SQL Statements

- SQL Server Profiler
 - Requires ALTER TRACE permission
 - Don't remote desktop onto the server
 - Pick events carefully
 - Filter as necessary
 - Run on a PC fast enough to take the load
 - Set Application Name in connection string
- DBCC DROPCLEANBUFFERS
 - Requires sysadmin fixed server role
- DBCC FREEPROCCACHE
 - Requires ALTER SERVER STATE permission

Capturing & Analysing SQL Statements

- Analysing – SQL Server Profiler output
 - ClearTrace
 - <http://www.scalesql.com/cleartrace>
 - TraceAnalyzer
 - <http://www.dbsophic.com/traceanalyzer>
 - Roll your own SQL

Indexing & Statistics

- Index
 - Fast way to find specific data
- Statistics
 - Information about data
 - Help database make decisions on finding data
- These have a cost

Indexing & Statistics

- Demo
 - Database Engine Tuning Advisor

Indexing & Statistics

- Check for similar indexes / statistics
- Database Engine Tuning Advisor
 - Requires sysadmin server role
- Retest!

Locking & Row versioning

- Locking
 - Synchronize multi user access to data
- Main types of Locks
 - Shared – Allow other readers
 - Update – Reduce potential deadlocks
 - Exclusive – Prevent access to resource
 - Intent – Prevent higher level locks occurring

Locking

- Database Engine Isolation Levels
 - Read uncommitted – read uncommitted data
 - Read committed – read lock select duration
 - Repeatable read – read lock transaction duration
 - Serializable – stops changes that bring data into and out of read scope

Row versioning

- Row versioning
 - Reader gets previously committed values without blocking

Row versioning

- Read Committed Snapshot
 - Database wide setting
 - Maintain committed data for read duration
- Snapshot isolation
 - Database wide setting but set by session
 - Maintain committed data for transaction duration
 - Errors occur if there are update conflicts

Row versioning

- Demo

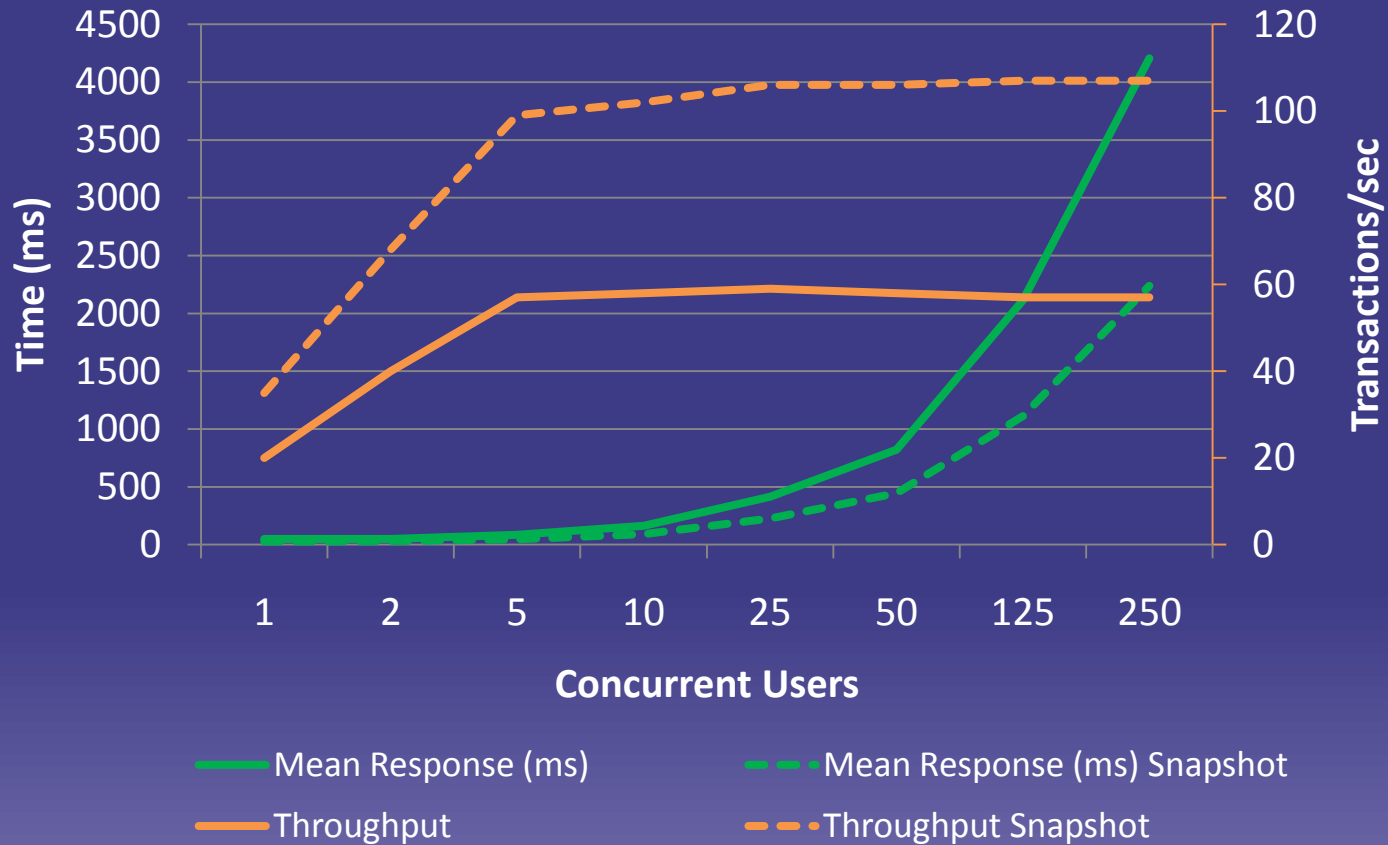
Row versioning

- Row versioning
 - Database setting
 - Behaviour change
 - Helps with lock waits
 - Overhead – hits tempdb

Row versioning

- Read Committed Snapshot
 - No code change
- Snapshot isolation
 - Code change
 - More error handling

Row Versioning Results



Summary

- Preparation
 - Good tests - a lot of data + multiple threads
 - Perfmon, Activity Monitor, DMVs & DMFs
 - get high level picture
 - Locking, IO, CPU issues?
 - SQL Profiler
 - Find hot spots - Hardest hit not slowest

Summary

- Action
 - Necessary / Appropriate
 - Indexes & Statistics
 - Recode
 - Denormalise maybe Normalise
 - Cache
 - Remove Scalar functions / Cursors
 - Row Versioning

Questions?

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Resources

- Slides and Demos
 - <http://blogs.catalystcomputing.co.uk/2010/10/guerrilla-warfare>
- ClearTrace - <http://www.scalesql.com/cleartrace>
- TraceAnalyzer - <http://www.dbsophic.com/traceanalyzer>
- Brent Ozar - <http://www.brentozar.com>
 - <http://www.brentozar.com/sql/sql-server-performance-tuning>
 - <http://www.brentozar.com/archive/2006/12/dba-101-using-perfmon-for-sql-performance-tuning>
 - http://sqlbits.com/Agenda/event5/Using_Perfmon_and_Profiler/default.aspx
- Quest Software – (Web search and sign up to get)
 - [QuestSoftware-PerfmonPosterSQLServer.pdf](#)
- The Art of Application Performance Testing – O'Reilly
- Performance Tuning with SQL Server Dynamic Management Views – Redgate
- Microsoft SQL Server 2005 The Storage Engine – MS Press
- Microsoft SQL Server 2008 Internals – MS Press

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