

IBM Health Checker for z/OS



Redbooks International Technical Support Organization

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eNetwork	DFSMS/MVS	IMS	RACF
geoManager	DFSMSdfp	IMS/ESA	RMF
AD/Cycle	DFSMSdss	IP PrintWay	RS/6000
ADSTAR	DFSMShsm	IPDS	S/390
AFP	DFSMSrmm	Language Environment	S/390 Parallel Enterprise Server
APL2	DFSORT	Multiprise	SecureWay
APPN	Enterprise System 3090	MQSeries	StorWatch
BookManger	Enterprise System 4381	MVS/ESA	Sysplex Timer
BookMaster	Enterprise System 9000	Network Station	System/390
C/370	ES/3090	NetSpool	SystemView
CallPath	ES/4381	OfficeVision/MVS	SOM
CICS	ES/9000	Open Class	SOMobjects
CICS/ESA	ESA/390	OpenEdition	SP
CICS/MVS	ESCON	OS/2	VisualAge
CICSPlex	First Failure Support Technology	OS/390	VisualGen
COBOL/370	FLowMark	Parallel Sysplex	VisualLift
DataPropagator	FFST	Print Services Facility	VTAM
DisplayWrite	GDDM	PrintWay	WebSphere
DB2	ImagePlus	ProductPac	3090
DB2 Universal Database	Intelligent Miner	PR/SM	3890/XP
DFSMS/MVS	IBM	QMFr	z/OS
			z/OS.e

Domino (Lotus Development Corporation)
DFS (Transarc Corporation)
Java (Sun Microsystems, Inc.)
Lotus (Lotus Development Corporation)

Tivoli (Tivoli Systems Inc.)
Tivoli Management Framework
(Tivoli Systems Inc.)
Tivoli Manger (Tivoli Systems Inc.)

UNIX (X/Open Company Limited) Windows (Microsoft Corporation) Windows NT (Microsoft Corporation)



Health Checker History



- Multi-system outage analysis
 - 15-20% system outages attributed to Setup/Configuration
- □ A tool developed by ITSO to address component configuration and setup errors commonly made by installations
- ☐ Unsupported tool available via web download prototype
 - Implemented as Batch job
 - Checks integrated into tool
 - Configuration/customization related component warnings
 - 37 Component checks available Feb-July of 2003
 - 3000+ downloads to date



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Health Checker for z/OS Objectives



- □ Objective of IBM Health Checker for z/OS is to:
 - Identify potential problems before they impact availability or cause outages
 - Checks the current active z/OS and sysplex settings
 - Checks definitions for a system and compares the values to those suggested by IBM or defined by you
- Not a diagnostic or monitoring tool
- ☐ Runs continuously to find deviations from best practices
- Produces output in the form of detailed messages
 - Indicates both potential problems and suggested actions
 - Does not mean that Health Checker has found problems that you need to report to IBM!
 - Messages simply informs you of potential problems so that you can take action on your installation



Changes from the Prototype



- ☐ Health Checker for z/OS has the following changes and enhancements:
 - Is available with its own FMID
 - Current and future checks are shipped with the individual components
 - Additional checks can be added in the service stream
 - Checks may be provided by vendors and 3rd parties
 - > SDSF support



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Products that Produce Checks



- ☐ The following products have checks available:
 - > Consoles
 - > GRS
 - > RACF
 - > RRS
 - > RSM
 - UNIX System Services
 - > VSM
 - Cross system coupling facility (XCF)
 - Others: APF libraries, LINKLST, LINKLIB, APFLIST

Health Checks



- □ A check is actually a program or routine that identifies potential problems before they impact availability
- ☐ Checks are owned, delivered, and supported by:
 - > The component, element, or product that writes it
- ☐ You can override some check values:
 - > Statements in the HZSPRMxx parmlib member
 - The MODIFY command
 - > SDSF interactive command panel
- Output is presented as messages
 - > You can save the check results using System Logger

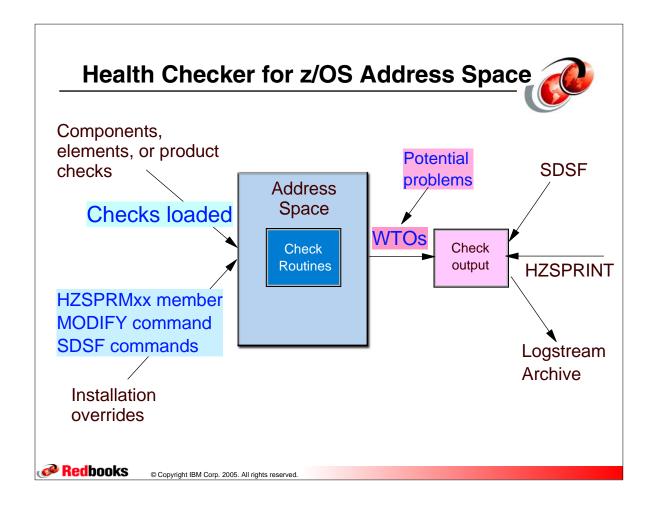


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Overview of Checks



- Each check has 3 parts
 - The dynamic exit routine that identifies the check to the Health checker
 - > The check itself
 - A message table to define messages that are issued by the check



Check Values



- □ Each check includes the following:
 - > A set of pre-defined values, such as:
 - Interval, or how often the check will run
 - Severity of the check, which influences how check output is issued
 - Routing and descriptor codes for the check
- ☐ You can update or override (installation updates) some check values using:
 - > SDSF
 - > Statements in the HZSPRMxx parmlib member
 - MODIFY command

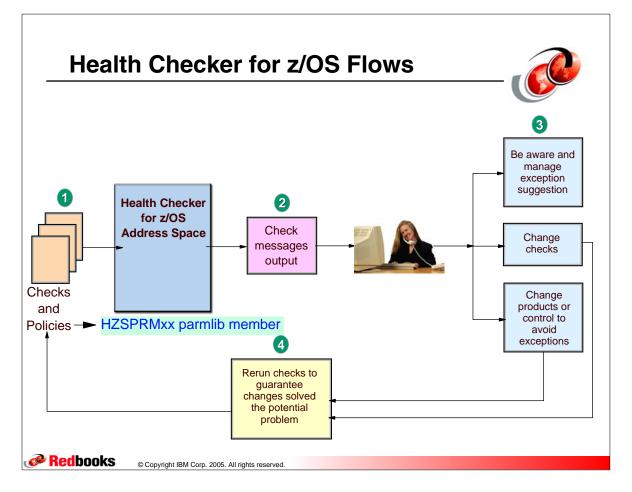
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Viewing Health Check Messages



- ☐ Check output messages WTOs
 - View using SDSF
 - > The HZSPRINT utility
 - Logstream that collects a history of check output
- ☐ If a check finds a deviation from specifications
 - > Issues a WTO message exceptions
- Check exception messages include:
 - Description of the potential problem found
 - Includes the severity
 - Information on what to do to fix the potential problem





Policy Statements



- Use the policy statement in the HZSPRMxx parmlib member to establish permanent overrides to existing checks - Policy statements are as follows:
 - ADD POLICY
 - ADDREPLACE POLICY
 - REMOVE POLICY

```
{ADD | ADDREPLACE}

POLICY STATEMENTNAME(name) UPDATE(filters) [UPDATE options] REASON(reason) DATE(date)

POLICY STMT(name) DELETE(filters) REASON(reason) DATE(date)

REMOVE POLICY STATEMENT(name)

Where filters:
CHECK=(check_owner,check_name)

EXITRTN=exit routine CATEGORY=([{ONLY|ANY|EVERY|EXCEPT},][category1[,...,categoryn]])
```

Commands to Stop and Start

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- s hzsproc
- □ s hzsproc,HZSPRM=xx)
 - > or

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- \square s hzsproc,HZSPRM=(x1,...,xn)
- f hzsproc,stop
- Indicate which parmlib members to use
 - f hzsproc,SET,PARMLIB=(x1,x2,...xn)
 - f hzsproc,ADD,PARMLIB=(x1,x2,...xn)
 - f hzsproc, REPLACE, PARMLIB=(x1, x2,...xn)



User Interface to Manage Checks



- □ There are 3 ways to interact with Health Checker for z/OS to deactivate, add, or temporarily update check values:
- SDSF panels
 - > CK command
- MODIFY command
 - > Temporary check changes
- ☐ HZSPRMxx parmlib member
 - > Permanent check changes



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SDSF and Health Checker



- □ One row per check
- Additional columns include information about scheduling, categories, and counts of exceptions and times the check has run
- Users can rearrange and resize columns (ARRANGE command)
- □ Checks that are running are highlighted

SDSF CK Command



- Parameters on CK command can filter checks shown
- □ CK (category | E | EH | EM | EL | EN | D | ALL)
 - With no parameters displays active checks
 - category is a category namewhich can include pattern-matching characters:
 - * (any string) or % (any single character).
 - E displays all exception checks, with these variations:
 - EH exception-high
 - EM exception-medium
 - EL exception-low
 - EN exception-none
 - D displays deleted checks
 - ALL displays deleted as well as active checks



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SDSF Display



New panels to work and control Health Checker for z/OS

Display Filter View Print Options Help

SDSF HEALTH CHECKER DISPLAY SC70 LINE 10-34 (53) SCROLL ===> CSR COMMAND INPUT ===> CheckOwner Status NAME Severity Result CNZ_SYSCONS_ROUTCODE IBMCNZ SUCCESSFUL LOW SUCCESSFUL IBMCNZ CNZ TASK TABLE LOW IBMGRS EXCEPTION-LOW LOW GRS_CONVERT_RESERVES GRS_EXIT_PERFORMANCE IBMGRS EXCEPTION-LOW LOW IBMGRS SUCCESSFUL LOW
IBMGRS SUCCESSFUL LOW
IBMRACF SUCCESSFUL HIGH GRS_MODE GRS SYNCHRES RACF_GRS_RNL 0 IBMRACF EXCEPTION-HIGH HIGH RACF_SENSITIVE_RESOURCES 12 IBMRRS SUCCESSFUL LOW RRS_DUROFFLOADSIZE RRS MUROFFLOADSIZE IBMRRS SUCCESSFUL 0 LOW RRS_RMDATALOGDUPLEXMODE IBMRRS EXCEPTION-MEDI MEDIUM

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Default Display Using CK Command



Display Filter View Print Options Help SDSF HEALTH CHECKER DISPLAY SC70 LINE 1-23 (54) COMMAND INPUT ===> SCROLL ===> PAGE ACTION=//-Block,=-Repeat,+-Extend,A-Activate,D-Display,E-Refresh,H-Deactivate, ACTION=P-Delete,R-Run,S-Browse,U-RemoveCat,X-Print CheckOwner State Checkowner State Status

CNZ_AMRF_EVENTUAL_ACTION_MSGS IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_CONSOLE_MASTERAUTH_CMDSYS IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_CONSOLE_MSCOPE_AND_ROUTCODE IBMCNZ ACTIVE(ENABLED) EXCEPTION-LOW

CNZ_CONSOLE_ROUTCODE_11 IBMCNZ ACTIVE(ENABLED) EXCEPTION-LOW

CNZ_EMCS_HARDCOPY_MSCOPE IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_EMCS_INACTIVE_CONSOLES IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_SYSCONS_MASTER IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_SYSCONS_MSCOPE IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_SYSCONS_PD_MODE IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_SYSCONS_PD_MODE IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_SYSCONS_ROUTCODE IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_SYSCONS_ROUTCODE IBMCNZ ACTIVE(ENABLED) SUCCESSFUL

CNZ_SYSCONS_ROUTCODE IBMCNZ ACTIVE(ENABLED) SUCCESSFUL IBMCNZ
IBMCNZ
IBMCNZ
IBMCNZ CNZ_SYSCONS_ROUTCODE ACTIVE (ENABLED) SUCCESSFUL CNZ_TASK_TABLE ACTIVE (ENABLED) IBMCNZ SUCCESSFUL ACTIVE(ENABLED) EXCEPTION-LOW IBMGRS GRS_CONVERT_RESERVES IBMGRS IBMGRS GRS_EXIT_PERFORMANCE ACTIVE(ENABLED) EXCEPTION-LOW

IBMGRS

IBMRACF IBMRACF REDBOOK

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GRS_MODE GRS SYNCHRES

RACF_GRS_RNL

RED CHECK LOGON

RACF_SENSITIVE_RESOURCES

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SDSF Action Characters



ACTIVE(ENABLED) SUCCESSFUL

ACTIVE(ENABLED) SUCCESSFUL

ACTIVE(ENABLED) SUCCESSFUL

ACTIVE(ENABLED) SUCCESSFUL

ACTIVE(ENABLED) EXCEPTION-HIGH

- Action characters let you work with checks and SDSF issues MODIFY commands
- Action characters and description
 - **Activate** > A
 - Display > D
 - Display long > DL
 - Display policies > DP
 - > DPO Display policies that are outdated - not applied
 - Display status > DS
 - > E Refresh
 - > H Deactivate



Action Characters



- > P Delete
- > PF Delete force
- > R Run
- S Browse (access SDSF's Output Dataset Panel)
- SB Browse using ISPF Browse
- > SE Browse using ISPF Edit
- U Remove all categories for the check
- > X Print the check output You can add the following:
 - C Close the print file after printing (XC)
 - D Display the Open Print Data Set panel (XD or XDC)
 - F Display the Open Print File panel (XF or XFC)
 - S Display the Open Print panel (XS or XSC)

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Overtypeable Columns



- ☐ You can modify check attributes by typing over the values in these columns and SDSF generates MODIFY commands
 - Category Category of the check (up to 16)
 - Debug Debug mode indicator (OFF, ON, HC)
 - Interval How often the check runs (hhh:mm)
 - Severity Severity level of the check (HIGH, MEDIUM, LOW)
 - UserDate Date of the check
 - > WTOType WTO type or descriptor code, in decimal

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Protect Action Characters - CK Display



- ☐ Each ACTION character can be protected by a profile
 - > XFACILIT class with proper access
- Give users access to all characters

RDEFINE XFACILIT HZS.** UACC(NONE) PERMIT HZS.** CLASS(XFACILIT) ID(userid or groupid) ACCESS(CONTROL) SETROPTS RACLIST(XFACILIT) REFRESH

```
A HZS.sysname.checkowner.checkname.ACTIVATE
                                            XFACILIT UPDATE
D HZS.sysname.checkowner.checkname.QUERY
                                            XFACILIT READ
E HZS.sysname.checkowner.checkname.REFRESH XFACILIT CONTROL
H HZS.sysname.checkowner.checkname.DEACTIVATE XFACILIT UPDATE
P HZS.sysname.checkowner.checkname.DELETE XFACILIT CONTROL
R HZS.sysname.checkowner.checkname.RUN
                                            XFACILIT UPDATE
S,X HZS.sysname.checkowner.checkname.MESSAGES XFACILIT READ
```

U action character - all overtypeable fields HZS.sysname.checkowner.checkname.UPDATE

XFACILIT UPDATE

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Select (s) a Check

LINE 0 COLUMNS 0 SDSF OUTPUT DISPLAY XCF_CF_CONNECTIVITY SCROLL ===> CSR

COMMAND INPUT ===> ****** TOP OF DATA **********

CHECK(IBMXCF,XCF_CF_CONNECTIVITY) START TIME: 09/23/2005 14:23:43.072479

CHECK DATE: 20050130 CHECK SEVERITY: MEDIUM

IXCH0449I System SC65 has all installed channel paths connected to coupling facility CF1 online and operational.

IXCH0454I Not all installed channel paths are online from system SC65 to coupling facility CF2.

* Medium Severity Exception *

IXCH0446E System SC65 has only one online operational channel path to coupling facility CF2.

Explanation: The specified system has only one channel path that can be used to communicate to the indicated coupling facility. This represents a single point of failure regarding communication to the coupling facility.

System Action: The system continues processing normally.

Operator Response: Report the problem to the system programmer.

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MODIFY Command (F hzsproc,...)



☐ Use MODIFY command to control checks

- Start and stop Health Checker address space
- Update or override some check values
- Connect to a z/OS log stream
- Can change policy statements but
 - Only use during testing

F hzsproc, DISPLAY, CHECKS (check_owner, check_name), [SUMMARY | DETAIL] [,ANY |, NOTDELETED |, DELETED] [,POLICYEXCEPTIONS] [,EXCEPTIONS]



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MODIFY Command Parameters



f hzsproc,parameters

ACTIVATE Sets the check state to active.

ADD/ADDREPLACE/REMOVE POLICY Adds, replaces or removes a policy statement.

ADDNEW Adds new checks to Health Check

ADD/REPLACE/SET Uses it to indicate which parmlib members

suffixes is going to be in use with Health Checker

DEACTIVATE Disables running of specified check

DELETE Deletes the specified check from Health Check. Once deleted you can bring it back only by refresh

processing

DELETE, FORCE In the case you need to delete a check that

is running, you need to use DELETE, FORCE

DISPLAY Shows information about the check

DISPLAY, CHECKS To find the check_owner and check_name

LOGGER Used to connect to a pre-defined logstream



MODIFY Command (Con't)



f hzsproc,parameters

REFRESH Refresh process first deletes the check, than it does the ADDNEW function, adding the check to Health Checker again.

RUN Run a check immediately
STOP Stops the Health Checker

UPDATE Allows a temporarily update to the current default or override values for a specific check. The new value is in effect until the next refresh for the specified check.

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Modify Command Example



F HZSPRJV, DISPLAY

OUTSTANDING EXCEPTIONS: 15

(SEVERITY NONE: 0 LOW: 6 MEDIUM: 8 HIGH: 1)

ELIGIBLE CHECKS: 55 (CURRENTLY RUNNING: 0)

INELIGIBLE CHECKS: 0 DELETED CHECKS: 0

ASID: 0036 LOG STREAM: NOT DEFINED HZSPDATA DSN: SYS1.SC65.HZSPDATA

Enable Log Streams



- ☐ Use the MODIFY command:
 - > f hzsproc,logger=on,logstreamname=logstreamname
- Or Use the LOGGER parameter in the HZSPRMxx parmlib member:
 - LOGGER(ON) LOGSTREAMNAME(logstreamname)
- □ To disable a log stream, issue the following MODIFY command:
 - f hzsproc,logger=off



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MODIFY Command Example



F hzsproc,DISPLAY,CHECK(check_owner,check_name),
[SUMMARY|DETAIL]
[,ANY|,NOTDELETED|,DELETED]
[,POLICYEXCEPTIONS][,EXCEPTIONS]

F HZSPROC, DISPLAY, CHECKS, CHECK=(IBMGRS, GRS_MODE), DETAIL

HZS0201I 10.15.56 CHECK DETAIL 670

CHECK(IBMGRS,GRS_MODE)

STATE: ACTIVE(ENABLED) GLOBAL STATUS: SUCCESSFUL

EXITRIN: ISGHCADC

LAST RAN: 05/06/2005 09:54 NEXT SCHEDULED: (NOT SCHEDULED)
INTERVAL: ONETIME SEVERITY: LOW WTOTYPE: INFORMATIONAL

SYSTEM DESCCODE: 12

DEFAULT PARAMETERS: STAR

REASON FOR CHECK: GRS should run in STAR mode to improve

performance.

MODIFIED BY: MODIFY COMMAND

CATEGORIES: GRS

DEFAULT DATE: 20050105 DEBUG MODE: OFF



Categories to Manage and Display Info



- ☐ Resource to control checks
 - When you have many checks, you can use categories to make it easier to manage or display information
- Use with the following parameters
 - ADDCAT Add a specified check to a category
 - > REPCAT Replace a category for a check
 - > REMCAT Remove a check from a category
- ☐ Filters specify which check or checks you wish to take an action against
 - You can specify wildcard characters * and ? for filters



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Adding Categories and Filters



```
{ADD | ADDREPLACE}
POLICY STATEMENTNAME(name) UPDATE(filters)
[UPDATE options] REASON(reason) DATE(date)
POLICY STMT(name) DELETE(filters) REASON(reason)
DATE(date)

REMOVE POLICY STATEMENT(name)

Where filters:
CHECK=(check_owner,check_name)EXITRTN=exit routine
CATEGORY=([{ONLY|ANY|EVERY|EXCEPT},]
```

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[category1[,...,categoryn]])

MODIFY Command Using Categories



```
F HZSPROC, DISPLAY, CHECKS, CATEGORY=(GRS), DETAIL
HZS0201I 10.45.01 CHECK DETAIL 725
CHECK(IBMGRS,GRS_SYNCHRES)
STATE: ACTIVE(ENABLED)
                                 STATUS: SUCCESSFUL
 EXITRTN: ISGHCADC
 LAST RAN: 05/09/2005 09:54 NEXT SCHEDULED: 05/09/2005 10:54
 INTERVAL: 1:00 SEVERITY: LOW WTOTYPE: INFORMATIONAL
 SYSTEM DESCCODE: 12
THERE ARE NO PARAMETERS FOR THIS CHECK
 REASON FOR CHECK: GRS synchronous RESERVE processing should be
                  enabled to avoid deadlock conditions.
MODIFIED BY: MODIFY COMMAND
CATEGORIES: GRS
 DEFAULT DATE: 20050105
                                           DEBUG MODE: OFF
 CHECK (IBMGRS, GRS_MODE)
 STATE: ACTIVE(ENABLED) GLOBAL STATUS: SUCCESSFUL
 EXITRTN: ISGHCADC
LAST RAN: 05/06/2005 09:54 NEXT SCHEDULED: (NOT SCHEDULED)
INTERVAL: ONETIME SEVERITY: LOW WTOTYPE: INFORMATIONAL
 SYSTEM DESCCODE: 12
DEFAULT PARAMETERS:
                        STAR
REASON FOR CHECK: GRS should run in STAR mode to improve
                 performance.
MODIFIED BY: MODIFY COMMAND
 CATEGORIES: GRS
DEFAULT DATE: 20050105
                                          DEBUG MODE: OFF
```

HZSPRMxx Parmlib Member



- A member to define and modify policies
 - Make permanent overrides

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- □ For example: making all GRS checks high severity
 - Add statements to HZSPRM06

ADD POLICY STMT(GRSPOL) UPDATE CHECK(IBMGRS,*),
SEVERITY(HIGH) REASON('flag GRS check
exceptions') DATE(20050901)
Adding consoles check messages to hardcopy log
make exception msgs go to HC log
ADDREPLACE POLICY STMT(CONSPOL) UPDATE
CHECK(IBMCNZ,*) ADDCAT(CNZ) WTOTYPE(HARDCOPY)
REASON('add category, exceptions to HC log')
DATE(20050901)

s hzsproc,HZSPRM=(01,06)



Check Name Changes in z/OS V1R7



 Several check names have changed since they were released in the prototype and listed here is the old and new check names

Prototype check name IBM Health Checker for z/OS check name

EMCS_hardcopy	CNZ_EMCS_Hardcopy_Mscope	
GRS_SyncRsv	GRS_SYNCHRES	
SYSCONS_MSCOPE	CNZ_Syscons_Mscope	
SYSCONS_ROUTCODES	CNZ_Syscons_Routcode	
SYSCONS_PDMODE	CNZ_Syscons_PD_Mode	
SYSCONS_MASTER	CNZ_Syscons_Master	
Console_Master	CNZ_Console_MasterAuth_Cmdsys	
Console_MSCOPE_and_Routcodes	CNZ_Console_Mscope_and_Routcode	
AMRF_And_MPF_Consistent	CNZ_AMRF_Eventual_Action_Msgs	
Console_routcode_11	CNZ_Console_Routcode_11	

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Sample Jobs for Installation



- ☐ SYS1.SAMPLIB(HZSALLCP) Format a data set to track persistent data (One for every system)
- □ SYS1.SAMPLIB(HZSPROC) Procedure to start IBM Health Checker for z/OS Must be a USS superuser
- SYS1.SAMPLIB(HZSPRINT) Copy message buffers for one or more checks
- SYS1.SAMPLIB(HZSMSGNJ) Format a message table for a new check - If logger support is desired, the logstream must be defined
- SYS1.PARMLIB(HZSPRMxx) Define the Health Checker for z/OS policy statement overrides and the System Logger command



Health Check for z/OS Procedure



Define a user ID

```
AU HZSUSER OMVS(UID(0)HOME('/')PROGRAM('/bin/sh')) NOPASSWORD
ADDGROUP OMVSGRP OMVS(GID(4600))
CONNECT HZSUSER GROUP(OMVSGRP)

RDEFINE STARTED HZSPROC.* STDATA(USER(HZSUSER) GROUP(OMVSGRP))

//HZSPROC JOB JESLOG=SUPPRESS

//HZSPROC PROC HZSPRM='00'

//HZSSTEP EXEC PGM=HZSINIT,REGION=0K,TIME=NOLIMIT,

// PARM='SET PARMLIB=&HZSPRM'

//HZSPDATA DD DSN=SYS1.&SYSNAME..HZSPDATA,DISP=OLD

// PEND

// EXEC HZSPROC
```

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Enhanced Preventive Service Planning Tool



- □ IBM is adding more checks to IBM Health Checker for z/OS periodically
 - Both integrated into z/OS and as APARs
- □ To identify checks that have been provided in PTFs
 - Use the Enhanced Preventive Service Planning tool, available at the following Web site:
 - http://techsupport.services.ibm.com/390/psp_main.html
- ☐ You can identify checks by specifying the keyword:
 - HCHECKER/K



Web Sites Available Information



- □ Parallel Sysplex availability checklist at:
 - http://www.ibm.com/servers/eserver/zseries/pso/
- ☐ ITSO Redbooks at:
 - http://www.redbooks.ibm.com/
- zSeries Platform Test Report at:
 - > http://www.ibm.com/servers/eserver/zseries/zos/integtst/
- Washington System Center Flashes at:
 - http://www.ibm.com/support/techdocs/

