



Minimizing Downtime: Keeping Your Centricity™ Business System Humming: A System Perspective

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Centricity Healthcare User Group Conference

Keeping it Simple in Complicated Times

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Keeping your System Humming

This is part 2 of 2 sessions to discuss how to reduce unplanned downtime, and minimize headaches with the help of regular system maintenance. Each session will take a close look at Monitoring and Maintaining, Tuning, Purging and Backups. Come share your best practices!

Session One (B02_10 Fri 1:30-2:30) will focus on the Application process including: Proactive monitoring, global maintenance, and optimizing ETM performance.

Session Two (B03_10 Fri 2:45-3:45) will focus on the System process including: System monitoring tools, Cache configuration, and system purging recommendations.

Applications Preview/Review

Monitor and Maintain System

Application License

Monitor Error Trap

Monitor Night Jobs

Monitor Interfaces

Monitoring Tools: Centricity Business

Proactive Monitoring

Purging Your System

Interface Globals

Report Writer Globals

TES Audit Trail Globals

HPA/ADT Audit trail Globals

Error trap Globals

Security Plus Globals

Patient Confidentiality Globals

BAR Statement Run Global

EDI Globals

HMO Globals

ETM Globals

System Tuning

ETM Views

ETM Run Times

Table Tuning

System Backup

Test Namespace/Backup

Test Environments/Web Servers

Monitor and Maintain

Maintain Current Operation System and Cache Versions

Review supported versions, how frequently to upgrade patches, etc.

Plan cache upgrades 18-24 months

Keep current on patches and support contracts

Speak with support rep on supported versions and check knowledge center for updates

Daily

Supported Version Matrix

The Systems Release Management Strategy was established in 2001 to align support of operating system and database products with their respective vendors. This year we will be adding the date support ends for products by vendor. GE will end support of products the same date as the vendor. Staying current allows you to take advantage of new features and enhancements, as well as bug fixes which are only available in new versions of Operating systems as well as Cache. Newer versions also have a direct affect on cost of ownership due to increased vendor support fees for older versions, as well as a possible release management surcharge. Customers should be planning a Cache' upgrade every 18-24 months.

One last, but significant, consideration if you remain on unsupported versions. If you encounter a serious "bug" within Cache, Intersystems will refuse to back port the fix to versions 5.0.20, 5.0.21. This would also apply to 2008.2 after 12/31/2014. The only option you would have would be to do an emergency upgrade to the most current version of Cache'

Below is a list of the versions that fall within the Release Management guidelines and are supported via the Basic OSS contract, as of 12/31/2014

Product	Support Status
OpenVMS 8.3/Alpha	Supported HP Support ends 12/31/2015
OpenVMS 8.3/Alpha clusters	Supported HP Support ends 12/31/2015
OpenVMS 8.3/Integrity	Supported HP support ends 12/31/2015
OpenVMS 8.3/Integrity clusters*	Supported HP Support ends 12/31/2015
OpenVMS 8.4/Alpha	Supported HP Support ends 12/31/2016
OpenVMS 8.4/Alpha clusters*	Supported HP Support ends 12/31/2016
OpenVMS 8.4/Integrity	Supported HP Support ends 12/31/2020
OpenVMS 8.4/Integrity clusters*	Supported HP Support ends 12/31/2020
AIX 6.1	Supported
AIX 7.1	Conditionally Supported. Requires Cache' 2012 adhoc 12956 or a later release
Windows 2003 (32 bit)	Not supported Microsoft support ended 7/13/2010
Windows Server 2008 (64 bit)	Supported Microsoft support ends 1/13/2015
HP-UX 11i v3	Supported HP Support ends 12/31/2020
Cache 2008.2	Supported GE Support ends 12/31/2014
Cache 2012.1	Supported

Maintain Journal File

Separate disk/filesystems

Set purge criteria (3-7 days)

Do not move, delete or zip journal files

Switch primary/secondary

Recommended size is 1 or 2G

Daily

Switch Journal File Example

Cache 2012, will switch between primary and secondary, and secondary to primary when current fills

To manually set it back to primary:

```
home/idxsys # cache
```

```
%SYS>d ^JOURNAL
```

```
Option? 7
```

- 1) Primary Journal Directory: /cachejrn/
- 2) Secondary Journal Directory: /cachealtjrn/
- 3) Journal File Size Limit (MB): 1024
- 4) Journal File Name Prefix:
- 5) Journal Purge Options: 5 days OR 2 backups, whichever comes first

```
Change Property?
```

Change primary to be the same as secondary, save changes, change primary back to old value

Performance

Run autogen , review report, make appropriate changes, and then reboot (VMS)

Run reports on backend for hotspots and/or disk allocation (SAN)

Max user and quotas of the system limits

CIO on filesystems with cache databases and journal files (AIX), XFC off (VMS)

Balance write daemon

Daily

Balanced Write Daemon Example

Write daemon as assigned according to disks(VMS) or filesystems (unix)

```
%SYS>d ^%SS
```

```
Cache System Status: 11:15 am 15 Aug 2014
```

Process User/Location	Device	Namespace	Routine	CPU, Glob	Pr
21A010CB			WRTDMN	195270,2250	14
21A010D5			SWRTDMN	191417,1857571	14
21A010D4			SWRTDMN	191417,10437154	14
21A010D2			SWRTDMN	191413,19080139	14
21A010D0			SWRTDMN	191413,27779907	14
21A010D3			SWRTDMN	191413,43268881	14
21A010D1			SWRTDMN	191413,20535841	14
21A010CF			SWRTDMN	191413,14414399	14

Fragmentation

Cache: Review with Integrity Check output

Operating System: Index File (VMS)

Big block extents or pre-allocate cache.dat

GBLOCKCOPY

Daily

Review Integrity Check (IC) Report

---Total for directory /db/adt/---

9,889 Pointer Level blocks	77MB (73% full)
3,833,161 Data Level blocks	29946MB (71% full)
0 Big String blocks	
3,843,449 Total blocks	30026MB (71% full)
2,970 Free blocks	23MB

Elapsed time = 8645.1 seconds 11:37:39

Global: IAR

Top Pointer Level:	# of blocks=1	8kb (2% full)
Pointer Level:	# of blocks=10	80kb (71% full)
Bottom Pointer Level:	# of blocks=4,150	32MB (68% full)
Data Level:	# of blocks=1,753,664	13,700MB (69% full)
Total:	# of blocks=1,757,825	13,733MB (69% full)

Elapsed Time = 1716.2 seconds 13:21:43

Review Database Allocation

```
1)* Directory: /db5/live/
2)* Block size (bytes): 8192
3)* Mirror DB Name:
4)* Mirror Set Name:
5) Current Size (MB): 87000 <= can be allocated now
6) Max size (MB), 0=Unlimited: 110000 <= allow for growth
7) Expansion size (MB), 0=Default: 1000 <= larger enough?
8) Resource name: %DB_%DEFAULT
9) Preserve global attributes: No
10) Global journal state: Yes <= be sure it is journalled
11) New global collation: Cache standard
12) New global growth block: 50
13) New global pointer block: 16
14) Read Only: No
15)* Encrypted: No
Mount PMC Required At Startup? Yes => <= this should be YES for all
```

Monitor growth by searching cconsole.log for Expansion completed for database
from %FREECNT

Database	Max Size	Size	Available	%Free	Disk Free
/db5/live/	107.42GB	84.96GB	19.00GB	22.36	8.30GB

GBLOCKCOPY example

To run, there should be no activity in source database

```
%SYS>d ^GBLOCKCOPY
```

This routine will do a fast global copy from a database to another database or to a namespace. If a namespace is the destination, the global will follow any mappings set up for the namespace.

1) Interactive copy

2) Batch copy

3) Exit

Option? 2

1) Manage Batches

2) Run a Batch

Option? 1

1) Create a Batch

2) Edit a Batch

3) List Batches

Review Cache Performance

^GLOSTAT - Cache efficiency

^mgstat - Cache performance monitoring routine

CSTAT queue sizes - External review of cache
internal variables

Daily

GLOSTAT example

```
%SYS>d ^GLOSTAT
```

```
Continue (c), zero statistics (z), timed stats (# sec > 0), quit? 30
```

```
Counts per Second for 30 Seconds...
```

Statistics (per second)	Total
-----	-----
Global references (all):	58,111.1
Global update references:	991.4
Routine calls:	3,692.4
Routine buffer loads & saves:	0.4
Routine commands:	1,838,864.9
Routine not cached:	131.9
Logical block requests:	19,511.2
Block reads:	57.9
Block writes:	0
WIJ writes:	0
Cache Efficiency:	1,003.1
Journal Entries:	747.2
Journal Block Writes:	1.4

^mgstat example

```
%SYS>d ^mgstat(3,2)
```

```
Date,          Time    ,  Glorefs, RemGrefs, GRratio,  PhyRds, Rdratio, Gloupds, Rem
Gupds, Rourefs, RemRrefs,  RouLaS, RemRLaS,  PhyWrs,  WDQsz,  WDtmpq, WDphase,
  WIJwri,  RouCMs, Jrnwrts,  ActECP,  Addblk,  PrgBufL, PrgSrvR,  BytSnt,  BytRcd,
  WDpass,  IJUcnt, IJUlock
08/15/2014, 12:14:42,    69769,      0,      0,      75,  416.93,    1520,
      0,    3468,      0,      0,      0,      0,    1572,    3804,      0,
      0,     53,      3,      1,      0,      0,      0,   46504,   28578,
310353,      0,      0
08/15/2014, 12:14:45,    52285,      0,      0,      91,  287.35,    1110,
      0,    3818,      0,      0,      0,      0,    1606,    3804,      0,
      0,     50,      1,      1,      0,      0,      0,  148590,   90524,
310353,      0,      0
```

CSTAT example

```
$ ccontrol stat cache
```

```
SWITCH: 0 (0x0), WDWAKE: 0, NUMCPU: 32
```

```
IJULOCK: 0, IJUCNT: 0, IJPANIC: 0, WDSTOP: 0 WDPASS: 2006
```

```
SHMLBA: 10000000, GCCOUNT_MASTER: 10 GCDISMOUNT_CNT 1 GCCOUNT 2 GCTOPPNT: 7
```

```
WDTHRS: 3, BSLAV: 0, ADJWDMX: 0, ASLAV: 7, MSLAV: 7, NDEV: 8, ADEV: 8, MDEV: 16
```

```
MASync: 0, SASync: 0, # of buffers in wdqinmemoryq: 742
```

```
Buffer Size: 8192 Number Buffers 1920000 BATCHQ: 538195, NOWINTERACTIVE: 1440000
```

```
, MAXINTERACTIVE: 1440000
```

```
GMINREQUEUE: 360000, GMINREQUEUELOW: 120000, GREQUEUECNT: 74036, GREQUEUECNTLOW:
```

```
77665
```

```
GWDQSize: 742, GWDQMax: 537600, GWDCurCycle: 0
```

```
GAvailBuf: 1919258, GMinBuf: 576000, GMinBufBatch: 768000, GCntOffLRU: 0
```

```
$ ccontrol stat cache -a1 > cstat081514_a1.out
```

```
%SYS>d ^Buttons
```

```
$ cachesys/bin/CacheHung.sh
```

Know Your System History

Performance history

Additional license added

Space growth

Baseline of resource utilization

Daily

Monitoring Tools: System Monitor Console (SMC)

Free tool available for clients that pro-actively monitors system level and application level processes

Various methods of alerting

Threshold-driven alerts

Able to monitor Production and Test UCIs

Easy to install, maintain and modify

Enter SR to have SMC installed on your system

Daily

Cache and System License

%SYS.LICENSE tool

Trending (SMC)

Review parameters (when adding licenses)

Daily

%SYS.LICENSE examples

```
%SYS>d CKEY^%SYS.LICENSE
```

```
Cache Key display:
```

```
Based on the file '/cachesys/mgr/cache.key'
```

```
LicenseCapacity = Ensemble 2008.2 C4 for IBM AIX for System Power  
System-
```

```
64:725, Multi-Server
```

```
CustomerName = my system
```

```
OrderNumber = 201408117
```

```
ExpirationDate = 3/27/2044
```

```
AuthorizationKey = 4123700072500072500000000009A1C82xxxxxxxx220
```

```
MachineID =
```

```
currently available = 721
```

```
minimum available = 707
```

```
maximum available = 725
```

%SYS.LICENSE examples

```
%SYS>d counts^%SYS.LICENSE
```

```
Local view of license use.
```

```
725      Total    Authorized LU
721      Current Available  LU
707      Minimum Available  LU
  4      Current Users active
 11      Maximum Users active
  1      Current CSP Users active
  8      Maximum CSP Users active
  0      Current CSP Sessions in grace period
 12      Maximum CSP Sessions in grace period
```

%SYS.LICENSE examples

```
%SYS>d ldumpall^%SYS.LICENSE
```

```
725 entries dumped to /cachesys/mgr/all.dmp
```

```
/cachesys/mgr # more /cachesys/mgr/all.dmp
```

UserId	Type	Connects	MaxCon	CSPCon	LU	Active	Grace
User Startup							
LDABNEY	Mixed	5	5	3	1	643	0
JKIRKLAN	User	28	35	0	28	2361462	0
free		0	0	0	0	0	0
ACASTILLO	Mixed	2	2	1	1	628	0
ESMITH	Mixed	5	5	3	1	263	0

Parameters to review when adding licenses

Server

memory configuration

Cache parameters

gmheap
Global and routine buffers

VMS

interactive logins
MAXPROCESSCNT (run autogen for other potential parameters)

AIX

maxuproc
of pty devices

Purging your System

Purging Data

%ZIDSPUR Spool File

Clean up

Audit trails, UCIs/namespaces, interfaces, security plus logs, logging (web), error trap, 3rd party temp files, MCA fee schedules, temp globals/backup globals, ADM log files and night job table for unused processes, jobs, etc.

As Needed

%ZIDER example

```
LIVE>d ^%ZIDER
```

```
Errors are contained in both error trap formats.
```

```
CHOOSE:    1) Platform independent  
           2) Platform dependent
```

```
Option: 1
```

```
                IDX Standard Error Reporter
```

```
Error date: ?
```

```
11/01/2011    24 errors  
11/02/2011    61 errors  
11/03/2011    33 errors  
11/04/2011    65 errors
```

```
Error date:
```

```
Delete errors more than 30 days old? N => Y
```

```
Global Size Display of _DSA100:[LIVEC]
```

```
ZIDETRAP 104762    <= over 800MB
```

Operating System Purge

VMS:

Accounting records, security audit logs,
operator logs, print spool directory

AIX:

wtmp file, print spool directory, core
dumps

As Needed

Tuning your System

System Reboot

Full system reboots are recommended to ensure memory is contiguous

Restarting Cache without a reboot causes memory to become fragmented over time

As Needed

Mapping

Check mapping of temp globals to cachetemp in LIVE namespace

As Needed

Mapping examples, setting up mapping in MP

Only map temporary globals from LIVE namespace to CACHETEMP

From cache.cpf file

```
[Map.LIVE]
```

```
Global_BSC=CACHETEMP
```

```
Global_BSC1=CACHETEMP
```

```
Global_BSC2=CACHETEMP
```

```
Global_TEMP=CACHETEMP
```

```
Global_TMP=CACHETEMP
```

```
Global_TMP1=CACHETEMP
```

```
Global_ZSC=CACHETEMP
```

```
Global_ZSC1=CACHETEMP
```

```
Global_ZSC2=CACHETEMP
```

Setting up mapping in MP

The screenshot shows a web application interface for configuring global mappings. At the top, there is a navigation menu with links for Home, About, Help, and Logout. The current page is titled "Global Mappings" and is part of a configuration path: System > Configuration > Namespaces > Global Mappings. The server is identified as "btaix" and the namespace is "%SYS".

A modal window titled "Global Mapping" is open, displaying the following fields and options:

- Global database location:** A dropdown menu set to "CACHETEMP".
- Global name:** A text input field containing "BSC".
- Global subscripts to be mapped:** An empty text input field.
- Advanced:** A red text label.
- Instructions:** A red text label stating "Subscrip reference must begin with an open parenthesis. [Click here to see examples.](#)"
- Buttons:** "OK" and "Close" buttons at the bottom right.

The modal window is titled "Global Mapping - Mozilla Firefox" and the address bar shows the URL: 192.168.95.17:57772/csp/sys/mgr/UtilConfigGblMapping.csp?\$ZEN_POPUP=1&\$ID1=PMC&IsNew=0&\$ID2=BSC&zer

Setting up mapping in MP

Global Mapping - Mozilla Firefox

192.168.95.17:57772/csp/sys/mgr/UtilConfigGblMapping.csp?ZEN_POPUP=1&ID1=PMC&IsNew=0&ID2=ETMACTI

Global Mapping

Edit global mapping in namespace PMC:

Global database location: PMCBGM

Global name: ETMACTNX

Global subscripts to be mapped:

Subscript reference must begin with an open parenthesis. [Click here to see examples.](#)

Advanced

OK Close

Max Sizes

Check database/namespaces

Avoid device/disk full at OS level

Max size for Report Writer database

Set mount at start up

As Needed

Cache Parameters

Review global and routine buffer sizes

Locktable size

gmheap

W `##class(%SYSTEM.Config.SharedMemoryHeap).RecommendedSize(p)`

cachetemp size

at least 2G for max size, expand by 250MB

AIX – ensure filesystem is large enough for max size

Monthly or when settings change

Backing Up your System

Back Up Testing and Restores

Review logs daily for errors

Tested through out the year:

New databases are added, verify part of backup

New hardware is added

Backup dependencies have been added or changed

As Needed

Thanks for Attending

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