

**BP112**

# In the Land of the Blind, Logs make you King

---

*Daniel Nashed*

*Wouter Aukema*

*Nash!Com  
Germany*

*Trust Factory  
Netherlands*

Lotusp<sup>h</sup>ere<sup>®</sup> 2008



**IBM**<sup>®</sup>

# About Daniel

- Nash!Com - IBM/Lotus Advanced Business Partner/ISV

- ▶ Located in Germany
- ▶ Member of The Penumbra group an international consortium of selected Business Partners pooling their talent and resources
- ▶ One of the Cult-Shirt Sponsors :-)



- Focused on Cross-Platform C-API, Domino® Infrastructure, Administration, Integration and Troubleshooting

- Platform Focus: W32, xLinux, zLinux, AIX® and Solaris®

- ▶ Maintainer of cross-platform start script

- Contact

- ▶ [nsh@nashcom.de](mailto:nsh@nashcom.de)
- ▶ <http://www.nashcom.de>

# About Wouter Aukema



- Owner of Trust Factory B.V. (since 1999)
  - Decision Support for TCO, Performance and Server Consolidation
  - Serving medium & large IBM Lotus Domino customers
  
- Benchmarking & Research
  - Data Warehouse with 10 TB of Customer Statistics on > 1/2 million Users
  - Teaming in Penumbra to share knowledge and resources
  
- Past Speaking Engagements
  - DefCon, Las Vegas
  - CSI, Chicago
  - BlackHat Briefings, HongKong & Singapore
  
- Contact:
  - <http://www.trust-factory.com>
  - [wouter.aukema@trust-factory.com](mailto:wouter.aukema@trust-factory.com)

# Agenda

---

- Data Sources
- Easy Ways to Collect Log Data
- 10 Important Server Statistics
- Real World Examples
- Summary



# Data Sources

---

*Each Challenge has its Log, and each Log has its Challenges*



# Data Sources in this Session

- Log Files
  - Log.nsf
- Server and Platform Statistics
  - Statrep.nsf
- Deployed Objects
  - Catalog.nsf
  - Names.nsf (Person, Server, Group documents)
  - Notes DB Directory (Databases & Templates deployed)
- Debug Info
  - Client & Server Clocking

## Not covered in this session:

- Domlog
- Activities
- Activity Trends
- Semaphore Debugging
- Memory Dumps



# Easy Methods for Collecting Data

*Each Challenge has its Log, and each Log has its Challenges*



# Export data from Notes client

The screenshot shows the Lotus Notes client interface with several callouts and dialog boxes:

- Menu, File, Export:** A callout points to the 'File' menu and the 'Export...' option.
- Working!:** A callout points to a progress dialog box titled 'Exporting all documents' showing '100%' completion.
- Output File Type:** A callout points to the 'Save as type' dropdown in the 'Export' dialog, which is set to 'Comma Separated Value'.
- More details:** A callout points to the 'CSV Export' dialog box.
- When using CSV: don't put comma's in your data For TAB delimited output: don't put tabs in data:** A callout box with this text is positioned above the 'CSV Export' dialog.

The 'Export' dialog shows the file name 'export.csv' and the 'Save as type' dropdown menu with options: Comma Separated Value, Lotus 1-2-3, Structured Text, Tabular Text, vCard 2.1, and vCard 3.0.

The 'CSV Export' dialog has sections for 'How Much to Export' (All documents selected), 'Export Character Set' (Default character set selected), and 'Detail to Incorporate' (Include View titles checked).



# Extract Data using NotesSQL

The image shows a Microsoft Excel 2003 interface with the 'Data' menu open. The 'PivotTable and PivotChart Report...' option is highlighted. A yellow callout box labeled 'Data, Pivot' points to this menu item. Below the menu, the 'PivotTable and PivotChart Wizard - Step 1 of 3' dialog box is open. It has two sections: 'Where is the data that you want to analyze?' with 'External data source' selected, and 'What kind of report do you want to create?' with 'PivotTable' selected. A yellow callout box labeled 'External Data Source' points to the 'External data source' radio button. Below this, the 'PivotTable and PivotChart Wizard - Step 2 of 3' dialog box is open, showing a 'Get Data...' button and the message 'No data fields have been retrieved.' A yellow callout box labeled 'Get Data' points to this button. At the bottom, the 'Choose Data Source' dialog box is open, showing a list of data sources including '<New Data Source>', 'd2host', 'd2host\_billing', 'd2hostbilling\*', 'd3host', 'dBASE Files\*', 'dipole\*', 'domino\_log', 'eriks exact toegang', and 'eriks'. A yellow callout box labeled 'New Data Source' points to the '<New Data Source>' entry in the list.



# Extract Data using NotesSQL

What name do you want to give your data source?  
1. My Domino Directory

Select a driver for the type of database you want to access:  
2. Lotus NotesSQL Driver (\*.nsf)

Click Connect and enter any information requested by the driver:  
3. Connect...

Select a default table for your data source (optional):  
4.

Save my user ID and password in the data source definition

OK Cancel

Select Driver,  
then Connect

What name do you want to give your data source?  
1. My Domino Directory

Select a driver for the type of database you want to access:  
2. Lotus NotesSQL Driver (\*.nsf)

Click Connect and enter any information requested by the driver:  
3. Connect...

Select a default table for your data source (optional):  
4. Person

People  
People\_\_other\_\_Alternate\_Language\_Information  
People\_\_other\_\_Certificate\_Expiration  
People\_By\_Category  
PeopleCat  
Personal\_SortOrder

Select Form or  
View

NotesSQL

[lotus][odbc lotus notes]driver not capable

OK

Ignore and click  
Connect again

Choose Data Source

Databases | Queries | OLAP Cubes

domino\_log  
eriks\_exact\_toegang  
exact  
exacttest  
Excel Files\*  
localmail  
LPDE Migration Catalog  
MS Access Database\*  
My Domino Directory  
Personal\_SortOrder

Cancel  
Browse...  
Options...  
Delete

Use the Query Wizard to create/edit queries

Select what you  
created

ODBC Lotus Notes Connection

Change Domino server, database, or connection options.  
Then choose OK.

Note: The lists of Domino servers and databases may take a moment.

Domino server: interpol OK

Database: names.nsf Browse

Using Installation: C:\Program Files\Lotus\notes  
Cancel  
Options <<

NotesSQL Options:

User name: <None> Add User ...

Password: Clear password

Max length of text fields: 254

Max length of rich text fields: 512

Return Notes implicit fields:

Map special characters:

Enter Server and  
Database

Query Wizard - Choose Columns

What columns of data do you want to include in your query?

Available tables and columns:

Person

\_Return  
\_dispFullName  
\_dispFullNameLanguageDisp  
\_dispFullNameSort  
\_dispAssistant

Columns in your query:

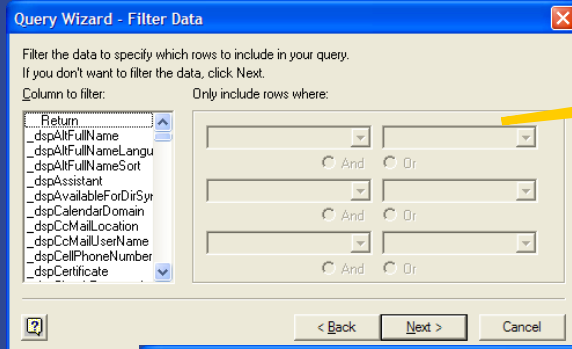
Preview of data in selected column:

Preview Now Options... < Back Next > Cancel

Select which fields  
to get



# Extract Data using NotesSQL



Query Wizard - Filter Data

Filter the data to specify which rows to include in your query.  
If you don't want to filter the data, click Next.

Column to filter:  Only include rows where:

<input type="text" value="Return"/>	<input type="text" value=""/>	<input type="text" value=""/>
<input type="text" value="Return"/>	<input type="text" value=""/>	<input type="text" value=""/>
<input type="text" value="Return"/>	<input type="text" value=""/>	<input type="text" value=""/>

And  Or

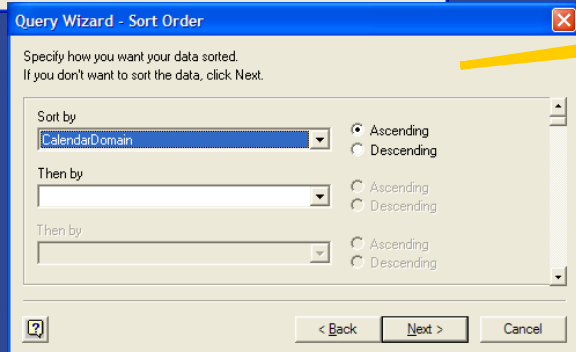
And  Or

And  Or

And  Or

< Back Next > Cancel

Optional Filters



Query Wizard - Sort Order

Specify how you want your data sorted.  
If you don't want to sort the data, click Next.

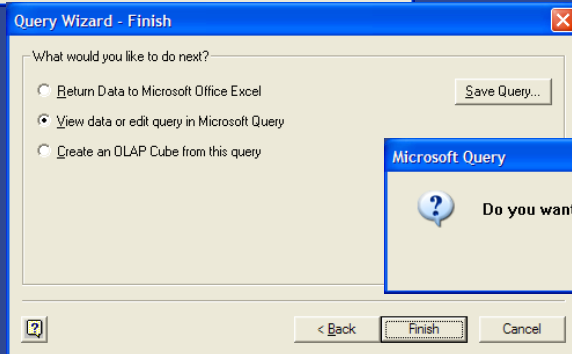
Sort by:   Ascending  Descending

Then by:   Ascending  Descending

Then by:   Ascending  Descending

< Back Next > Cancel

Optional Sorts



Query Wizard - Finish

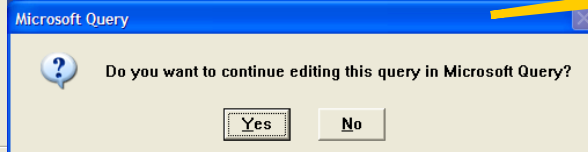
What would you like to do next?

- Return Data to Microsoft Office Excel
- View data or edit query in Microsoft Query
- Create an OLAP Cube from this query

Save Query...

< Back Finish Cancel

Very Optional



Microsoft Query

Do you want to continue editing this query in Microsoft Query?

Yes No



# Extract Data using NotesSQL

The screenshot shows the Microsoft Query interface with a menu open, highlighting 'Return Data'. A callout box points to this menu item with the text 'Return Data'. Another callout box points to the SQL statement window with the text 'Optional Modify SQL'. The SQL statement is: `SELECT Person.ClientType, Person.CntBld, Person.CntDate, Person.CntMachine, Person.CntPltrm, Person.FirstName, Person.FullName, Person.HTTPPassword, Person.HTTPPasswordChangeDate, Person.HTTPPasswordForceChange, Person.InternetAddress, Person.LastMod, Person.LastName, Person.Location, Person.LTPA_UsrNm, Person.MailAddress, Person.MailDomain, Person.MailFile, Person.MailServer, Person.MailSystem, Person.FullName, Person.FirstName`. Below the Query window, the Microsoft Excel interface is shown with a PivotTable field list containing 'ClientType' and 'CntBld'. A callout box points to the PivotTable field list with the text 'Here's your Excel Pivot with data from Lotus Notes!'. A text box provides the download URL: <http://www-306.ibm.com/software/lotus/products/domino/notessql.html>.

Return Data

Optional Modify SQL

Download from:  
<http://www-306.ibm.com/software/lotus/products/domino/notessql.html>

Here's your Excel Pivot with data from Lotus Notes!



# Server & Platform Statistics

*Vital Indicators for keeping your servers healthy*



Lotusphere<sup>®</sup> 2008

Lotusphere<sup>®</sup> 2008

# Server Statistics Explained

- Implemented as sub-system, maintained by the server
- Each task or sub-system is responsible for their own stats
  - ▶ Statistics are periodically updated – Most of them once per minute!
    - Not not all at the same time
    - API: StatUpdate(Facility, StatName, Flags, ValueType, pValue)
    - Can be used in own servertasks
- Most of the statistics cannot be reset
- Check events4.nsf for brief description of statistics

Tip: to reset statistics enter “Platform Reset” on Server Console



# Collecting Statistics Data

- Performed by Collect task
  - ▶ Writes to statrep.nsf
    - One document per collection interval
    - This document stores all topics
  - ▶ Configure in events4.nsf
    - Don't let dozens of servers collect each other
    - Don't schedule this to start each hour
  - ▶ Based on Statistics you can
    - Create Event Notifications, Feeding into DDM
    - Show them in Admin Client, Draw Live and Historical Charts

You can do extreme useful things with statistics



# Admin Client

The screenshot displays the IBM Domino Administrator Admin Client interface for the domain 'NashComLab7'. The main window shows the 'Performance Monitor' tab with a 'Statistics Charts' section. A line chart displays the percentage of total CPU utilization for the user mode of all CPUs in the system, with a red line showing fluctuations over time from 12:12:16:45 to 12:12:15:47. The chart's y-axis ranges from 0.0 to 1.4. Three callout boxes highlight key features: 'Add Statistic' points to the 'Add...' button in the 'Statistic counters' section; 'Select Statistic' points to the 'PctTotalUserCpuUtil' entry in the 'Add Statistics' dialog; and another 'Add Statistic' callout points to the 'Add...' button in the 'Select Range for Historical Statistics Charting' dialog. The 'Add Statistics' dialog shows the selected domain as 'NASHCOM-NET', the server as 'notes.nashcom.de/Srv/NashCom-Net', and the selected statistic as 'Platform.System.PctTotalUserCpuUtil'. The 'Select Range for Historical Statistics Charting' dialog shows the start date as 12.12.2007 and the end date as 12.12.2007, with a time range from 12:00 to 17:00. A footer note explains that the data is obtained from the 'statrep.nsf' database.

**Add Statistic**

**Select Statistic**

**Add Statistic**

**Platform.System.PctTotalUserCpuUtil**

Time	CPU Utilization (%)
12.12.16:45	0.3
12.12.16:35	0.35
12.12.16:16	0.6
12.12.16:06	0.85
12.12.15:55	0.5
12.12.15:54	0.7
12.12.15:53	0.7
12.12.15:52	0.75
12.12.15:51	0.65
12.12.15:50	1.1
12.12.15:49	0.9
12.12.15:48	0.9
12.12.15:47	0.55

Historical statistics data will be obtained from the database 'statrep.nsf' on the selected server above.



# Using nstats.exe

- Server Task listening to a mail-in database
- Can be copied into Notes Client to collect stats yourself
  - ▶ Undocumented option
  - ▶ Run nstats "server name"
  - ▶ Dumps all the statistics
  - ▶ Works with normal user rights to dump all Server Statistics

Example: nstats.exe Notes/NotesWeb

C-API call NSFGetServerStats (...) is a light transaction  
This call is also used by the collect task for remote collects



# Domino SNMP Support

- Needs to be enabled on Domino server
  - ▶ Check Domino Admin Help for detailed configuration steps
  - ▶ You need a SNMP agent on your machine
  - ▶ domino.mib contains all stats and events to query
  - ▶ You can use the tool of your choice to collect, evaluate and graph the results
- SNMP Freeware Tools (GNU General Public License)
  - Cacti (<http://www.cacti.net/>)
  - RRDtool (<http://oss.oetiker.ch/rrdtool/>)
  - MRTG (<http://www.mrtg.com/>)
  - Or you can leverage your strategic corporate monitoring solution e.g. IBM Tivoli Monitoring
  - Some of them have their own agents to collect data

# Top 10 Statistics

- Database
  - ▶ NSF Buffer Pool
  - ▶ NSF Cache
- Server
  - ▶ (Cluster) Replication
  - ▶ Transactions
  - ▶ Concurrent Tasks
- Platform
  - ▶ Memory
  - ▶ CPU
  - ▶ PagingFile
  - ▶ Disk

## Statrep.nsf:

Over 2,000 Statistics items

We give you the most important ones

## Why Top 10:

Fast, Easy, Most Benefits



# Top 10 Statistics – NSF Buffer Pool

## ■ Database

- ▶ NSF Buffer Pool
- ▶ NSF Cache

## ■ Server

- ▶ (Cluster) Replication
- ▶ Transactions
- ▶ Concurrent Tasks

## ■ Platform

- ▶ Memory
- ▶ CPU
- ▶ PagingFile
- ▶ Disk

### Use:

Buffering Database I/O

### Statrep:

Database.Database.BufferPool.Maximum.Megabytes  
Database.Database.BufferPool.PercentReadsInBuffer

### Interpretation:

Bad < 90% < PercentReadsInBuffer < 98% < Perfect

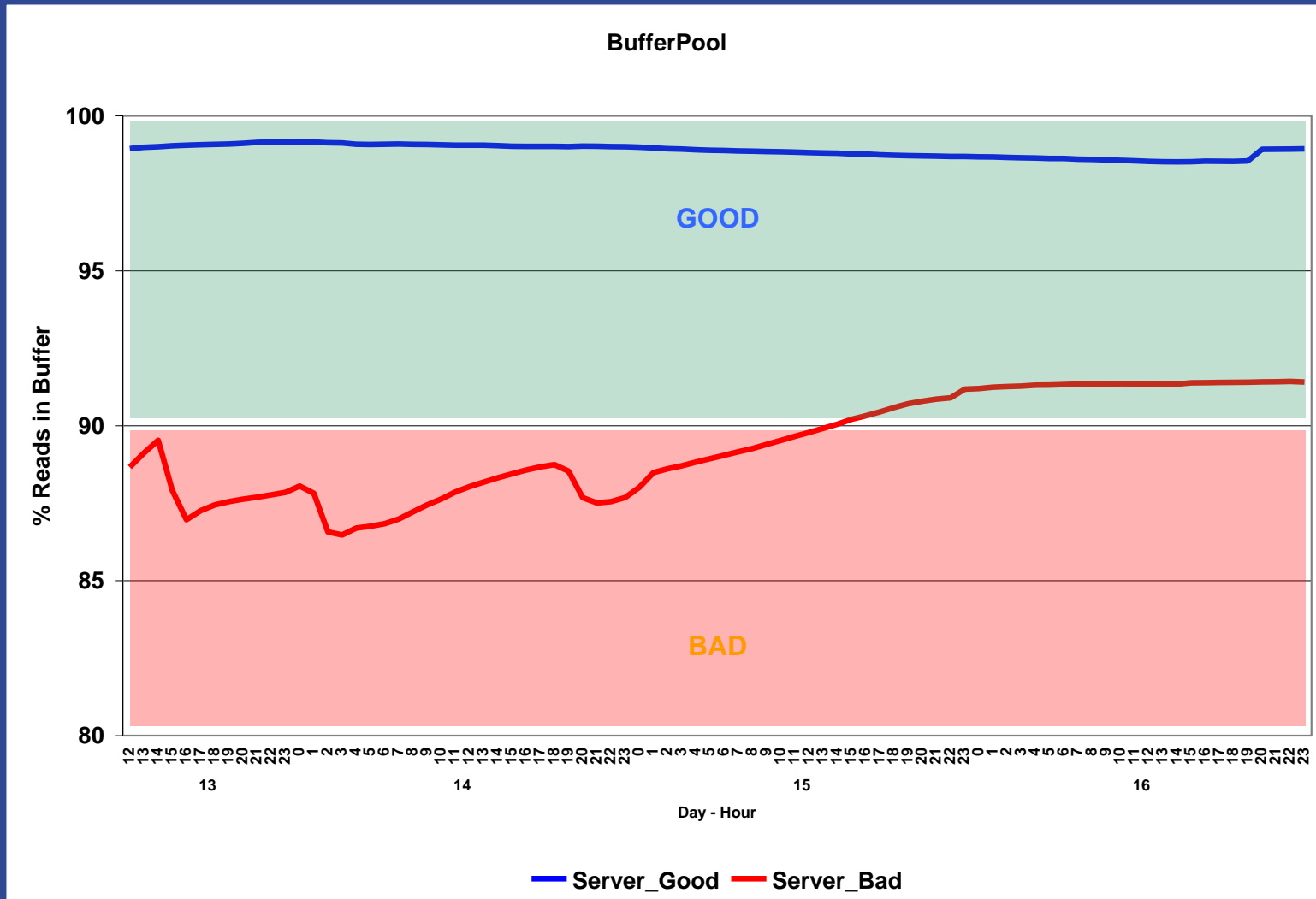
### Tune:

NSF\_Buffer\_Pool\_Size\_MB=n

Reference: Technote #1286171



# NSF Buffer Pool



# Top 10 Statistics – NSF Cache

## ■ Database

- ▶ NSF Buffer Pool
- ▶ NSF Cache

## ■ Server

- ▶ (Cluster) Replication
- ▶ Transactions
- ▶ Concurrent Tasks

## ■ Platform

- ▶ Memory
- ▶ CPU
- ▶ PagingFile
- ▶ Disk

### Use:

Caching Open Databases

### Statrep:

Database.DbCache.OvercrowdingRejections

Database.DbCache.HighWaterMark

Database.DbCache.CurrentEntries

Database.DbCache.MaxEntries

### Interpretation:

Good = HighWaterMark < MaxEntries

Good = 0 OvercrowdingRejections

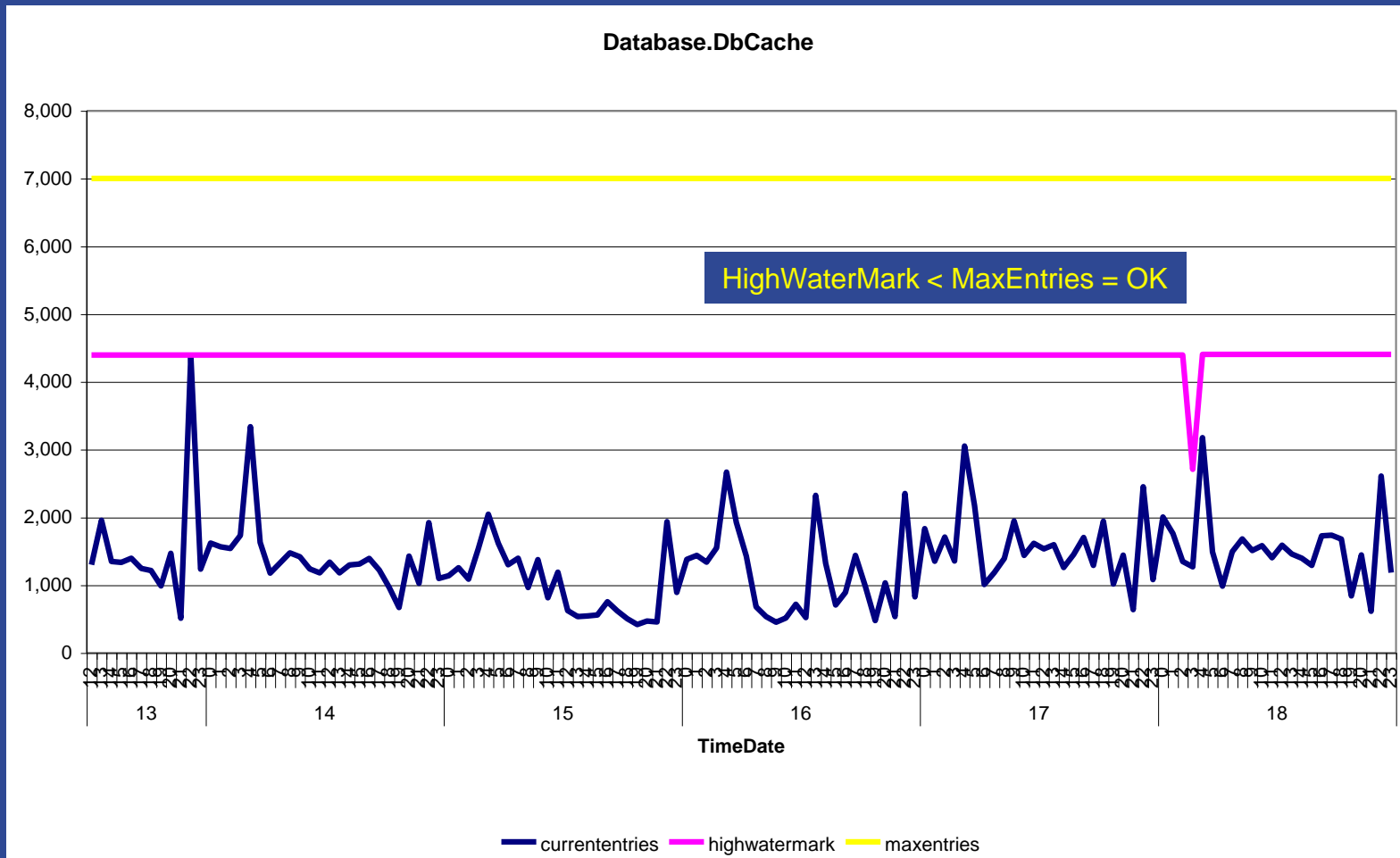
### Tune:

NSF\_DbCache\_MaxEntries = n

Reference: Technote #1279893



# NSF Cache



# Top 10 Statistics – (Cluster) Replication

- Database

- ▶ NSF Buffer Pool
- ▶ NSF Cache

- Server

- ▶ (Cluster) Replication
- ▶ Transactions
- ▶ Concurrent Tasks

- Platform

- ▶ Memory
- ▶ CPU
- ▶ PagingFile
- ▶ Disk

**Use:**

Cluster Replicator Performance

**Statrep:**

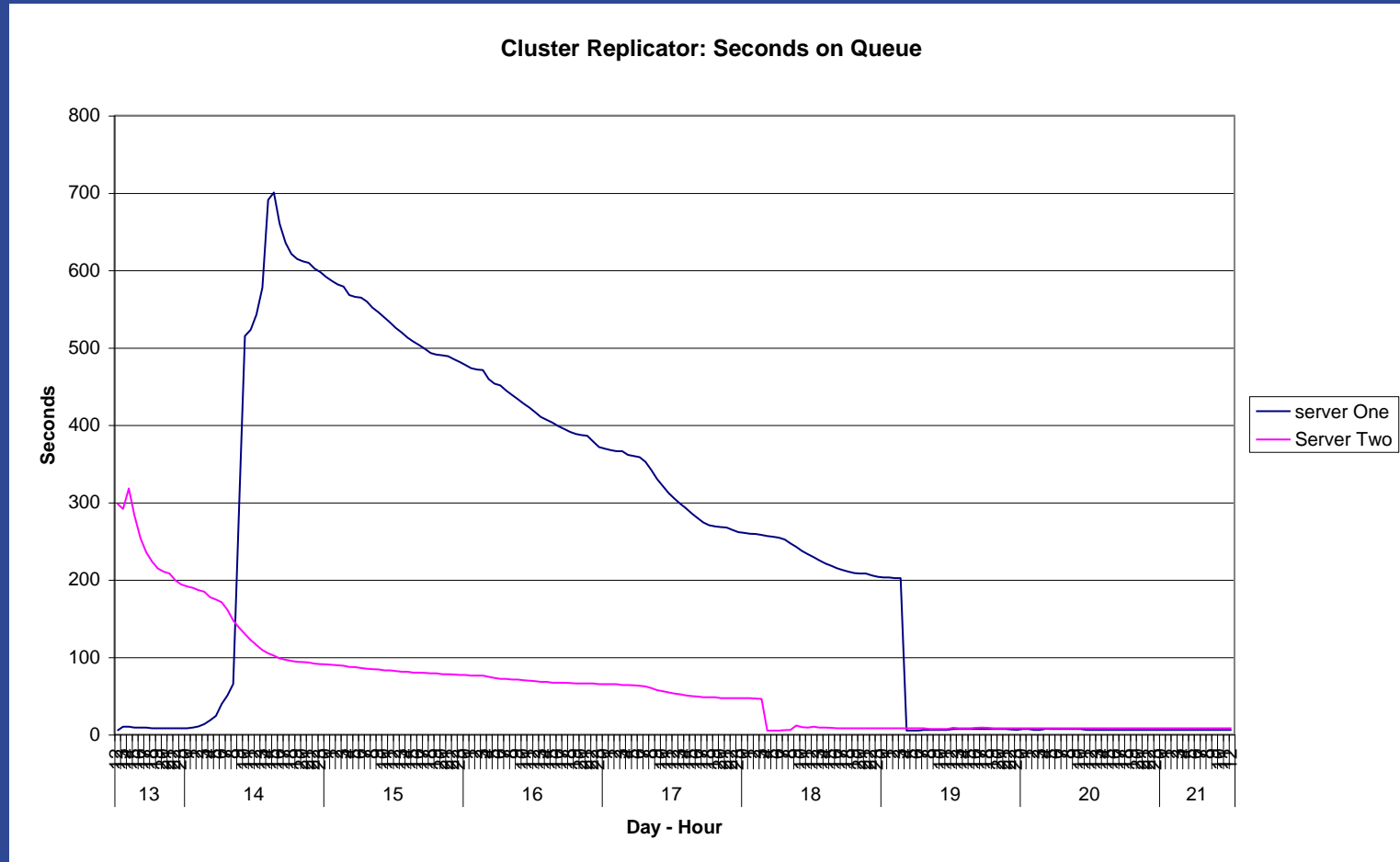
Replica.Cluster.SecondsOnQueue  
Replica.Cluster.WorkQueueDepth  
Replica.Cluster.Failed

**Interpretation:**

Perfect < 10 < SecondsOnQueue > 15 > Bad  
Perfect < 10 < WorkQueueDepth > 15 > Bad



# (Cluster) Replication



# Top 10 Statistics – Transactions

- Database
  - ▶ NSF Buffer Pool
  - ▶ NSF Cache
- Server
  - ▶ (Cluster) Replication
  - ▶ Transactions
  - ▶ Concurrent Tasks
- Platform
  - ▶ Memory
  - ▶ CPU
  - ▶ PagingFile
  - ▶ Disk

## Use:

Indication of Server Load

## Statrep:

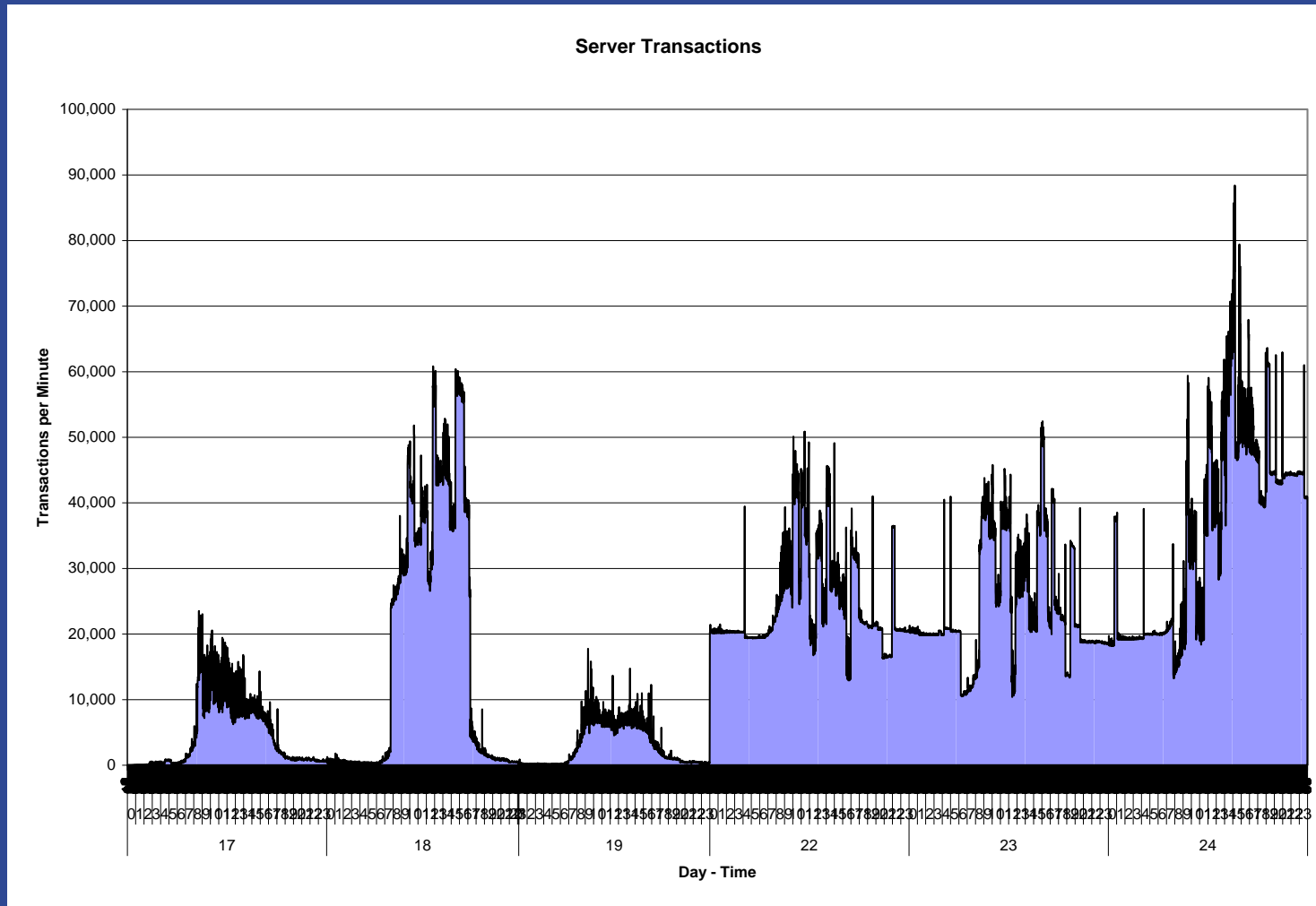
Server.Trans.PerMinute

## Interpretation:

Heavy < 30 < Trans.PerMinute (per User) > 10 > Light



# Transactions



# Top 10 Statistics – Concurrent Tasks

- Database
  - ▶ NSF Buffer Pool
  - ▶ NSF Cache
- Server
  - ▶ (Cluster) Replication
  - ▶ Transactions
  - ▶ Concurrent Tasks
- Platform
  - ▶ Memory
  - ▶ CPU
  - ▶ PagingFile
  - ▶ Disk

## Use:

Simultaneous Active Database Connections

## Statrep:

Server.ConcurrentTasks

Server.ConcurrentTasks.Waiting

## Interpretation:

Waiting should be ZERO

## Tune:

Server\_Pool\_Tasks = n

Server\_Max\_Concurrent\_Trans = m

Reference: Technote #1207456



# Top 10 Statistics – Platform Memory

- Database

- ▶ NSF Buffer Pool
- ▶ NSF Cache

- Server

- ▶ (Cluster) Replication
- ▶ Transactions
- ▶ Concurrent Tasks

- Platform

- ▶ Memory
- ▶ CPU
- ▶ PagingFile
- ▶ Disk

**Use:**

Allocated using memory pools and sub-allocations

**Statrep:**

Mem.Allocated  
Mem.Allocated.Process  
Mem.Allocated.Shared

**Interpretation:**

Memory Leaks when increasing over days / weeks

**Tune:**

By several parameters (bufferpool, cache, namelookup...)

Be careful interpreting this statistic...



# Top 10 Statistics – Platform CPU

## ■ Database

- ▶ NSF Buffer Pool
- ▶ NSF Cache

## ■ Server

- ▶ (Cluster) Replication
- ▶ Transactions
- ▶ Concurrent Tasks

## ■ Platform

- ▶ Memory
- ▶ CPU
- ▶ PagingFile
- ▶ Disk

### Use:

CPU Utilization on Server

### Statrep:

Platform.System.PctCombinedCpuUtil

Platform.System.PctTotalPrivilegedCpuUtil

Platform.System.PctTotalUserCpuUtil

### Interpretation:

OK < 90% CombinedCpuUtil > 90% > TOO HIGH

### Tune:

Many Root Causes Possible ☹ ...



# Top 10 Statistics – Paging File

- Database

- ▶ NSF Buffer Pool
- ▶ NSF Cache

- Server

- ▶ (Cluster) Replication
- ▶ Transactions
- ▶ Concurrent Tasks

- Platform

- ▶ Memory
- ▶ CPU
- ▶ PagingFile
- ▶ Disk

Use:

Server Memory Swapping to Disk

Statrep:

Platform.PagingFile.Total.PctUtil

Interpretation:

OK < 0% < PctUtil.Avg > 10% > BAD

Tune:

OS Level tuning, Check Memory



# Top 10 Statistics – Platform Disk

- Database
  - ▶ NSF Buffer Pool
  - ▶ NSF Cache
- Server
  - ▶ (Cluster) Replication
  - ▶ Transactions
  - ▶ Concurrent Tasks
- Platform
  - ▶ Memory
  - ▶ CPU
  - ▶ PagingFile
  - ▶ Disk

## Use:

Allocated using memory pools and sub-allocations

## Statrep:

Platform.LogicalDisk.1.AvgQueueLen

Platform.LogicalDisk.1.PctUtil

## Interpretation:

Good < 2% < AvgQueueLen > 5% > BAD

Good = PctUtil < 80%

## Tune:

By several parameters (bufferpool, cache, namelookup...

Platform.LogicalDisk.1.AssignedName=C points to the disk



# Real World Examples

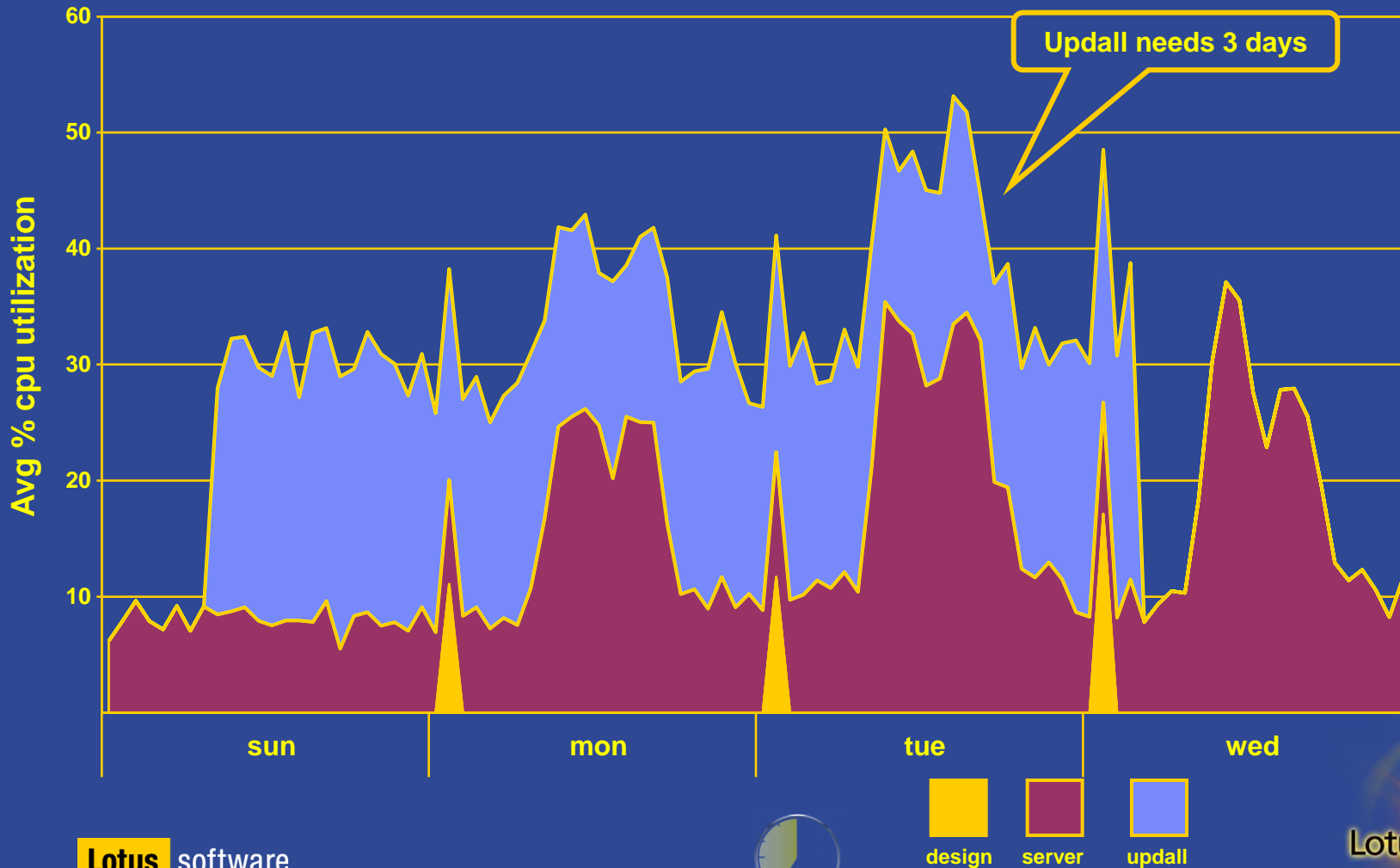
---

*Logs may Tell you Things you didn't Know*



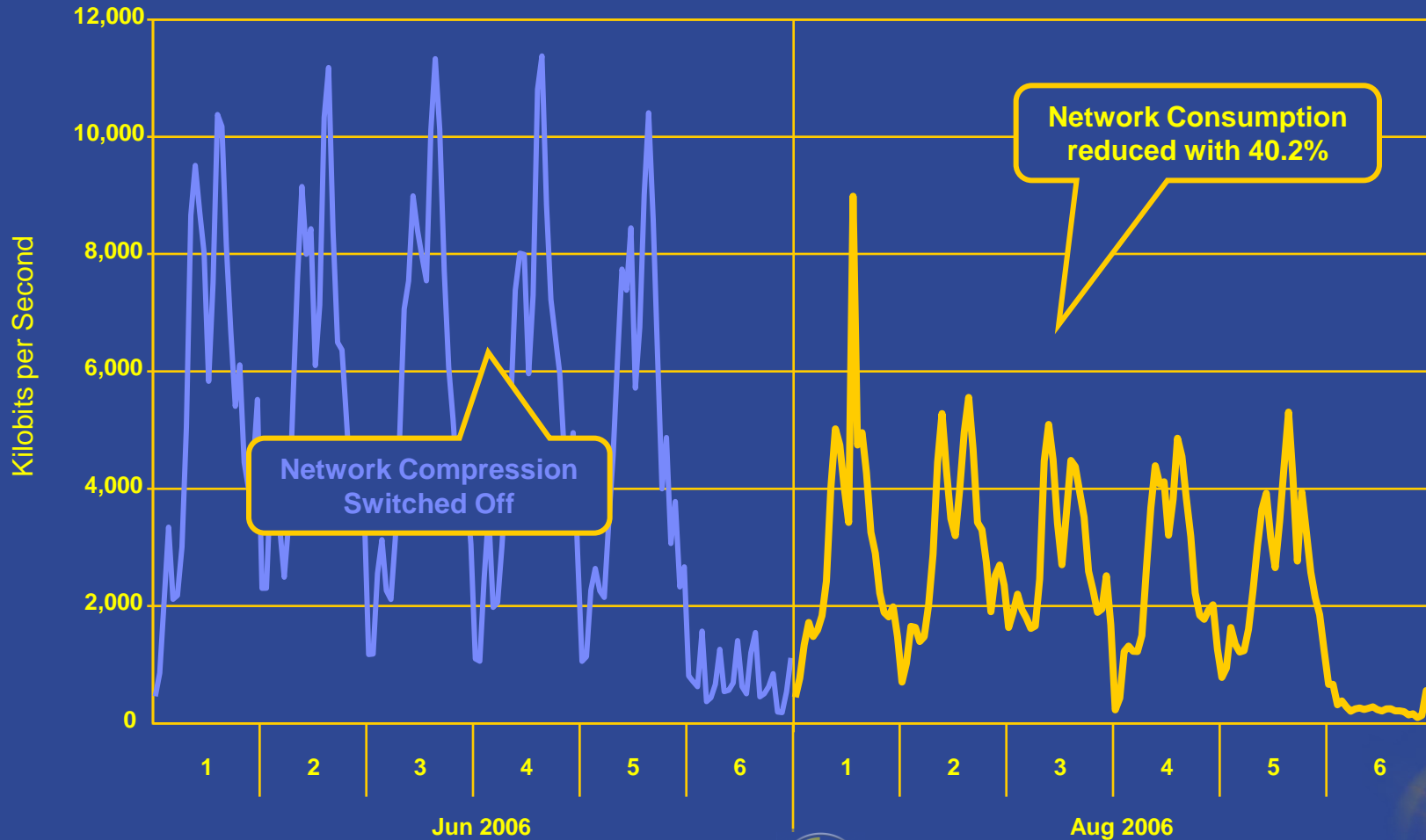
# Platform Statistics showing Server CPU

CPU Utilization  
Top 3 Domino Server Tasks

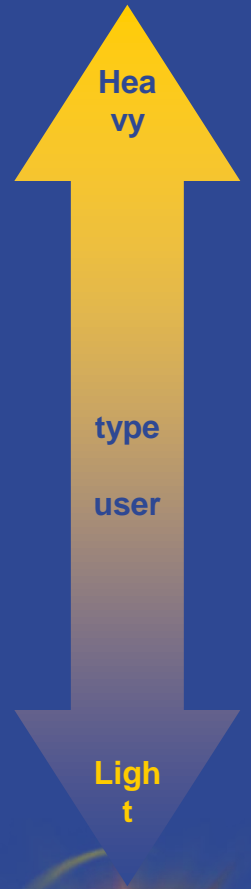
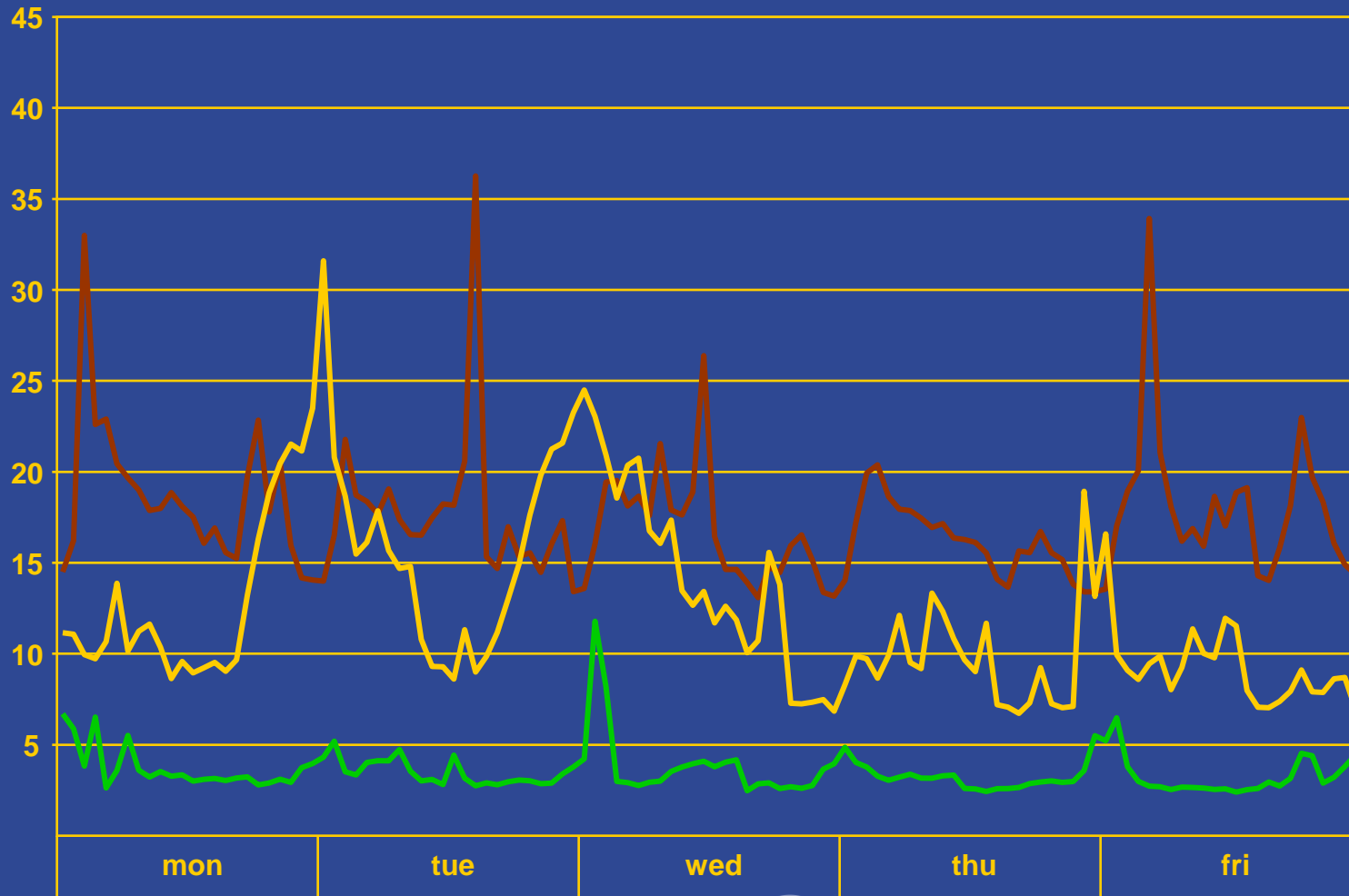


# Notes Log showing Network Compression

Network Compression Benefits  
within Lotus Domino



# Transactions per Minute Per User

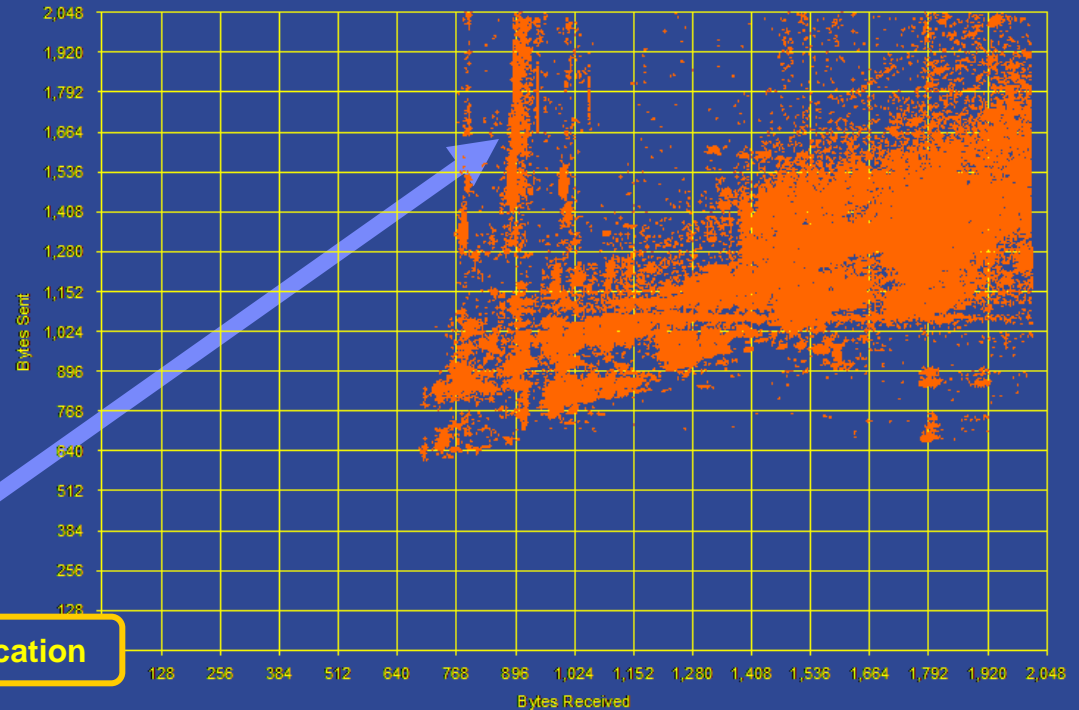


# The 'Art' of Domino Statistics

Charts show frequency distributions on 1,364,355 Lotus Notes sessions

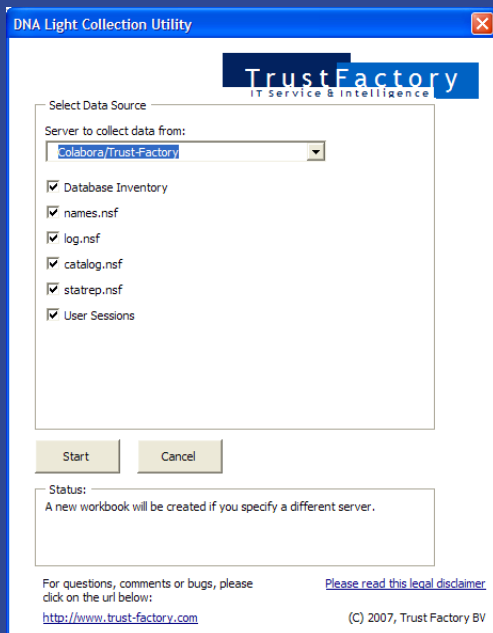
Check for New Mail

Calendar Notification



# Using COM (with e.g. VBA macro)

- Access to Domino back-end with VB(A/script)
  - ▶ Very easy for LotusScript developers
  - ▶ Minor exceptions to deal with
  - ▶ Very easy access to all kinds of log data

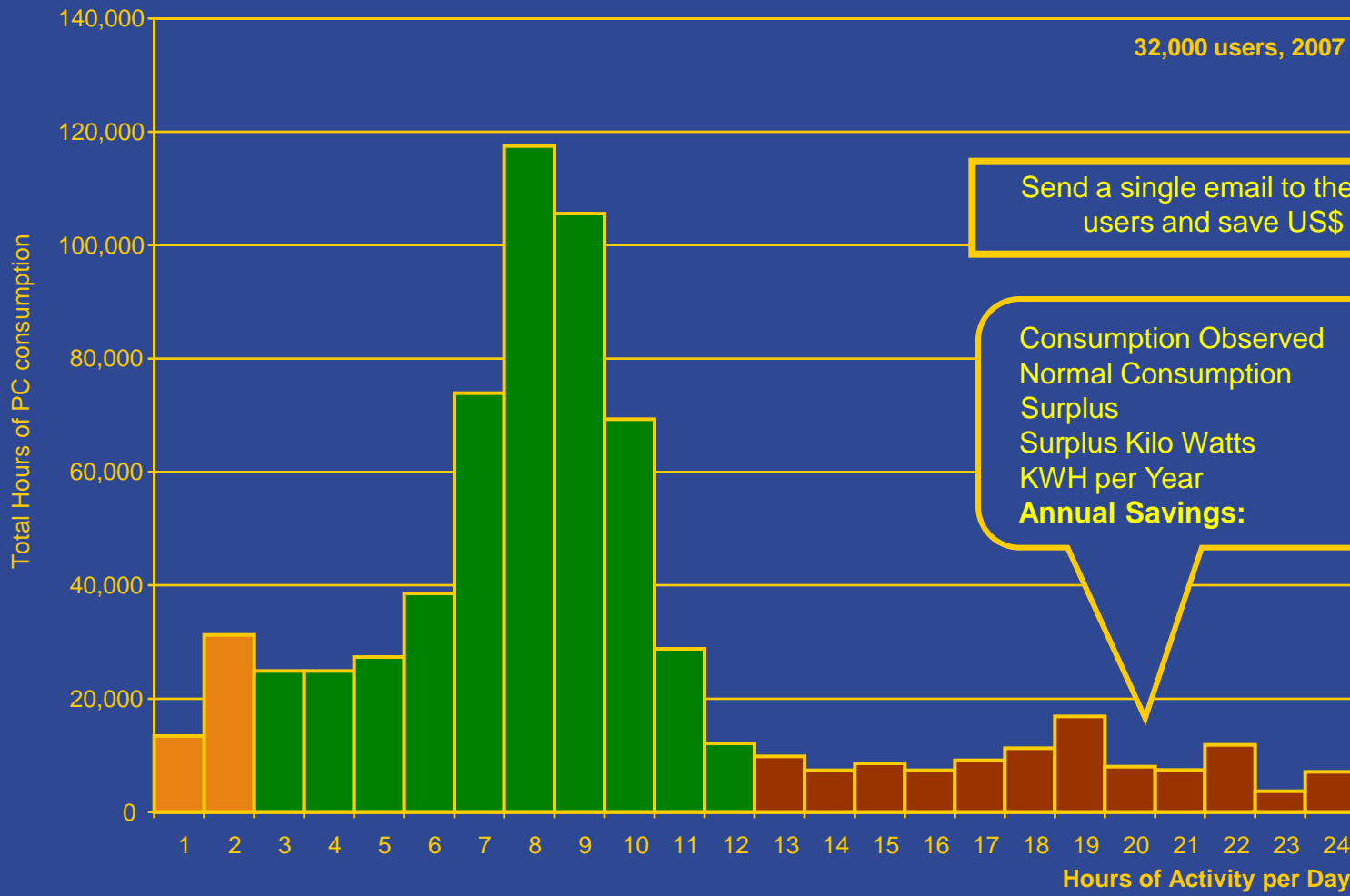


Free Download  
(incl. source)

<http://www.trust-factory.com/Site.nsf/ID/downloads/utills>



# Global Warming: Cold Facts



# Client Clocking

- How to Enable:

- ▶ `client_clock=1`
- ▶ `debug_console=1`
- ▶ `debug_outfile=c:\debug_notes.log`

- Example:

- ▶ (15-78 [15]) OPEN\_NOTE(REPC1256B16:0072BCBE-NT00000E3E,00400020): 0 ms. [52+1454=1506]

Transaction

Parameters

Response  
Time

Bytes  
In, Out, Total

Can also be done on Server:  
`server_clock=1`

Transactions counts on Console:  
Show trans  
Show trans reset



# Summary

- Looking at Log Data Enables you to:
  - Perform Root Cause Analysis
  - Present Facts instead of Assumptions
  - Focus on the Right Area of Expertise
  
- Getting Log Data is not complicated:
  - By Technical and Non Technical People
  - Available in Domino, let the Specialists handle the OS
  
- In the Land of the Blind, the Logs make you King!



# References

- HND106

- ▶ IBM Lotus Domino Domain Monitoring in the Real World
  - Speakers: Susan Bulloch, Kathleen McGivney
  - Y&B GH Salon II - Sunday 09:00am - 10:45am

- BP110

- ▶ The Tools Every IBM Lotus Domino Administrator Should Know - and How to Configure Them
  - Speaker: Gabriella Davis
  - SW 7-10 - Tuesday 11:15am - 12:15pm

- BP208

- ▶ Go Domino Go! Application Performance Engineering for IBM Lotus Domino Developers
  - Speakers: Jamie Magee, Kevin Marshall
  - SW Mockingbird – Tuesday 16:15 – 17:15pm



# Question and Answers

- Questions?
  - ▶ Now
  - ▶ Send email
  - ▶ Find us at our booth (323)
- Please fill out your evaluations!
- Presentation Updates on our websites
  - <http://www.nashcom.de/ls2008>
  - <http://www.trust-factory.com/ls2008>



Daniel Nashed



Wouter Aukema

