

BP112

In the Land of the Blind, Logs make you King

Daniel Nashed

Wouter Aukema

*Nash!Com
Germany*

*Trust Factory
Netherlands*

Lotusp^here[®] 2008



IBM[®]

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
- ▶ <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

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 near 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 sequence of steps in Microsoft Excel 2003 for connecting to an external data source. The main window displays the 'Data' menu with 'PivotTable and PivotChart Report...' selected. Below it, the 'PivotTable and PivotChart Wizard - Step 1 of 3' dialog is open, with 'External data source' selected under 'Where is the data that you want to analyze?' and 'PivotTable' selected under 'What kind of report do you want to create?'. A yellow callout box labeled 'Data, Pivot' points to the menu item. The next dialog, 'PivotTable and PivotChart Wizard - Step 2 of 3', shows the 'Get Data...' button highlighted, with a yellow callout box labeled 'External Data Source' pointing to it. The final dialog, 'Choose Data Source', shows a list of data sources including '<New Data Source>', 'd2host', 'd2host_billing', 'd2hostbilling*', 'd3host', 'dBASE Files*', 'dipole*', 'domino_log', 'eriks exact toegang', and 'excel'. A yellow callout box labeled 'Get Data' points to the 'Get Data...' button in the previous dialog, and another 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

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
denAssistant

Columns in your query:

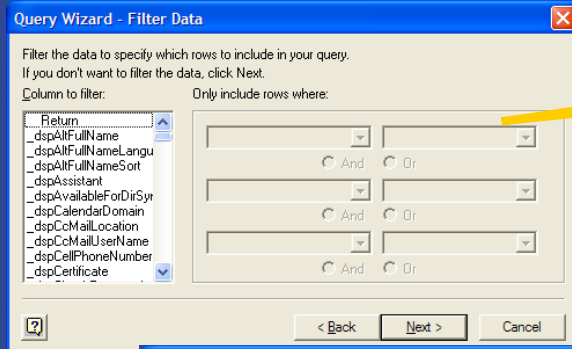
Preview of data in selected columns:

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.

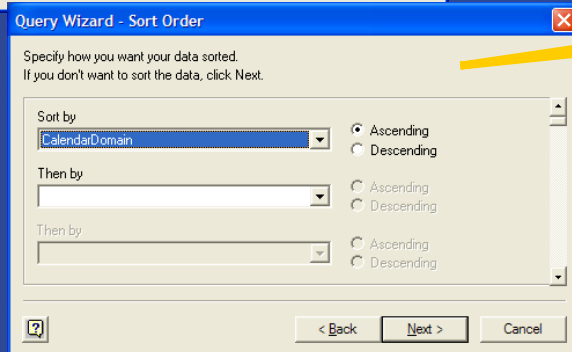
Column to filter: Only include rows where:

Return
_dspAltFullName
_dspAltFullNameLang
_dspAltFullNameSort
_dspAssistant
_dspAvailableForDirSyn
_dspCalendarDomain
_dspCcMailLocation
_dspCcMailUserName
_dspCellPhoneNumber
_dspCertificate

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: CalendarDomain

Ascending Descending

Then by:

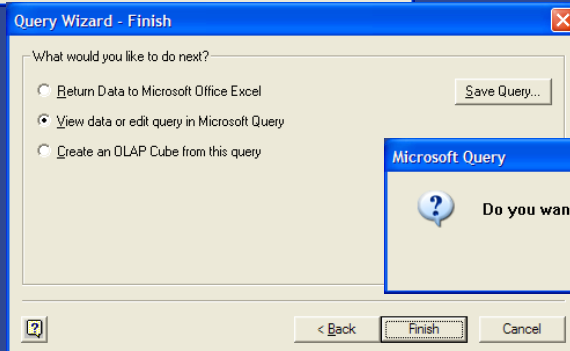
Ascending Descending

Then by:

Ascending Descending

< Back Next > Cancel

Optional Sorts



Query Wizard - Finish

What would you like to do next?

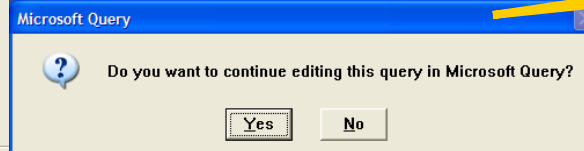
Return Data to Microsoft Office Excel

View data or edit query in Microsoft Query

Create an OLAP Cube from this query

Save Query...

< Back Finish Cancel



Microsoft Query

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

Yes No

Very Optional



Extract Data using NotesSQL

The screenshot shows the Microsoft Query interface with a menu open, highlighting 'Return Data to Microsoft Office Excel'. A callout bubble points to this menu item with the text 'Return Data'. Another callout bubble 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.CntPltfrm, 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
```

The Microsoft Excel window shows a PivotTable with the following data:

ClientType	CntBld
0	
0	Release 6.0.
0	Release 6.0.
3	Release 6.0.

A callout bubble at the bottom of the Excel window says: 'Here's your Excel Pivot with data from Lotus Notes!'. A text box in the center provides the download link: <http://www-306.ibm.com/software/lotus/products/domino/notessql.html>



Server & Platform Statistics

Vital Indicators for keeping your servers healthy



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 'NashComLab7 Domain'. The main window shows the 'Performance Monitor' tab with a 'Statistics Charts' section. A line chart displays the percentage of total user CPU utilization over time, with a red line showing fluctuations between approximately 0.3 and 0.9. Three callout boxes highlight key features: 'Add Statistic' (top center), 'Add Statistic' (top right), and 'Select Statistic' (middle left).

Add Statistic (Top Center): A callout box pointing to the 'Add...' button in the 'Statistic counters' section.

Add Statistic (Top Right): A callout box pointing to the 'Add Statistic' button in the 'Select Range for Historical Statistics Charting' dialog.

Select Statistic (Middle Left): A callout box pointing to the 'Statistic Name' list in the 'Add Statistics' dialog.

Dialogs and Settings:

- Add Statistics:** Domain: NASHCOM-NET, Server: notes.nashcom.de/Srv/NashCom-Net, Select: Individual statistics, Statistic: Platform.System.PctTotalUserCpuUtil.
- Select Range for Historical Statistics Charting:** Domain: NASHCOM-NET, Server: notes.nashcom.de/Srv/NashCom-Net, Start date: 12.12.2007, End date: 12.12.2007, Start time: 12:00, End time: 17:00.

Chart Data (Approximate):

Time	Value
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	0.68
12.12.15:52	0.75
12.12.15:51	0.65
12.12.15:50	0.9
12.12.15:49	0.85
12.12.15:48	0.85
12.12.15:47	0.55



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

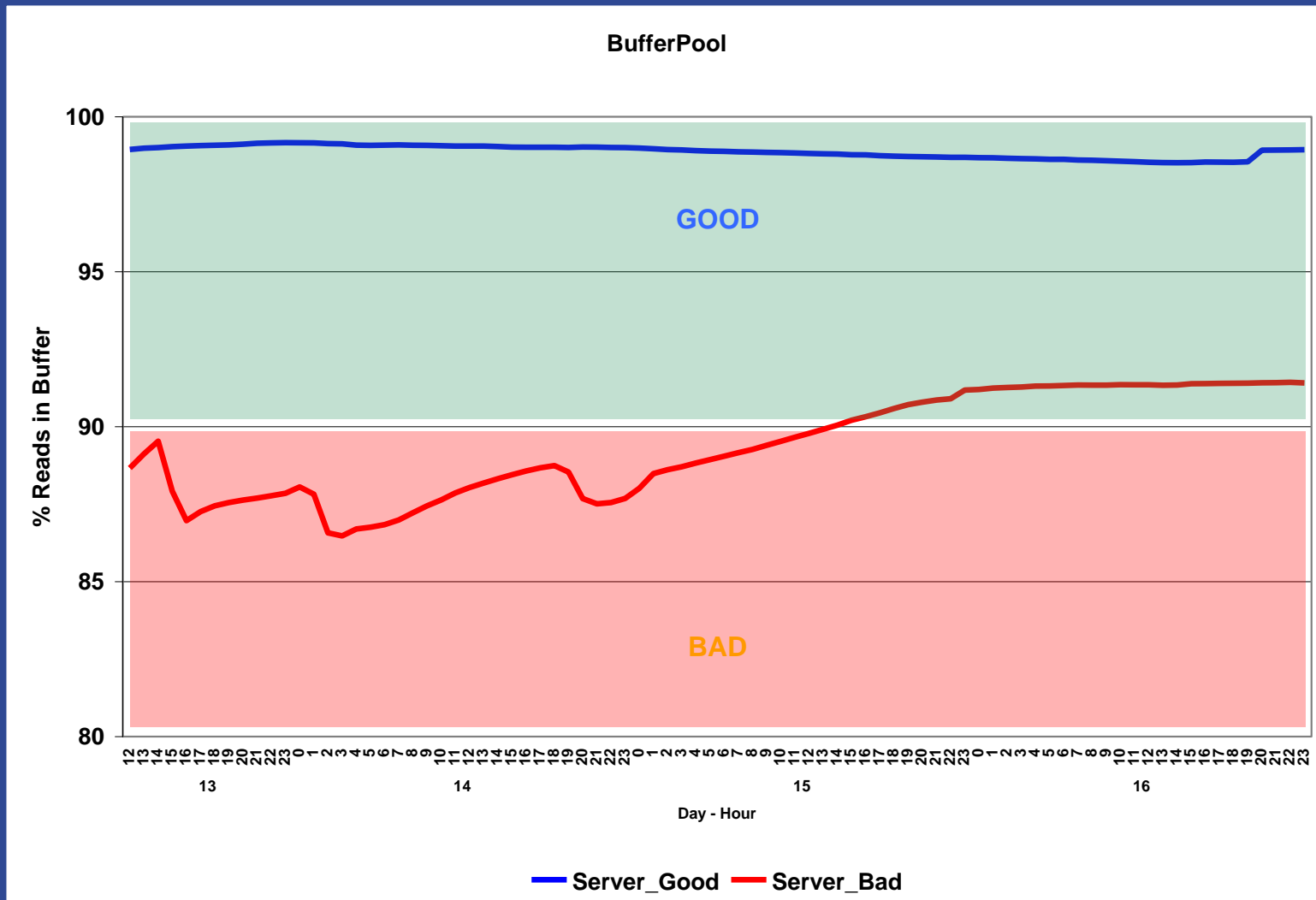
Tune:

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

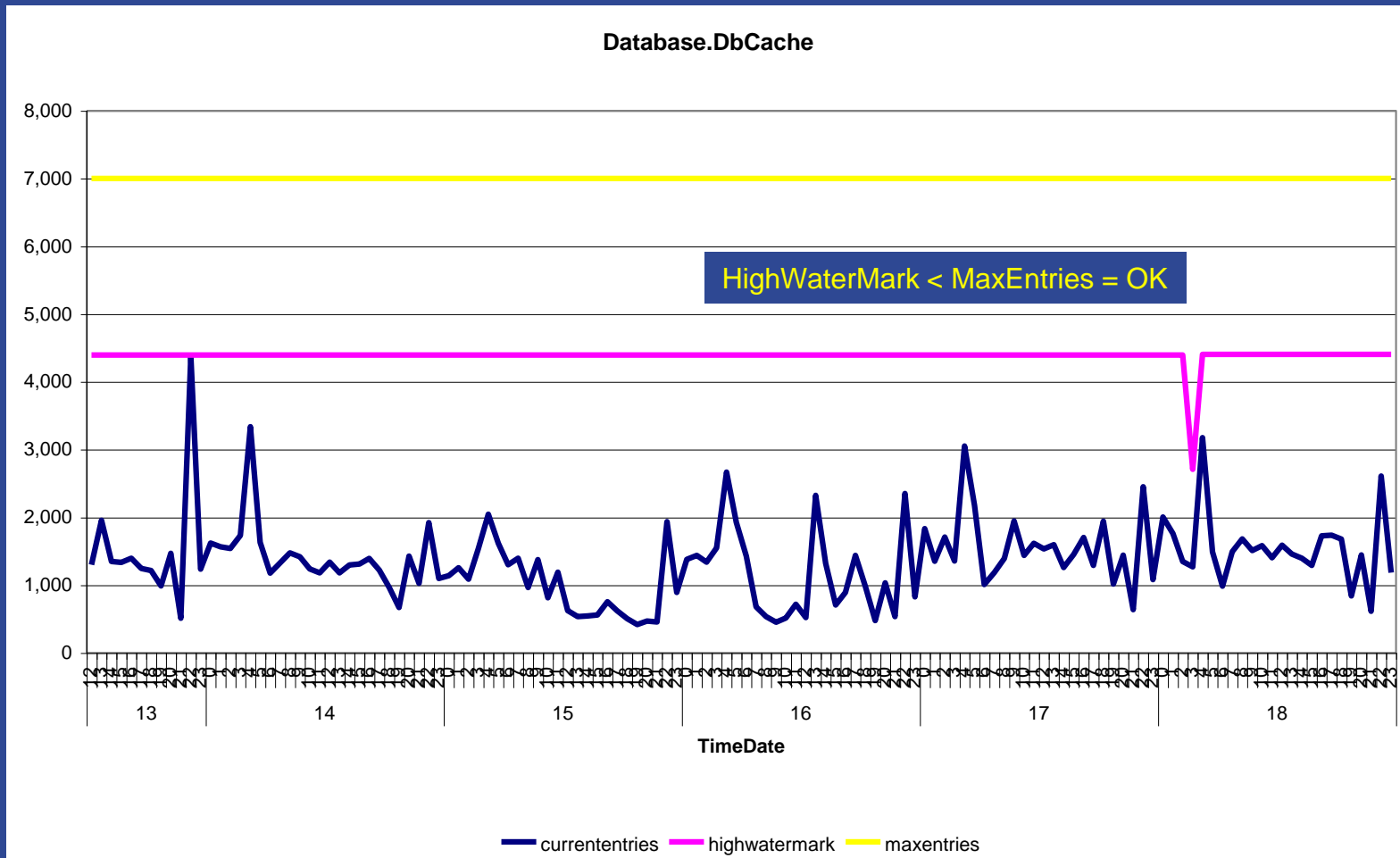
Tune:

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:

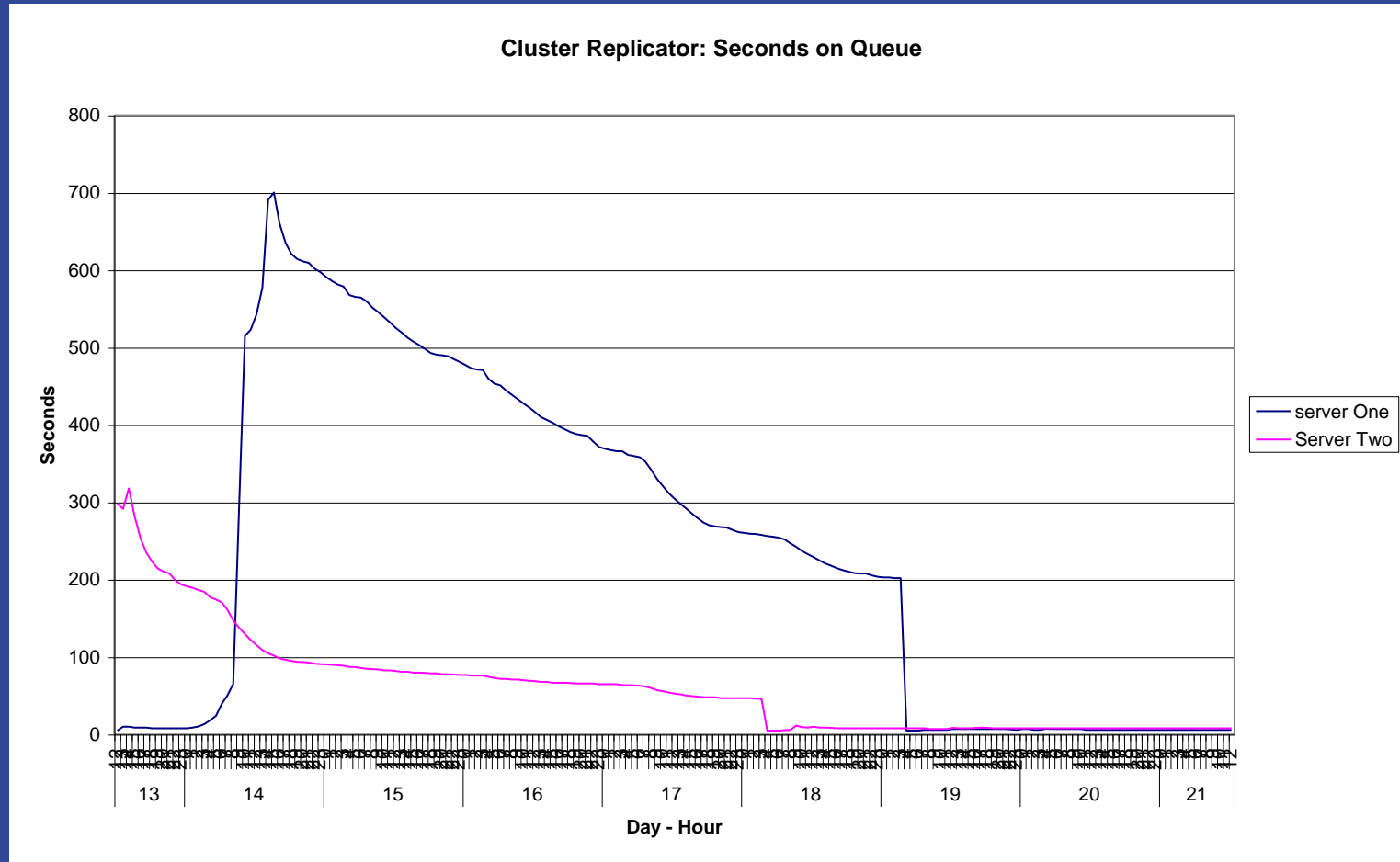
Replica.Cluster.SecondsOnQueue
Replica.Cluster.WorkQueueDepth
Replica.Cluster.Failed

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:

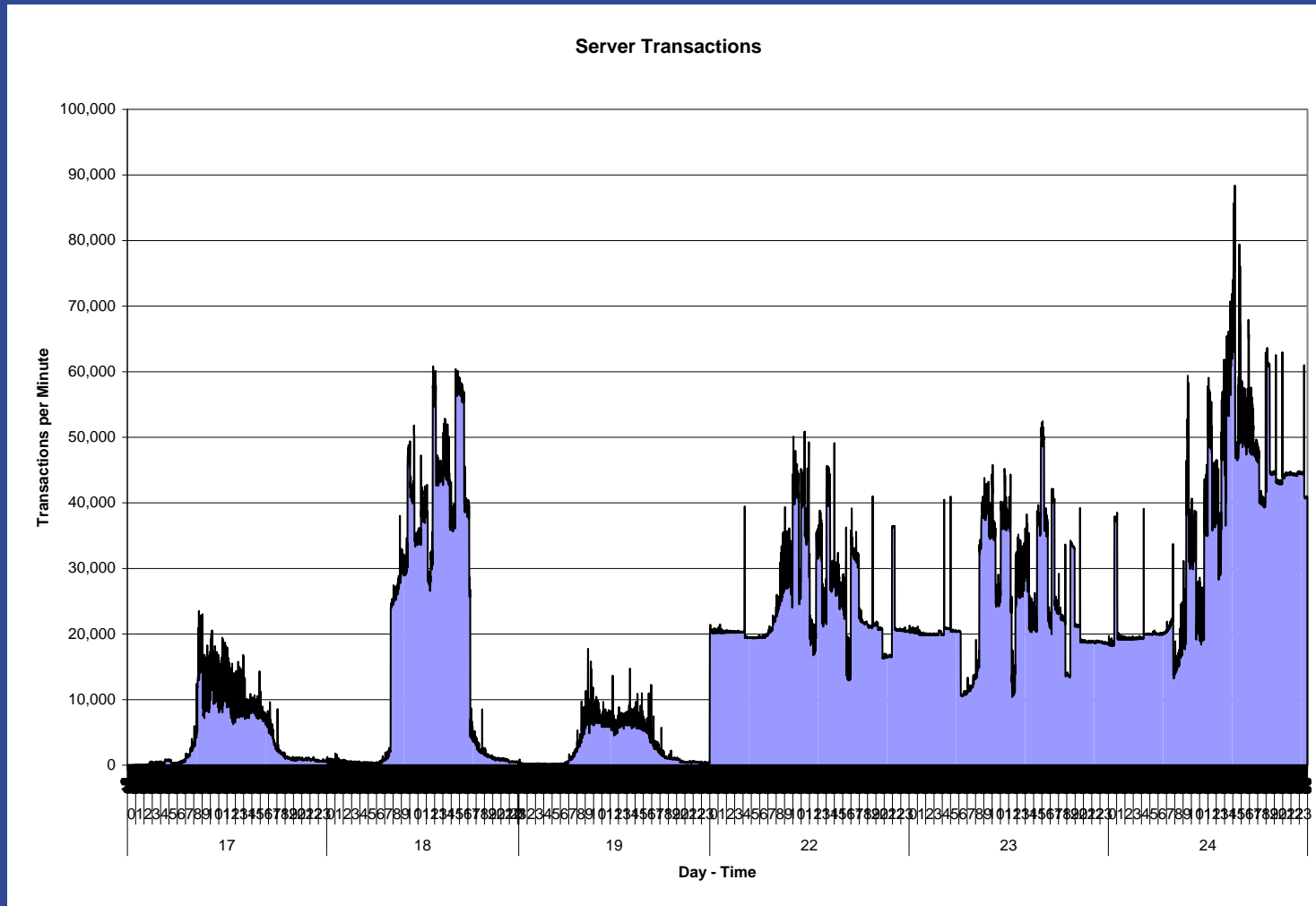
Server.Trans.PerMinute

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



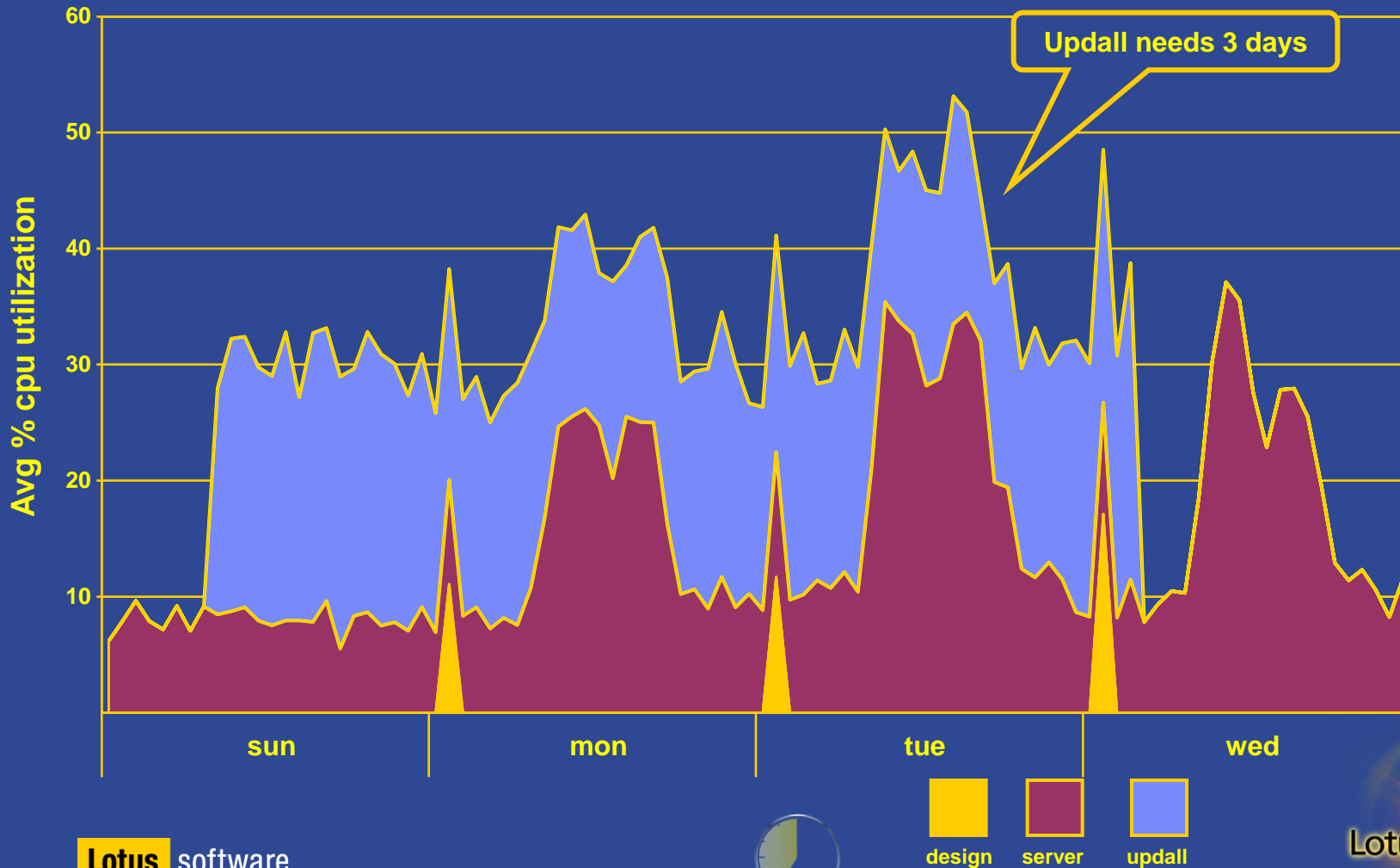
Real World Examples

Logs may Tell you Things you didn't Know



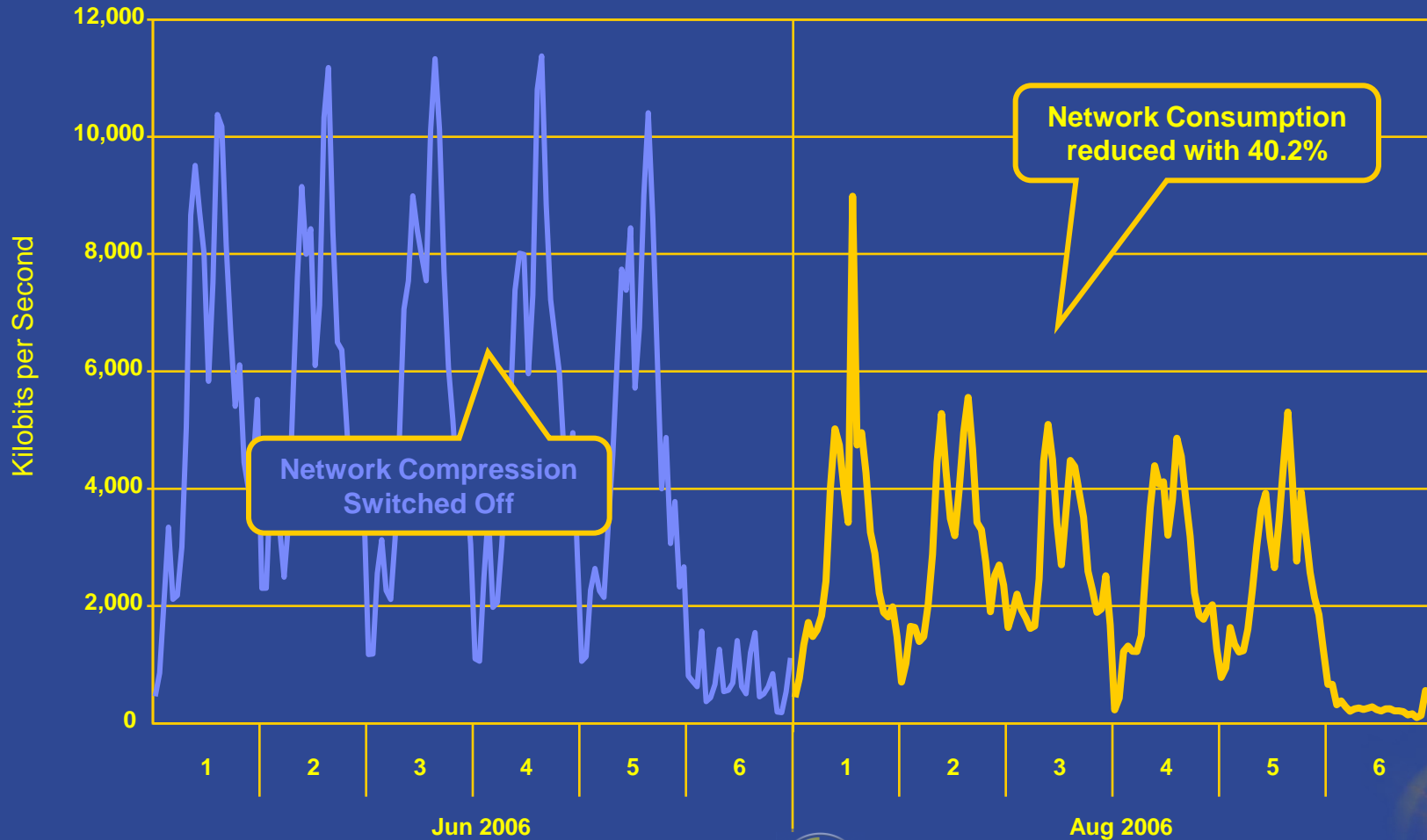
Platform Statistics showing Server CPU

CPU Utilization
Top 3 Domino Server Tasks

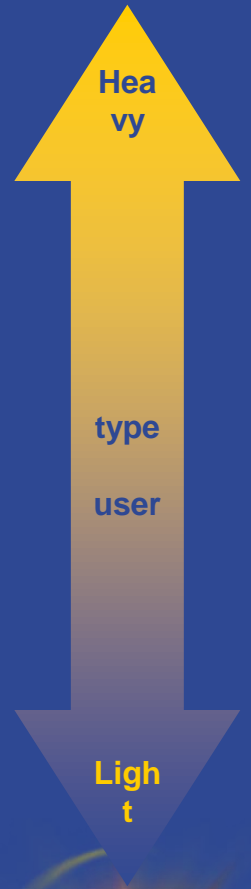
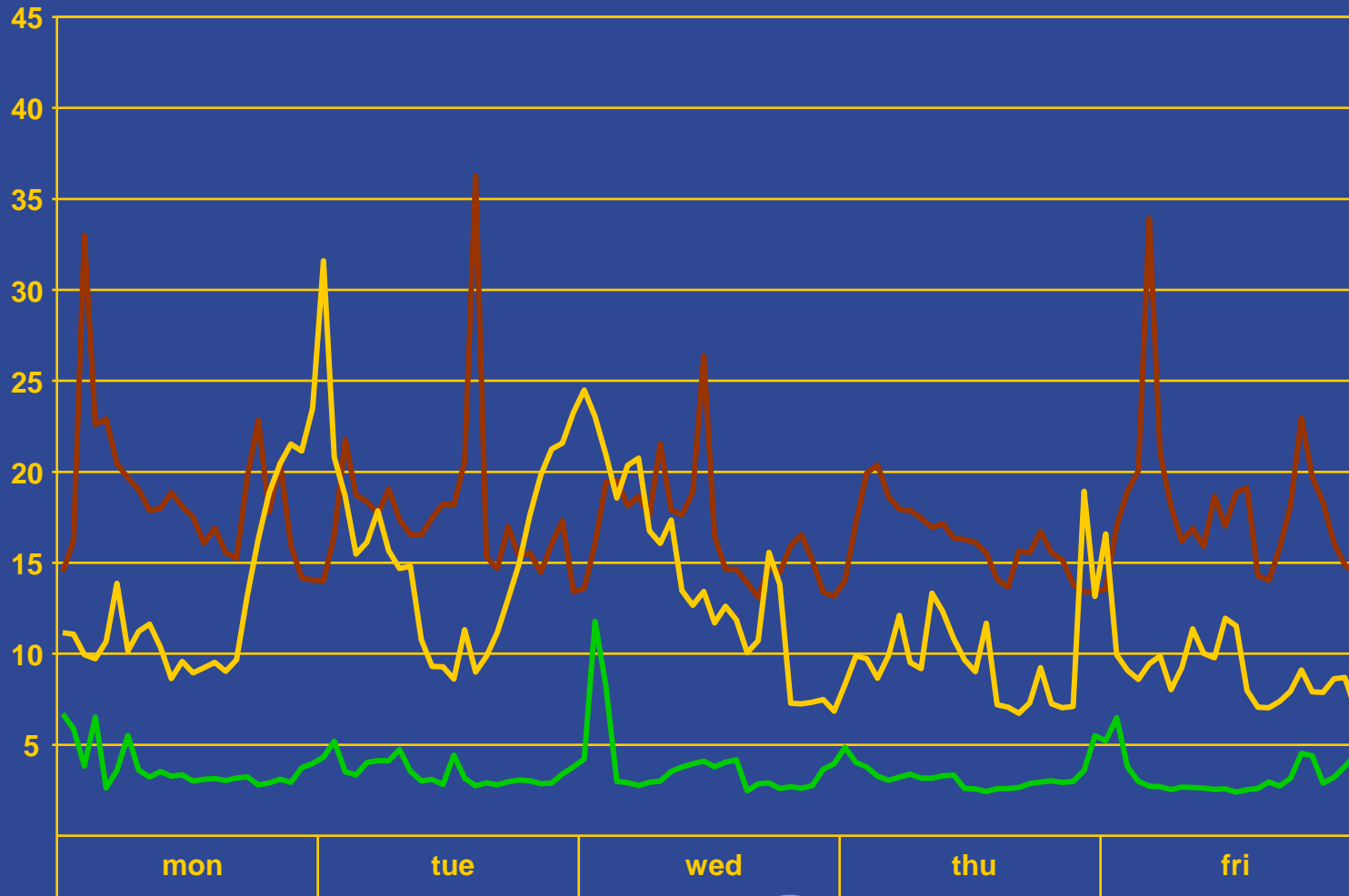


Notes Log showing Network Compression

Network Compression Benefits
within Lotus Domino



Transactions per Minute Per User

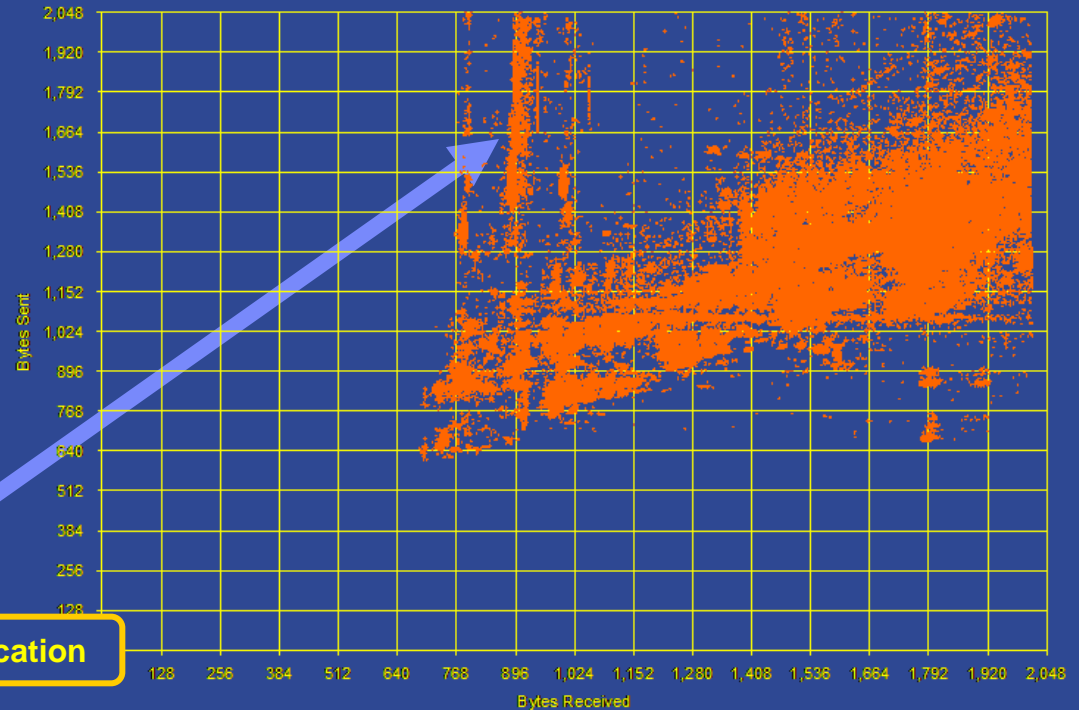


The 'Art' of Domino Statistics

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

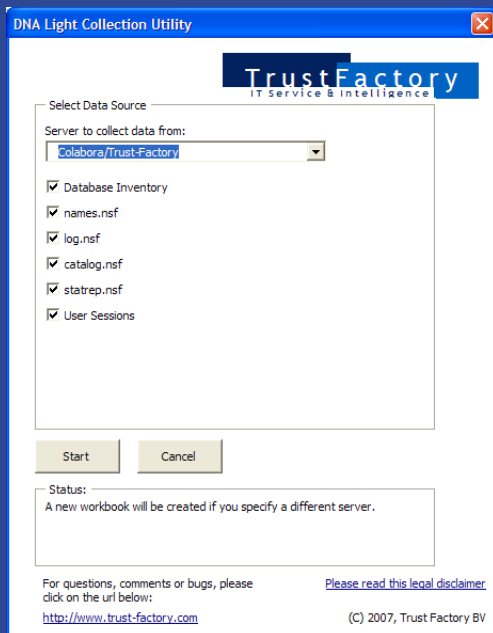
Check for New Mail

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

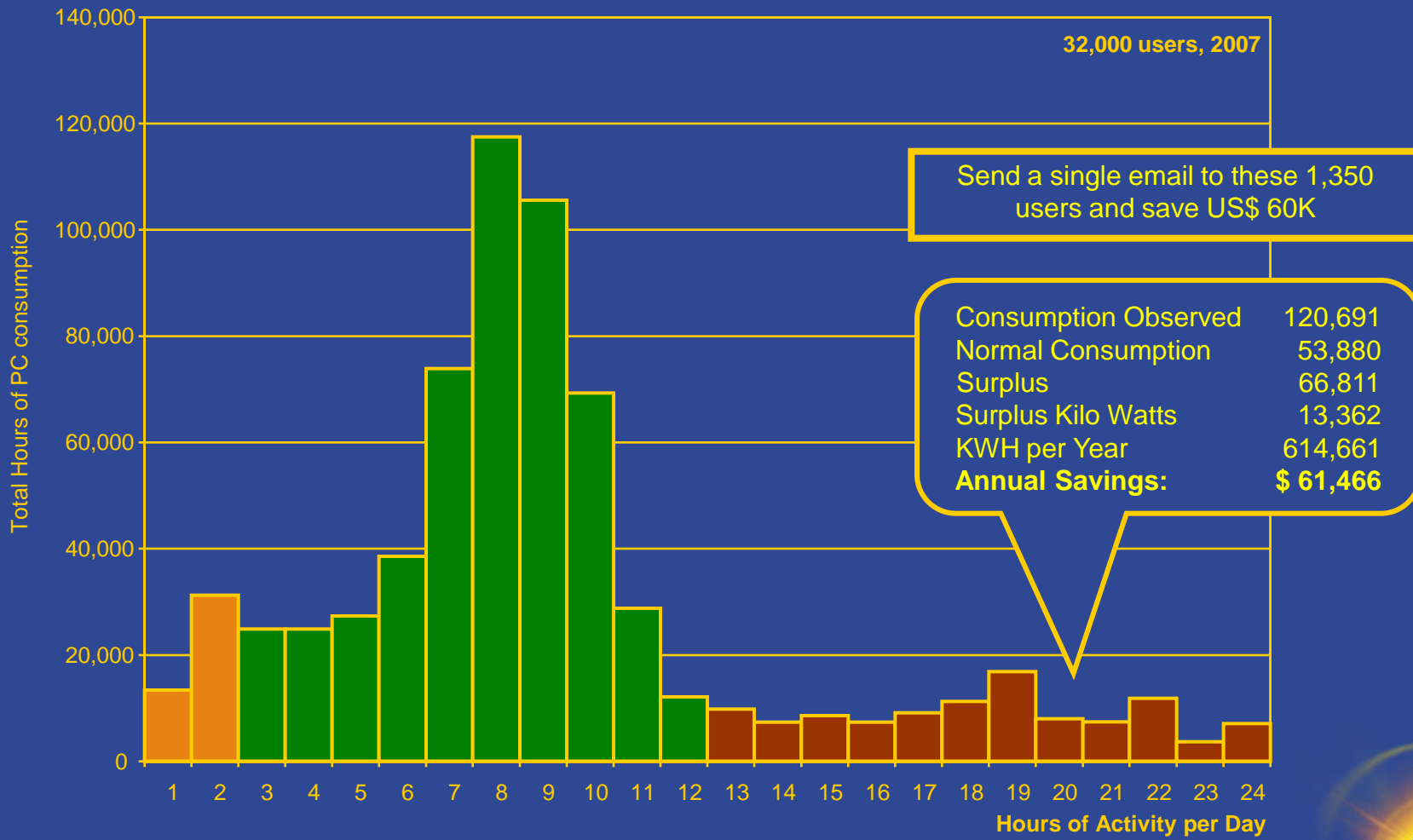


Free Download
(incl. source)

<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

