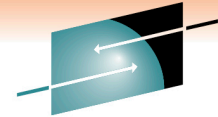


z/OS Audit Essentials



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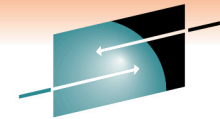
Technology • Connections • Results

Using the IBM Health Checker for z/OS to improve Compliance and Security Integrity

Paul R. Robichaux
NewEra Software, Inc.
pr@newera.com

3:00– 4:00 pm, Monday, February 28, 2011
Anaheim Convention Center – Room 207-B
Session Number - 8405





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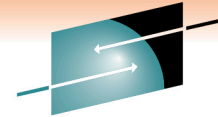
Abstract and Speaker

- To verify actual integrity levels, all information systems, including those based on the z/OS operating system should be continuously monitored in an effort to validate their conformity with established standards. Such standards are often times derived from the following: Common Sense, Best Practices, Operational Policy, Industry and/or Governmental Regulation.
- The IBM Health Checker for z/OS offers a substantial number of z/OS System and Security “Checks” that can be used within its Framework to continuously monitor for and report conditions that would result in a deviation from standards and diminished system integrity at the LPAR level.
- This session will provide an operational overview of the IBM Health Checker for z/OS and call out processes from currently available “Checks” that can be used to develop feedback systems that will assure high levels of automated vigilance over established system and integrity standards.
- Paul R. Robichaux, CEO, co-founder of NewEra Software, Inc. began his career in large systems computing as an operator and programmer of IBM 407s and 402s. He served as the Chief Financial Officer of Boole and Babbage for the ten years immediately preceding his founding of NewEra in 1990. He holds a BS in Accounting and a Masters in Business Administration from a Louisiana State University and is a Certified Public Accountant.
- The corporate mission of NewEra Software is to provide software solutions that help users avoid non-compliance, make corrections when needed and in doing so, continuously improve z/OS integrity.

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Presentation Outline



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1. Our Mission - (1/4)

- ✓ What is Compliance?
- ✓ The Need for Shared Values
- ✓ Critical Success Factors
- ✓ System Control Points
- ✓ Organizational Acceptance
- ✓ Cost of Implementation

2. The IBM Health Checker for z/OS - (3/4)

- ✓ Evaluation Criteria
- ✓ Operational Overview
- ✓ Notification and Reports
- ✓ Example – *RACF_Sensitive_Resources*
- ✓ System Customization
- ✓ Getting Started – “*Low Hanging Fruit*”

3. Hands-on Lab - *Recommended*

Wednesday, March 2, 2011

9:30AM – 10:30AM

Anaheim Convention Center – Room 208-B

4. Resources, References and Sessions

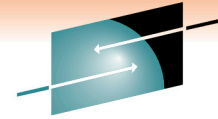
z/Auditing Essentials - Volume 1

zEnterprise Hardware - An Introduction for Auditors

Edited By Julie-Ann Williams - julie@sysprog.co.uk



Our Mission



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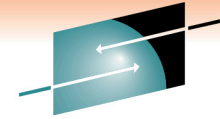
Why is this important?

- ❑ “The road to complete and sustained z/OS compliance runs through verifiable system integrity.”
- ❑ “System integrity failures can undermine all business and application controls, rendering them worthless.”

Brian Cummings, TATA Consulting

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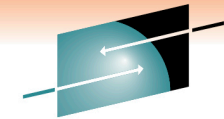
Our Mission

System Compliance Model – What is Compliance?

- ✓ Compliance - the act of adhering to, and demonstrating adherence to, a standard or regulation.
- ✓ Compliance - describes the goal that corporations or public agencies aspire to in their efforts to ensure that personnel are aware of and take steps to comply with relevant laws and regulations.
- ✓ Compliance - operational transparency that results in organizations adopting the use of consolidated and harmonized sets of compliance controls in order to ensure that all necessary governance requirements can be met without the unnecessary duplication of effort and activity.
 - Common Sense
 - Best Practice
 - Personal Preference
 - Internal Policy
 - Industrial
 - Governmental

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Our Mission

System Compliance Model – Critical Success Factors:

Operational

- ✓ People and Training
- ✓ Separation of Duties
- ✓ Control Over the System
- ✓ Process Documentation

Environmental

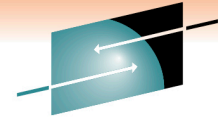
- ✓ Care
- ✓ Concern
- ✓ Conscience
- ✓ Commitment

The adoption of a *System Compliance Model* is *The* critical success factor in understanding and improving the effectiveness of the system review process.

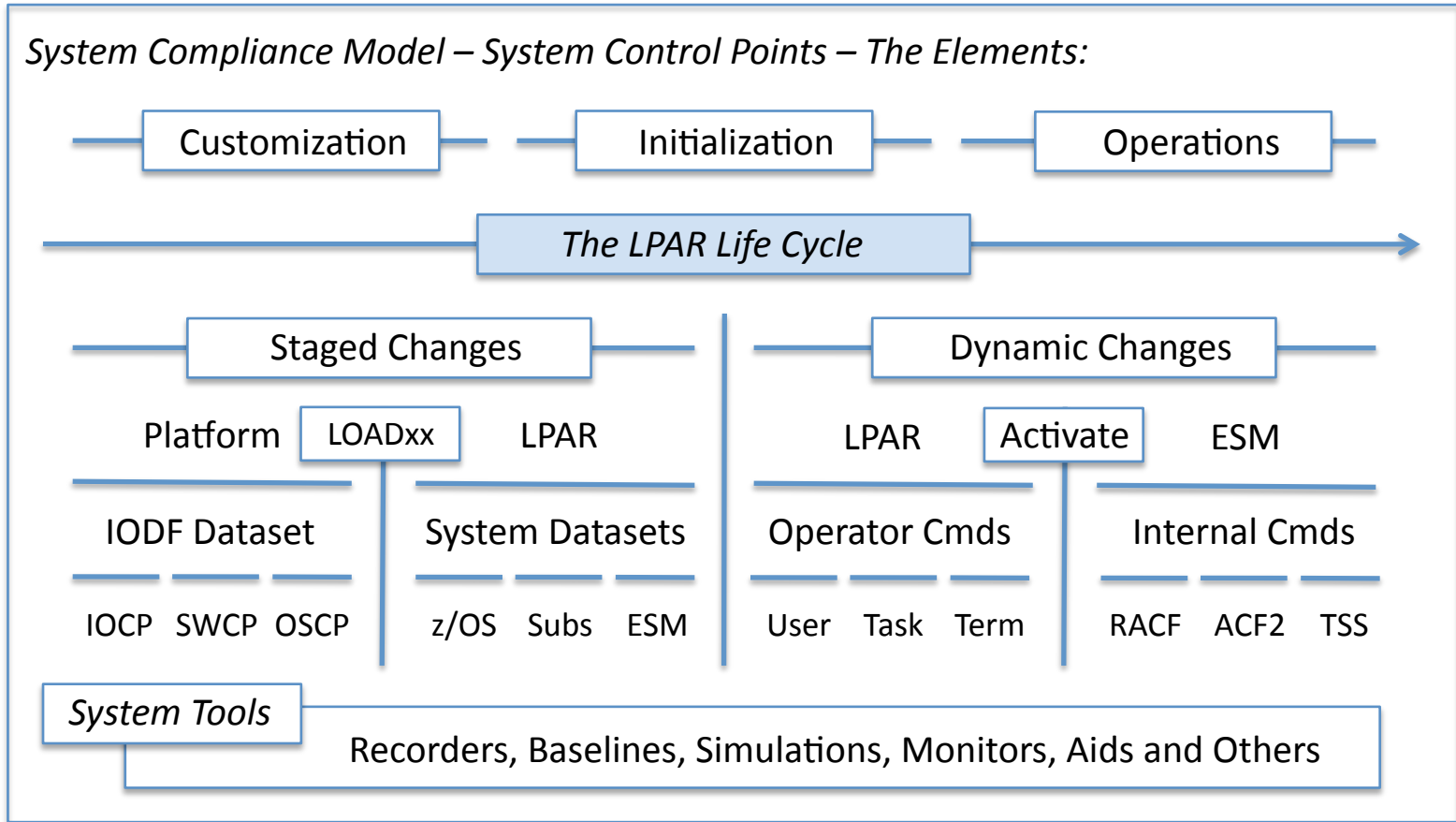
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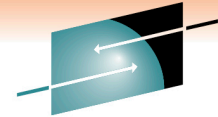
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System Compliance Model – Cost of Implementation:

----- SYS2.IODF4C - 2011-01-31 16:16:27 - LPARS:115 -----

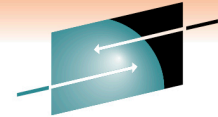
-----Processors-----				-----Logical Partitions-----				
-Unit-	-Modl-	--Serial--	cm -ProcId-	-Total-	-LCSS0-	-LCSS1-	-LCSS2-	-LCSS3-
		--Number--	--	cm Numb	cm Numb	cm Numb	cm Numb	cm Numb
2097	E26	02DBE22097	.. CDC1CFX	.. 7	.. 4	.. 0	.. 3	.. 0
2097	E26	02DBD22097	.. CDC1CF2	.. 6	.. 3	.. 0	.. 3	.. 0
2097	E56	015BD42097	.. CDC1CPL1	.. 16	.. 3	.. 0	.. 0	.. 13
2097	E56	0CDA512097	.. CDC1CPUA	.. 18	.. 2	.. 0	.. 6	.. 10
2097	E56	0CDA412097	.. CDC1CPUX	.. 13	.. 1	.. 0	.. 0	.. 12
2097	E26	0000002097	.. CF2A	.. 4	.. 2	.. 0	.. 2	.. 0
2097	E56	015BE42097	.. CPUDA	.. 8	.. 7	.. 0	.. 1	.. 0
2097	E56	03D4222097	.. CPUE	.. 14	.. 11	.. 0	.. 3	.. 0
2097	E56	03D4022097	.. CPUI	.. 22	.. 14	.. 8	.. 0	.. 0
2097	E56	03D3E22097	.. CPUW	.. 7	.. 2	.. 5	.. 0	.. 0
		
		



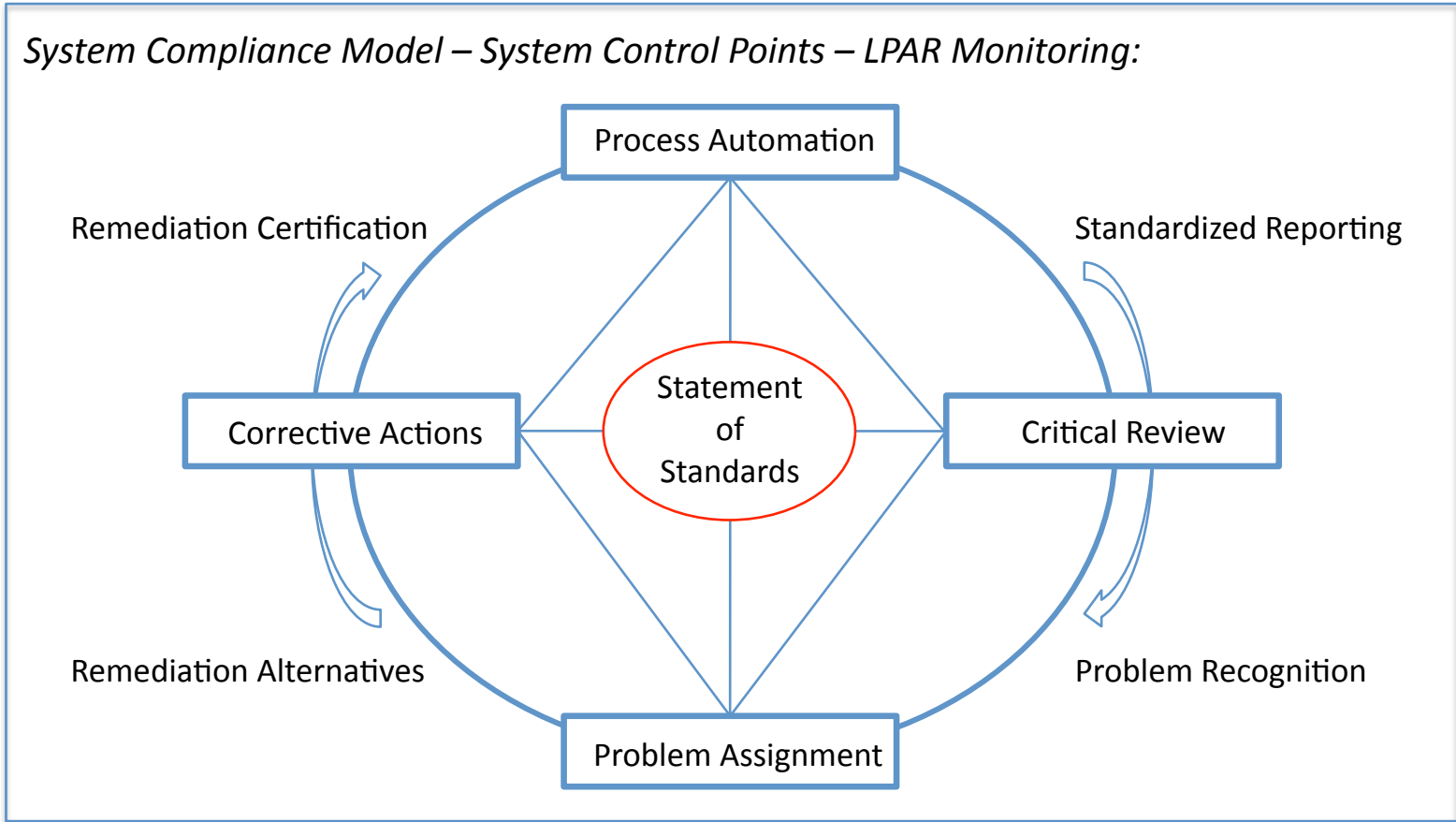
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Our Mission

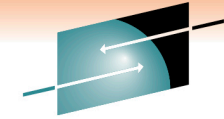


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Our Mission

System Compliance Model – Acceptance:

Administration

- Cost Effective
- Always-On
- Repeatable
- Consistent
- Understandable

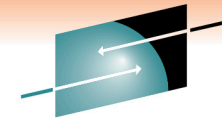


Technical

- Simple Set-up
- Highly Organized
- Adaptable Structure
- Enforces Standards
- Assures Compliance

Evangelize the *System Compliance Model* to all *System Stakeholders*: System Users, Management and Compliance Officers as a framework that can efficiently improve, document and demonstrate system compliance.

The IBM Health Checker for z/OS



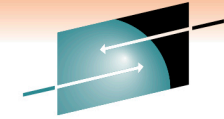
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What's Next?

*Considering The IBM Health Checker for z/OS
as a viable component of Compliance
Monitoring and a Focal Point for improving
overall z/OS Integrity.*

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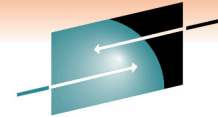
The IBM Health Checker for z/OS

LPAR Compliance Monitor - Evaluation Criteria

Attribute	Characteristics
✓ Automatic	System Controlled Automated Process
✓ Standards	Site, Industry and Regulatory
✓ Actionable	Findings Lead to Actions
✓ Flexible	Site Customization
✓ Extensible	Local and 3 rd Party Support
✓ Transparent	Multiple Methods for Sharing Findings
✓ Robust	Multi-System, Multi-LPAR Support
✓ Efficient	Demonstrable ROI

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The IBM Health Checker for z/OS

What is the IBM Health Checker for z/OS?

IBM Health Checker for z/OS provides a foundation that helps simplify and automate the identification of potential configuration problems before they impact system availability *and integrity*. It consists of:

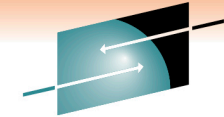
- A framework to manage functions such as check registration, messaging, scheduling, command processing, logging, and reporting.
- An Inventory of Checks, which evaluate settings and definitions specific to products, elements, or components. Checks are provided separately and are independent of the framework. The framework supports checks written by IBM, independent software vendors, and users.

The IBM Health Checker for z/OS is a sub-system of the Operating System.

<http://publibz.boulder.ibm.com/epubs/pdf/e0z2l150.pdf>

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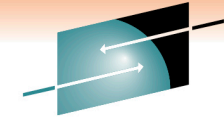


The IBM Health Checker for z/OS

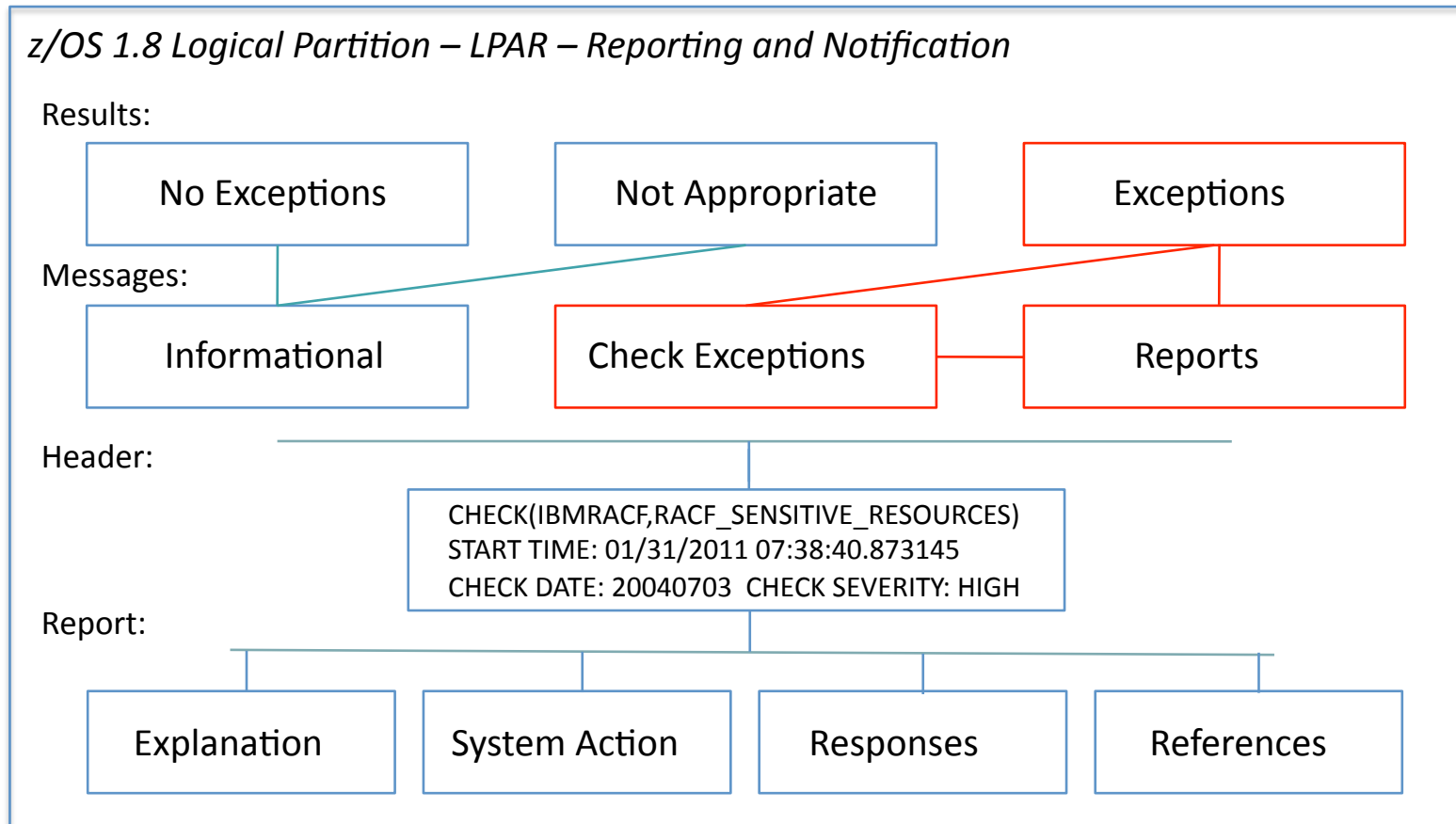
Real-Time Check Status – CA SYSVIEW Display

```
SYSVIEW ISPF1 XE57 ----- HCHECKER, Health Checker ----- 07/06/10
Command =====>                                         Scroll *==
----- Lvl 4 Row 1-32/110 Col
Formats DEFAULT NEXT2RUN OWNER STATUS
Options CNFM XSYS ACT INACT DEL ENAB DISAB BYNAME
Policy *NONE*          LogStr *NONE*          TaskId
Owner *                Check *

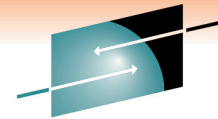
-----
Cmd Name                UState    SState    Status
ACF2_AUTO_START_CHECK   ACTIVE    ENABLED    SUCCESSFUL
ACF2_CHECK_DATABASES    ACTIVE    ENABLED    SUCCESSFUL
ACF2_CHECK_EXITS        INACTIVE  ENABLED    INACTIVE
ACF2_CHECK_JES2_EXITS   ACTIVE    ENABLED    SUCCESSFUL
ACF2_SAFDEF_NOAPF_CHECK INACTIVE  ENABLED    INACTIVE
TOP_SECRET_CACHE_STATUS ACTIVE    ENABLED    EXCEPTION-MEDIUM
TOP_SECRET_CHK_ATF_SECFILE ACTIVE    ENABLED    SUCCESSFUL
```



The IBM Health Checker for z/OS



The IBM Health Checker for z/OS



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Check Status - RACF_SENSITIVE_RESOURCE

Explanation: The RACF security configuration check has found one or more potential errors with the system protection mechanisms.

System Action: The check continues processing. There is no effect on the system.

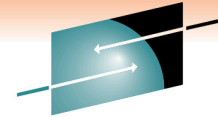
Operator Response: Report this problem to the system security administrator and the system auditor.

System Programmer Response: Examine the report that was produced by the RACF check. Any data set which has an "E" in the "S" (Status) column has excessive authority allowed to the data set. That authority may come from a universal access (UACC) or ID(*) access list entry which is too permissive, or if the profile is in WARNING mode. If there is no profile, then PROTECTALL (FAIL) is not in effect. Any data set which has a "V" in the "S" (Status) field is not on the indicated volume. Remove these data sets from the list or allocate the data sets on the volume.

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The IBM Health Checker for z/OS



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Check Status - RACF_SENSITIVE_RESOURCE

Problem Determination: See the RACF System Programmer's Guide and the RACF Auditor's Guide for information on the proper controls that should be used for your system.

Source:

RACF System Programmer's Guide
RACF Auditor's Guide

Reference Documentation:

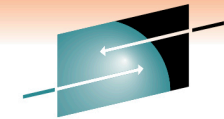
RACF System Programmer's Guide
RACF Auditor's Guide

Automation: None.

Check Reason: Sensitive resources should be protected.

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The IBM Health Checker for z/OS

Check Status - RACF_SENSITIVE_RESOURCE

Verifies the protection of each resource by examining the UACC, WARNING status, and the ID (*). If there is no profile protecting a data set, then if NOPROTECTALL or PROTECTALL(WARN) is in effect, the check flags the data set as an exception.

Optionally, specify a user ID to the check which, if specified, is used to perform a RACF authorization check for the next higher access authority after the highest expected general access authority.

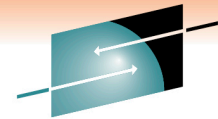
- APF Dataset Report
- RACF Dataset Report
- PARMLIB Dataset Report
- Current Link List Dataset Report
- System Rexx Dataset Report
- Sensitive General Resources Report

```
S Resource Name                Class      UACC Warn ID*  User
- - - - -
```

- ICHAUTAB Report

```
S Module    REQUEST=VERIFY REQUEST=LIST Location
- - - - -
```

The IBM Health Checker for z/OS



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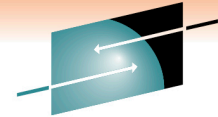
Real-Time Check Status – Getting Operations Staff in the Game

```
13.11.45 STC01629  IF00375I IPLCHECK INITIALIZATION COMPLETE FOR
STC=IPLCHECK.
*13.12.27 STC01533 *HZS0003E CHECK(NEWERA,NEZ_JES2_INSPECTION):
*NEZH051E The NEZ_JES2_INSPECTION check has found one or
*more potential errors in IPL integrity on this system.
*13.12.27 STC01533 *HZS0003E CHECK(NEWERA,NEZ_OPSYS_INSPECTION):
*NEZH051E The NEZ_OPSYS_INSPECTION check has found one or
*more potential errors in IPL integrity on this system.
- 13.13.21 TSU01619  IEF450I CCHIN1 SPFPROCE SPFPROCE - ABEND=S622 U0000
- REASON=00000000
- 13.13.21 TSU01619  IEF377I CCHIN1 SPFPROCE SPFPROCE
- CCHIN1.SPFLOG2.LIST NOT CATLGD 2
- 13.13.21 TSU01619  $HASP395 CCHIN1  ENDED
```

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Customization – Turning Checks ON/OFF

✓ Inactive

```
ADDREPLACE POLICY STMT(INACT1) UPDATE  
CHECK (IBMASM,ASM_LOCAL_SLOT_USAGE)  
DATE (20100628) INACTIVE  
REASON ('INACTIVATE ASM LOCAL SLOT CHECK')
```

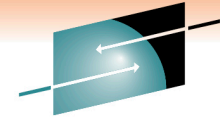
✓ Delete

System Programmer Response: If it is intended that the system broadcast data set be used for user mail then no action is required. Consider using a check policy in HZSPRMxx to DELETE this check:

```
ADDREP POLICY STMT (DEL1) DELETE CHECK (IBMTSOE, TSOE_USERLOGS)
```

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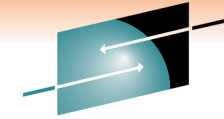
The IBM Health Checker for z/OS

Customization – Controlling Check Features

```
[, ACTIVE | INACTIVE ]
[, ADDCAT=(cat1, ..., cat16) ]
[, DATE={date | (date, NOCHECK) } ]
[, DEBUG={OFF | ON} ]
[, VERBOSE={NO | YES} ]
[, DESC CODE=(desc code1, ..., desc code n) ]
[, INTERVAL={ONETIME | hhh:mm} ]
[, EXCEPT INTERVAL={SYSTEM | HALF | hhh:mm} ]
[, PARM=parameter, REASON=reason, DATE={date | (date, NOCHECK) } ]
[, REASON=reason ]
[, REPCAT=(cat1 [, cat2 [, ..., cat16] ] ) ]
[, REMCAT=(cat1 [, cat2 [, ..., cat16] ] ) ]
[, ROUT CODE=(rout code1, ..., rout code n) ]
[, SEVERITY={HIGH | MEDIUM | LOW | NONE} ]
[, WTOTYPE={CRITICAL | EVENTUAL | INFORMATIONAL | HARDCOPY | NONE} ]
[, REXXTIMELIMIT=timelimit ]
```

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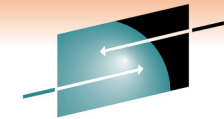
The IBM Health Checker for z/OS

Getting Started – “Low Hanging Fruit”

Check Name	Default	Interest
RACF_SENSITIVE_RESOURCES	High	High
RACF_GRS_RNL	High	High
RACF_ICHAUTAB_NONLPA	Medium	High
RACF_classname_ACTIVE	Medium	High
RACF_IBMUSER_REVOKED	Medium	High
CNZ_CONSOLE_ROUTECODE_11	Low	Medium
CSV_APF_EXITS	Low	Medium
CSV_LNKLST_SPACE	Low	Medium
USS_PARMLIB	Low	Medium

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The IBM Health Checker for z/OS

Getting Started – RACF_GRS_RNL

During its normal course of processing, RACF performs numerous serialization requests using the Global Resource Serialization (GRS) RESERVE, ENQ, and DEQ services. These serialization requests allow RACF to ensure that changes to the RACF database and RACF control blocks are done in a consistent manner, maintaining the integrity of RACF data.

```
CHECK(IBMRA CF,RACF_GRS_RNL)
START TIME: 06/30/2010 07:37:21.871542
CHECK DATE: 20040703 CHECK SEVERITY: HIGH
```

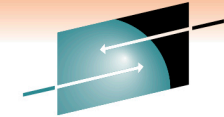
RACF_GRS_RNL Report

S	Major	Minor	Type	QName	Rname	Type
---	-------	-------	------	-------	-------	------

```
IRRH203I No RACF ENQ names were found in the GRS Resource Name List.
```

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The IBM Health Checker for z/OS

Getting Started - RACF_ICHAUTAB_NONLPA

Examines the RACF Authorized Caller Table (ICHAUTAB) and reports if there are any non-LPA entries in it.

The output format is similar to the report format for the ICHAUTAB Report in RACF_SENSITIVE_RESOURCES, with the exception that LPA-resident modules are not listed.

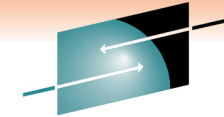
ICHAUTAB Report

```
S Module      REQUEST= REQUEST= Location
                VERIFY   LIST
-----
```

```
IRRH239I There are no ICHAUTAB programs on this system.
```

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The IBM Health Checker for z/OS

Getting Started - RACF_classname_ACTIVE

Examines the status of any of the following single RACF general resource class:

classname=

- UNIXPRIV
- FACILITY
- TAPEVOL
- TEMPDSN
- TSOAUTH
- OPERCMDS

IRRH229E The class TAPEVOL is not active.

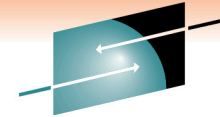
Explanation: The class is not active. IBM recommends that the security administrator at your installation activate this class and define in it the profiles to properly protect your system.

System Action: The check continues processing. There is no effect on the system.

Operator Response: Report this problem to the system security administrator and the system auditor.

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The IBM Health Checker for z/OS

Getting Started – RACF_IBMUSER_REVOKED

Examines the RACF Profile Database to determine if the user ID, IBMUSER is still active.

IRRH225E The user ID IBMUSER is not revoked.

Explanation: The user ID IBMUSER has not been revoked. IBM recommends revoking IBMUSER.

System Action: The check continues processing. There is no effect on the system.

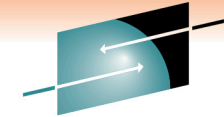
Operator Response: Report this problem to the system security administrator and the system auditor.

System Programmer Response: Revoke IBMUSER.

Problem Determination: See the RACF Auditor's Guide and the RACF Systems Programmer's Guide.

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The IBM Health Checker for z/OS

Getting Started – CNZ_CONSOLE_ROUTECODE_11

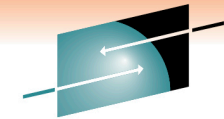
Console Type	Console Name	Active System
SYSCONS	HWCI	S0W1
SMCS	PRR1	(Inactive)
SMCS	PAT1	(Inactive)
SMCS	GHB1	(Inactive)
SMCS	MFZ1	(Inactive)
MCS	S0W103E1	(Inactive)
MCS	S0W10FFF	(Inactive)

CNZHF0005I One or more consoles are configured to receive messages intended only for programmers.

Explanation: One or more consoles are configured to receive messages with routing code 11. Messages issued with routing code 11 are intended to be sent to the programmer, not the operator console.

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The IBM Health Checker for z/OS

Getting Started – CSV_APF_EXITS

CSVH0955I A problem was found with each APF list entry displayed.

VOLUME	DSNAME	ERROR
VTMVSC	ANF.SANFLOAD	DS not found
VTMVAB	CEE.SCEERUN	Volume not found

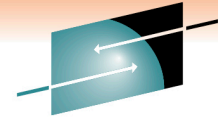
Explanation: CSVH0955I has been placed in the message buffer to describe the APF list entry error and condition that caused the exception.

A potential system integrity risk exists when a data set cannot be allocated using the criteria specified in the system APF list. If this data set were created it would be considered APF-authorized.

The error is one of the following conditions:

- DS is alias

 - The data set name is an alias of another data set.



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Getting Started – CSV_LNKLST_SPACE

Explanation: CSVH0979I has been placed in the message buffer for each LNKLST LNKLST set. It lists all data sets with secondary space defined.

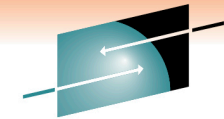
IBM suggests that partitioned data sets (PDS's) in the LNKLST be allocated with only primary extents, for two reasons.

First, a PDS allocated with only primary space defined has only one extent. This makes it easier to stay within the 255-extent limit for an active LNKLST concatenation without having to reallocate data sets with fewer initial extents.

Second, if a PDS will be updated while in the LNKLST set, it can be extended if it has been allocated using secondary space. This can cause members to be placed in extents that did not exist when the LNKLST concatenation was activated. An attempt to access a member in a new extent causes the requesting program to abend.

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The IBM Health Checker for z/OS

Getting Started – USS_PARMLIB

```
CHECK(IBMUSS,USS_PARMLIB)
START TIME: 06/30/2010 13:14:18.100041
CHECK DATE: 20060112 CHECK SEVERITY: LOW
```

BPXH003I z/OS UNIX System Services was initialized using:

```
OMVS=(OM,FS,SV,MS,61,65,VN)
```

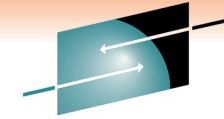
where each 2-character item is a BPXPRMxx suffix.

BPXH039I No differences were found between the system settings and the settings in the BPXPRMxx parmlib members.

```
END TIME: 06/30/2010 13:14:19.908682 STATUS: SUCCESSFUL
```

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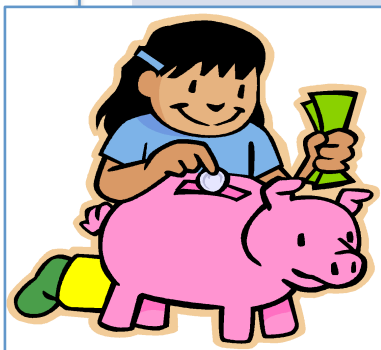


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The IBM Health Checker for z/OS

LPAR Compliance Monitor - Evaluation Criteria

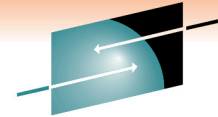
Attribute	Characteristics	IBM/HC
✓ Automatic	System Controlled Automated Process	Good
✓ Standards	Site, Industry and Regulatory	Good
✓ Actionable	Findings Lead to Actions	Excellent
✓ Flexible	Site Customization	Good
✓ Extensible	Local and 3 rd Party Support	Good
✓ Transparent	Multiple Methods for Sharing Findings	Good
✓ Robust	Multi-System, Multi-LPAR Support	Somewhat
	Demonstrable ROI	Excellent



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Presentation Wrap-Up



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1. Our Mission - (1/4)

- ✓ What is Compliance?
- ✓ The Need for Shared Values
- ✓ Critical Success Factors
- ✓ System Control Points
- ✓ Organizational Acceptance
- ✓ Cost of Implementation

2. The IBM Health Checker for z/OS - (3/4)

- ✓ Evaluation Criteria
- ✓ Operational Overview
- ✓ Notification and Reports
- ✓ Example – *RACF_Sensitive_Resources*
- ✓ System Customization
- ✓ Getting Started – “*Low Hanging Fruit*”

3. Hands-on Lab - *Recommended*

Wednesday, March 2, 2011

9:30AM – 10:30AM

Anaheim Convention Center – Room 208-B

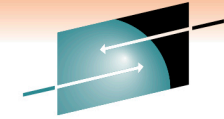
4. Resources, References and Sessions

z/Auditing Essentials - Volume 1

zEnterprise Hardware - An Introduction for Auditors

Edited By Julie-Ann Williams - julie@sysprog.co.uk





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Take the Next Step

Hands-on Lab:

Abstract:

Getting the IBM Health Checker up and running and customizing the Health Checks for your z/OS systems is easy to do. This self-directed lab will lead you through the process step by step. The lab is intended for those with little or no experience with the Health Checker. Attendees should have knowledge of TSO and JCL.

Session:

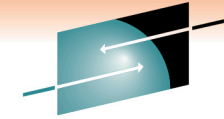
Wednesday, March 2, 2011
9:30AM – 10:30AM
Anaheim Convention Center – Room 208-B

Instructor:

Mr. Gordon Daniel, Director Development
NewEra Software, Inc.

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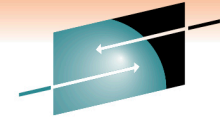
Compliance Resources

Players:

- Brian Cummings - Tata Consultancy Services - brian.cummings@tcs.com
- Stu Henderson - The Henderson Group - stu@stuhenderson.com
- Reg Harbeck - CA, Inc. - Reg@ca.com
- Julie-Ann Williams - millennia ltd - julie@sysprog.co.uk
- Craig Warren - millennia ltd - craig@sysprog.co.uk
- Martin Underwood - millennia ltd - martin@sysprog.co.uk
- Barry Schrage - Vanguard Professionals - barry.schrager@go2vanguard.com
- Mike Cairns - IBM Tivoli Asia Pacific - mike.cairns@au1.ibm.com
- Dinesh Dattani - z/OS Consultant - dinesh123@rogers.com
- David Hayes - U.S. Government Accountability Office - hayesd@gao.gov
- Mark Wilson - RSM Partners - markw@rsmpartners.com

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Compliance References

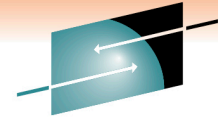
Publications:

- IBM Health Checker for z/OS Users Guide – SA22-7994-11
- MVS Initialization and Tuning Reference – SA22-7592-21
- MVS System Command Reference – SA22-7627-24
- MVS Planning Operations – SA22-7601-12
- CICS Audit Essentials – Julie-Ann Williams, Mike Cairns, Craig Warren and Martin Underwood
- CICS Best Practices – Julie-Ann Williams, Craig Warren and Martin Underwood
- Mainframe Audit News – Stu Henderson, The Henderson Group
- Information Security – NIST Publication 800-53 – February 2009
- NAIC Model Audit Rules & Implementation – Deloitte
- AUDIT.NET

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Compliance References



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Join the Peer Review Team:

Get Involved – Have Fun!

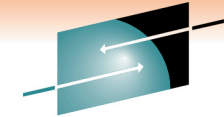
z/Auditing Essentials - Volume 1
zEnterprise Hardware - An Introduction for Auditors
Edited By Julie-Ann Williams - julie@sysprog.co.uk

Authors:

- Julie-Ann Williams
- Craig Warren
- Martin Underwood
- Steve Tresadern

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Follow-on Session:

Learn More – Have Fun!

Using HCD/HCM as the foundation
for z/OS System Compliance

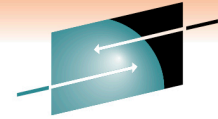
9:30 – 10:30 pm, Friday, March 4, 2011
Anaheim Convention Center – Room 207-B

Presenter:

Paul Robichaux
NewEra Software, Inc.

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That's it folks, all done!

Sessions Evaluation - Session Number - 8405

Thank You!

Paul R. Robichaux
NewEra Software, Inc.
pr@newera.com

Anaheim Convention Center – Booth 310

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