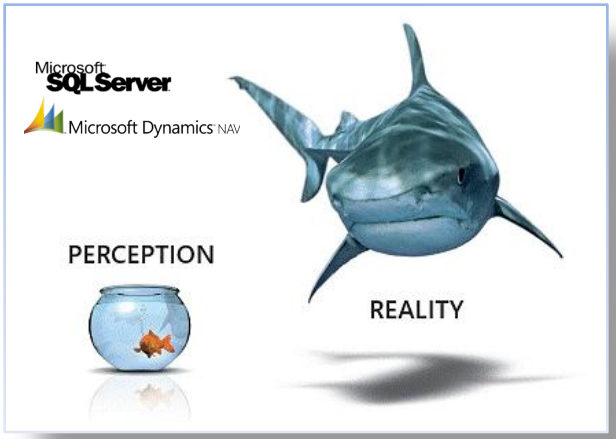
STRYK System Improvement
Performance Optimization & Troubleshooting

DIRECTIONS EMEA 2008

NAV/SQL Troubleshooting
Blocks and Deadlocks



Jörg A. Stryk
STRYK System Improvement

Microsoft Dynamics NAV

April 15, 2008

About Jörg Stryk

DIRECTIONS EMEA 2008

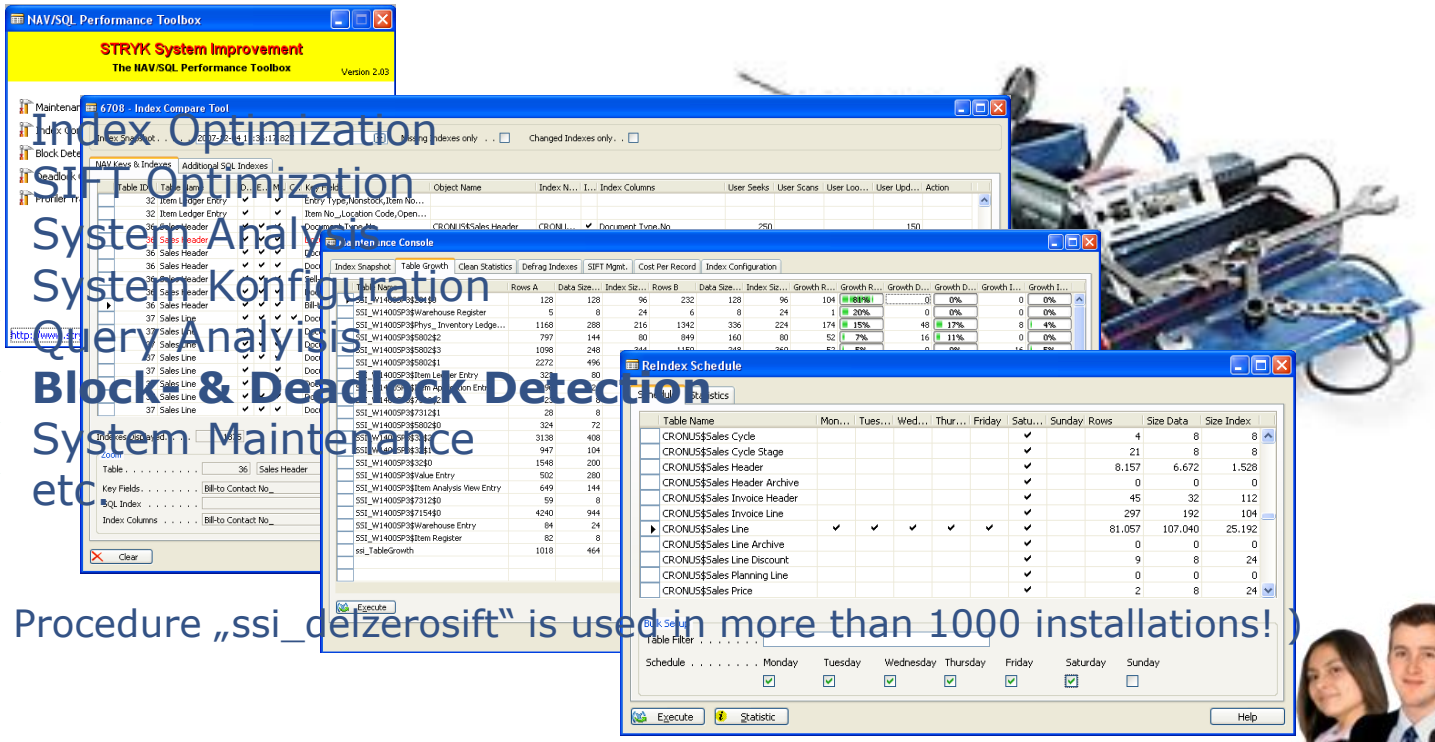
- MS Dynamics NAV (Navision) since 1997
- MS SQL Server since 2003
- Focus on NAV/SQL Performance Optimization
  Worldwide support of MS Dynamics Partners & Customers

- **Microsoft Most Valuable Professional** (MS Dynamics NAV)
- Microsoft Certified Professional (SQL Server)
- Microsoft Certified Business Management Solutions Specialist (NAV Programming/Development/Financial Management)

Microsoft Dynamics NAV

Products

- „The NAV/SQL Performance Toolbox“



- ✓ Index Optimization
- ✓ SIFT Optimization
- ✓ System Analysis
- ✓ System Konfiguration
- ✓ Query Analysis
- ✓ **Block & Deadlock Detection**
- ✓ System Maintenance
- ✓ etc

(Procedure „ssi_delzerosift“ is used in more than 1000 installations!)

Microsoft Dynamics NAV

Products

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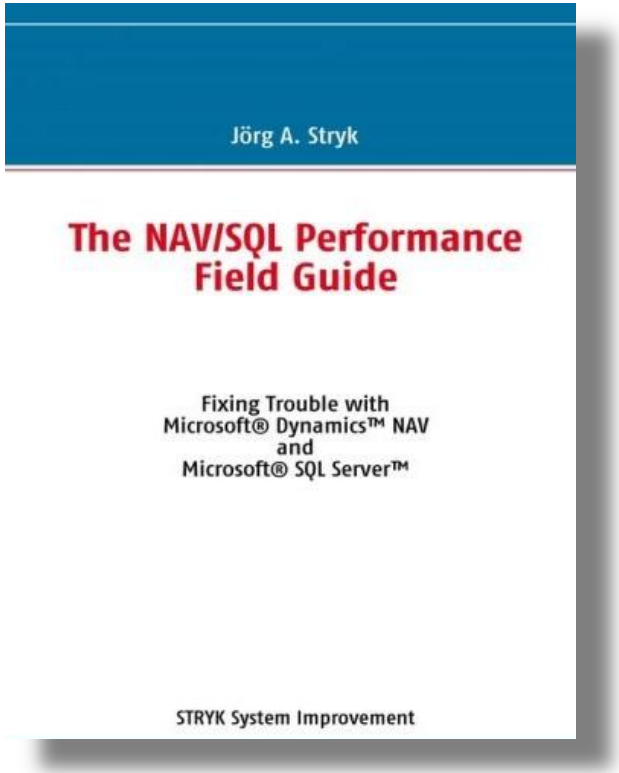
DIRECTIONS EMEA 2008

- „The NAV/SQL Performance Field Guide“



“Well I got mine, and I must say its great. The price is so silly that, everyone working on NAV should get one. “ (D.S.)

“Great Job. This book is AWESOME!!!! “ (H.)

Feedback on MIBUSO.com

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Microsoft Dynamics NAV

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Microsoft Dynamics NAV

Agenda

STRYK System Improvement

Performance Optimization & Troubleshooting

DIRECTIONS EMEA 2008

Locking Mechanisms

Block Detection

Avoiding Blocks

Deadlock Detection

Avoiding Deadlocks

(Excerpt from course „**Advanced NAV/SQL Performance Optimization**")

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Locking Mechanisms

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DIRECTIONS EMEA 2008

C/SIDE Server	SQL Server
Optimistic Concurrency	Optimistic Concurrency
Lock Types: • On/Off	Lock Types: • Shared Locks (S) • Exclusive Locks (X) • Update Locks (U) • [Intended Locks (I)]
Lock Levels: • Table	Lock Levels: • Row • Range • Page • Index • Key • Partition • Table • Database

Escalation

Isolation

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Lock Granularity

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- Use SQL Server Lock Escalation
  - Disable „Always Rowlock" (only use if really necessary!)
  - Set Default Lock Granularity

```
CREATE TABLE [$ndo$dbconfig] (config VARCHAR(1024))
GRANT SELECT ON [$ndo$dbconfig] TO [public]
GO
INSERT INTO [$ndo$dbconfig] VALUES ('DefaultLockGranularity=Yes')
```

- Avoid LOCKTABLE and FINDSET(TRUE)

  Set Transaction Isolation Level to SERIALIZABLE only if really necessary!

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Demonstration

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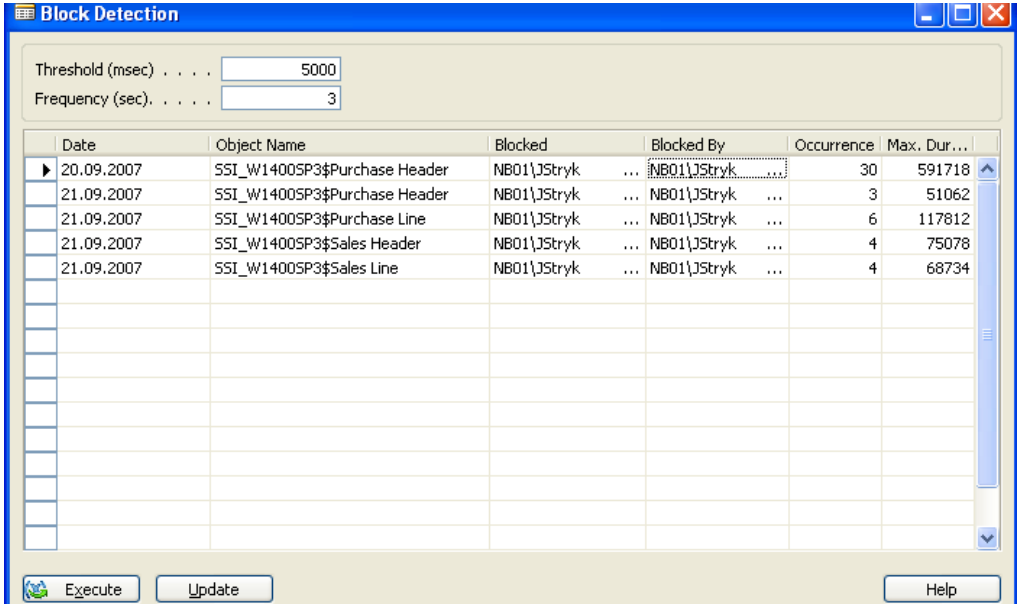
DIRECTIONS EMEA 2008

Block Detection

- Management Studio
- NAV/SQL Performance Toolbox



Block Detection

Threshold (msec) 5000

Frequency (sec). 3

Date	Object Name	Blocked	Blocked By	Occurrence	Max. Dur...
20.09.2007	SSI_W1400SP3$Purchase Header	NB01\JStryk ...	NB01\JStryk ...	30	591718
21.09.2007	SSI_W1400SP3$Purchase Header	NB01\JStryk ...	NB01\JStryk ...	3	51062
21.09.2007	SSI_W1400SP3$Purchase Line	NB01\JStryk ...	NB01\JStryk ...	6	117812
21.09.2007	SSI_W1400SP3$Sales Header	NB01\JStryk ...	NB01\JStryk ...	4	75078
21.09.2007	SSI_W1400SP3$Sales Line	NB01\JStryk ...	NB01\JStryk ...	4	68734

Execute Update Help

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Block Detection

DIRECTIONS EMEA 2008

ALERT

```
SQLServer:General Statistics
Processes blocked > 0
```

JOB

```
SELECT ... FROM
master..sysprocesses
WHERE ...
```

OUTPUT TABLE

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Avoiding Blocks

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DIRECTIONS EMEA 2008

- Avoid Serialization
- Avoid long Transactions (Lock Escalation)
- Avoid Index Scans (Index Optimization)

- Optimize SIFT Structures
- Use Temporary Tables
- Optimize Transactions in C/AL Code
- **Optimize physical Sorting (Clustered Index)**

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Clustered Index

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Performance Optimization & Troubleshooting

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Example: T357 „Document Dimension"

Clustered Index: *Table ID, Document Type, Document No., Line No., Dimension Code*

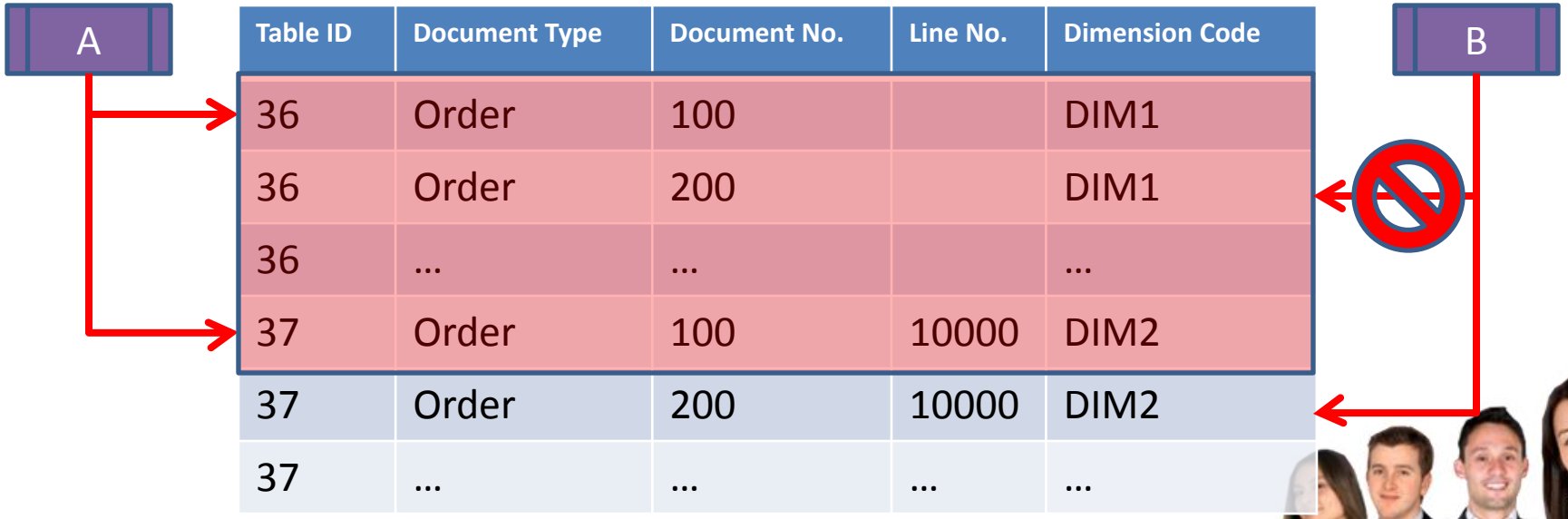

Table ID	Document Type	Document No.	Line No.	Dimension Code
36	Order	100		DIM1
36	Order	200		DIM1
36	…	…		…
37	Order	100	10000	DIM2
37	Order	200	10000	DIM2
37	…	…	…	…

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Clustered Index

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DIRECTIONS EMEA 2008

Example: T357 „Document Dimension"

Clustered Index: ***Document No.***, ***Document Type***, *Table ID, Line No., Dimension Code*

A

B

Document No.	Document Type	Table ID	Line No.	Dimension Code
100	Order	36		DIM1
100	Order	37	10000	DIM2
200	Order	36		DIM1
200	Order	37	10000	DIM2
…	…	…	…	…

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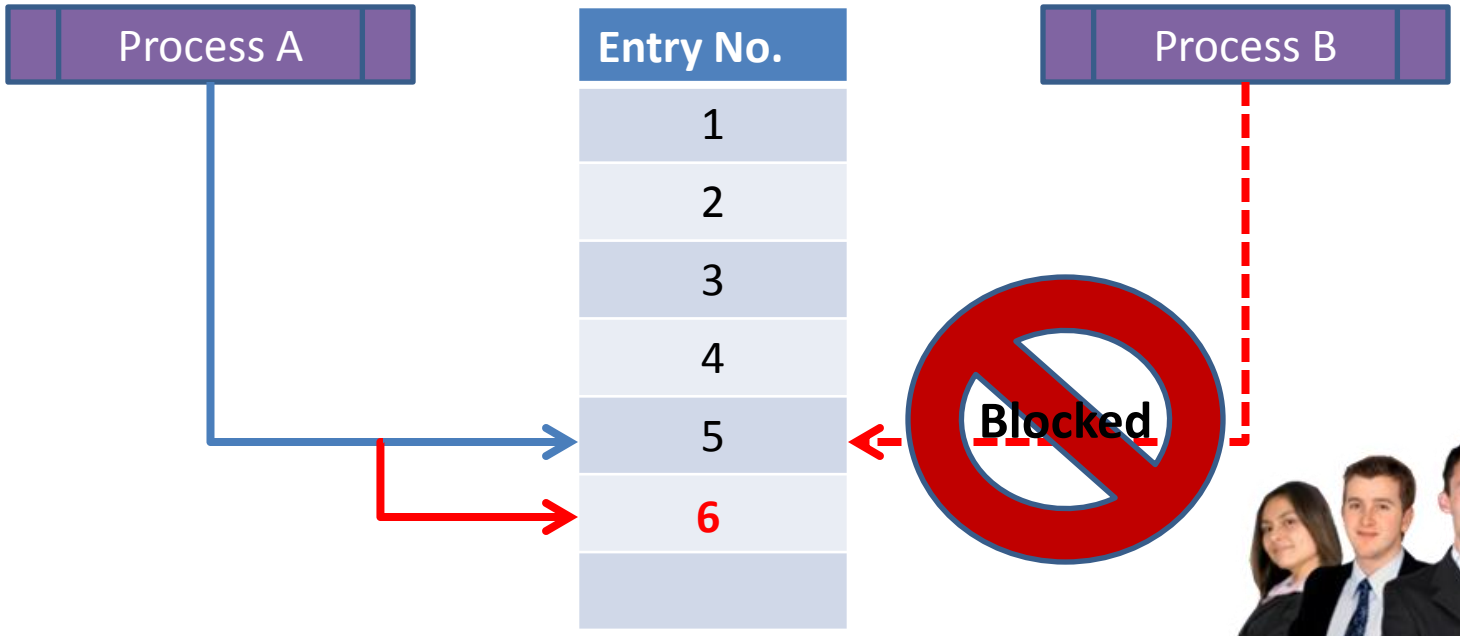
AutoIncrement & GUID

```
Ledger.LOCKTABLE;
Ledger.FINDLAST;
NewEntryNo := Ledger."Entry No." + 1
```

PK: Entry No.
CI: Entry No.



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AutoIncrement & GUID

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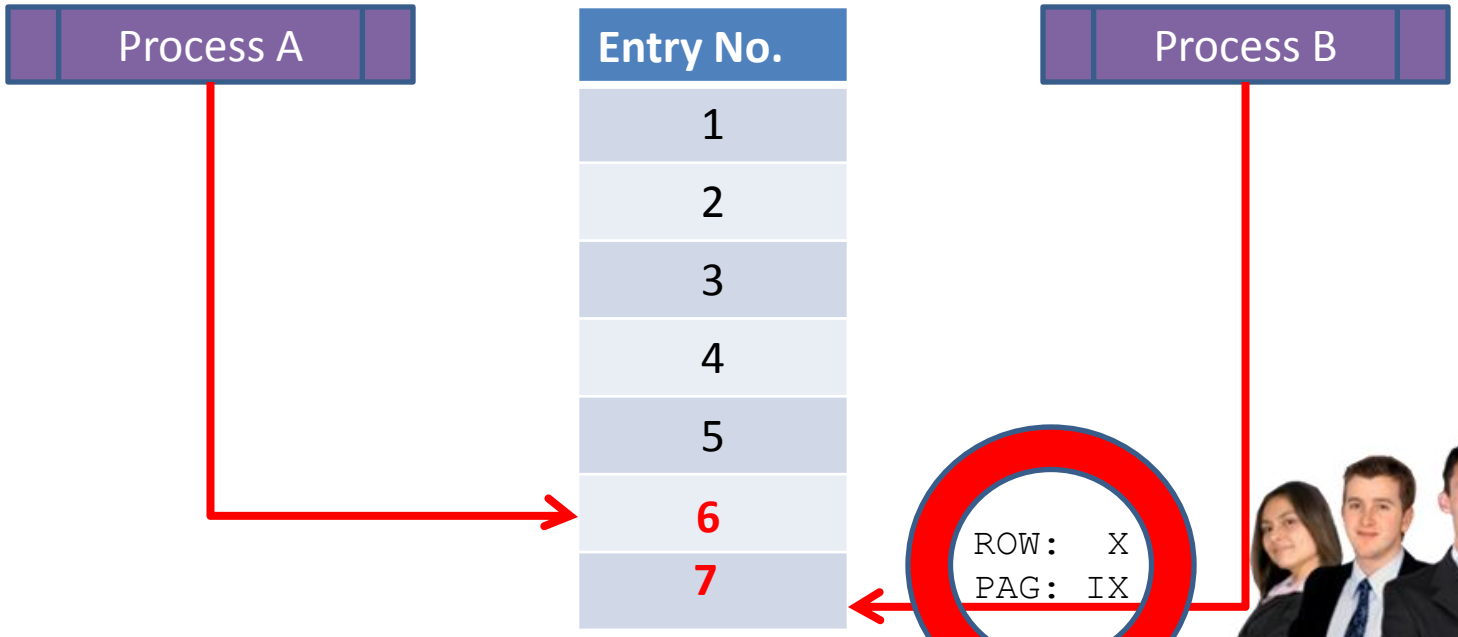
Performance Optimization & Troubleshooting

DIRECTIONS EMEA 2008

„Entry No.“: Property „**AutoIncrement**“ = TRUE

```
Ledger.INIT;
Ledger.“Entry No.“ := 0;
```

PK:	Entry No.
CI:	Entry No.



Microsoft Dynamics NAV

AutoIncrement & GUID

Field „UID", Type „GUID" (Globally Unique Identifier)

```
Ledger.INIT;
Ledger."Entry No." := 0;
Ledger.UID := CREATEGUID;
```

PK: Entry No.
CI: UID

Process A

Process B

Entry No.	UID
4	A
2	B
5	C
6	D
1	E
7	F
3	G

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Deadlocks

DIRECTIONS EMEA 2008

Process #1	Process #2	Status
Read Record #1	Read Record #2	
Write Record #1		Lock X #1
	Write Record #2	Lock X#2
Read Record #2		Block #1
	Read Record #1	Block #2

Rollback

Kill Victim

Deadlock

Microsoft Dynamics NAV

Demonstration

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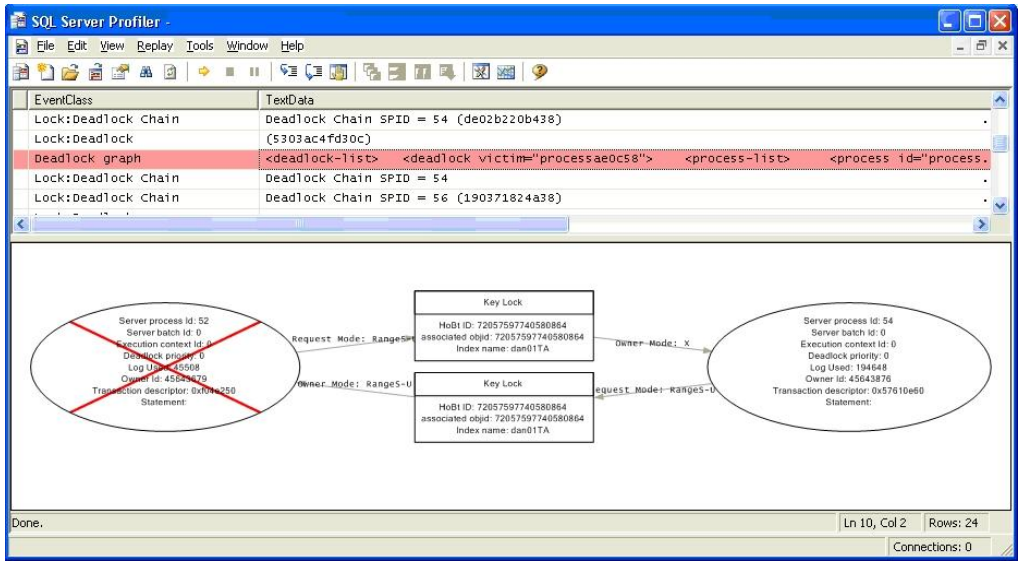
Performance Optimization & Troubleshooting

DIRECTIONS EMEA 2008

Deadlock Detection

- SQL Server
- SQL Server Profiler
- NAV/SQL Performance Toolbox



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Deadlock Detection

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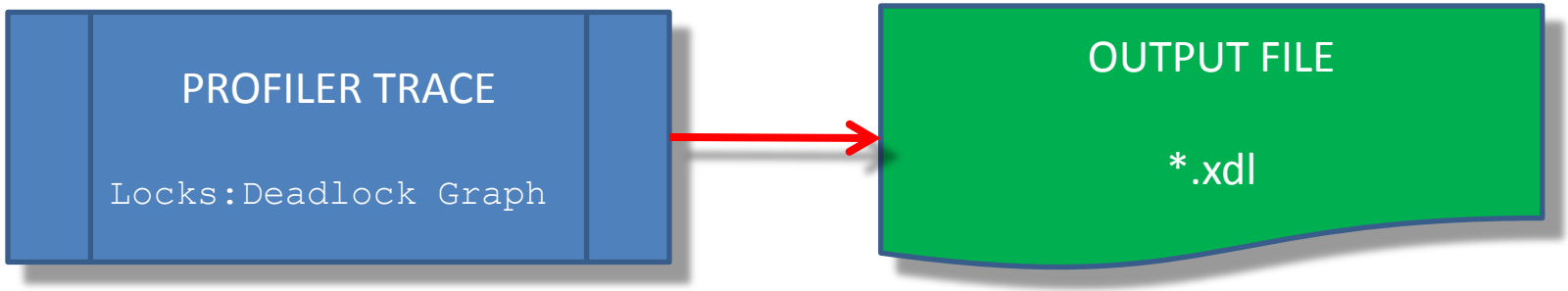
DIRECTIONS EMEA 2008



SQL 2000	SQL 2005
1204	1204
[1205]	1222
3605	

Startupparameter `-T<Flag>`

```
DBCC TRACEON (<Flag>, -1)
```

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Avoiding Deadlocks

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Performance Optimization & Troubleshooting

DIRECTIONS EMEA 2008

- Avoid Blocks
- Avoid conflicting Processes
- Use Common Locking Order

- [Lock common Master Resource (Serialization)]

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Q&A

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Performance Optimization & Troubleshooting

DIRECTIONS EMEA 2008

Thank you for your attention

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