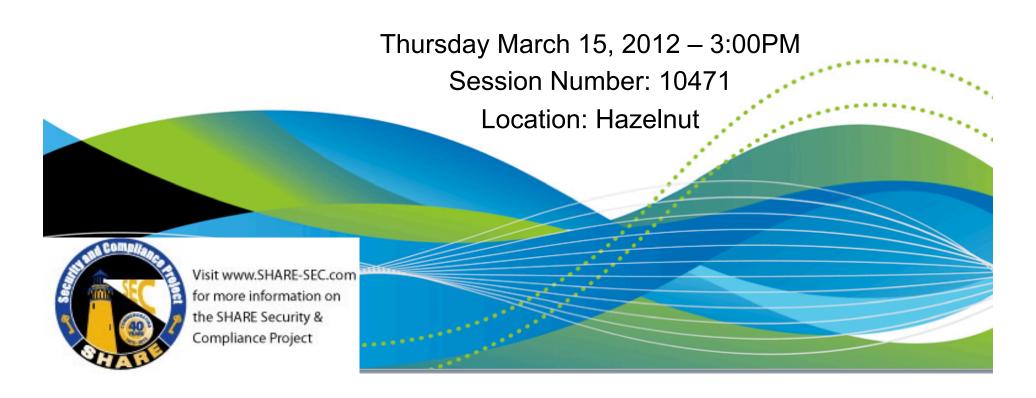




How to use the IODF as the Foundation of z/Enterprise System Compliance

Paul Robichaux NewEra Software, Inc.



Abstract and Speaker

- SHARE
- IBM's zEnterprise Server, AKA the Mainframe, and its companion Operating System z/OS combine to create the most powerful and secure transaction processing environment available to your clients. With a single server capable of supporting thousands of users, accessing hundreds of databases and generating billions of financial transactions per day, the z/Enterprise is an Audit target of material interest and should be included within the scope of any Information Technology Audit.
- The presentation will place emphasis on the adoption of the Input/Output Definition Files (IODF) as the central point of control for establishing a verifiable baseline of z/Enterprise elements. This session will introduce you to:
 - The Mainframe Software Stack (MSS), it's Cost and Abatement Strategies.
 - The Basics and Interactions of the zEnterprise Hardware and Software Configuration.
 - The Importance of the IODF in Understanding the Origin of System Vulnerability.
 - The Coming Revolution in zEnterprise Configuration Management.
 - Recommended IODF Management Best Practices.
 - No Cost Strategies for detecting Changes in the z/Enterprise Configuration.

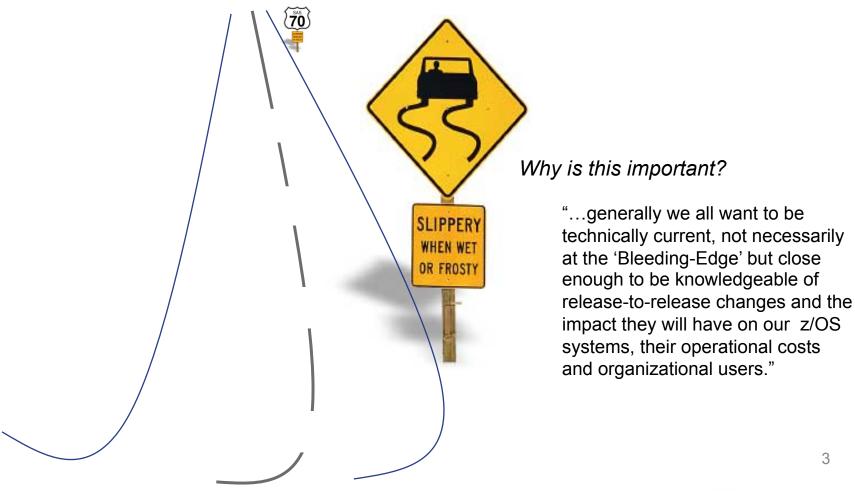
Paul R. Robichaux, CEO, co-founder of NewEra Software, Inc. began his career in large systems computing as an operator and programmer of IBM 407s and 402s. He served as the Chief Financial Officer of Boole and Babbage for the ten years immediately preceding his founding of NewEra in 1990. He holds a 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 2 non-compliance, make corrections when needed and in doing so, continuously improve z/OS integrity.

Our Mission



Continuous, Sustainable Improvements in z/OS Availability and Compliance.



Presentation Outline



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. IODF - the Absolute zControl Point! - (3/4)

- ✓ The Basic Elements of the Input/Output Definition File (IODF)
- ✓ Understanding the Origin of Key System Vulnerabilities
- ✓ Increasing Audit Interest in Using the IODF as a System Control Boundary
- ✓ How System Complexity is Driving the Need for New Thinking
- ✓ The Future of the zEnterprise Configuration Process
- ✓ How to Build an IODF-based Configuration Baseline StepOne

3. Health Checker - Hands-on Lab — Recommended

Session 10601 and Session 10876 or send email to support@newera.com - Send Lab

4. Resources, References and Sessions - Recommended

- ✓ z/Auditing Essentials Volume 1 zEnterprise Hardware An Introduction for Auditors
- ✓ How Barry Schrager Changed Your World Believe it!
 Both Edited By Julie-Ann Williams julie@sysprog.co.uk



Continuing Education Credit















What Bad News Look Like!

- "...Although progress has been made in correcting previously reported Information Security weaknesses, system control material weaknesses on tinue to jeopardize the confidentiality, integrity and availability of those formal processes intended to safeguard access to financial, intellectual property and customer data.."
- "...A material weakness is a deficiency, or a combination of deficiencies, in internal controls such that there is a reasonable possibility that material misstatement may result..."

Report to the Audit Sub-Committee of the Board of Directors

Information Security

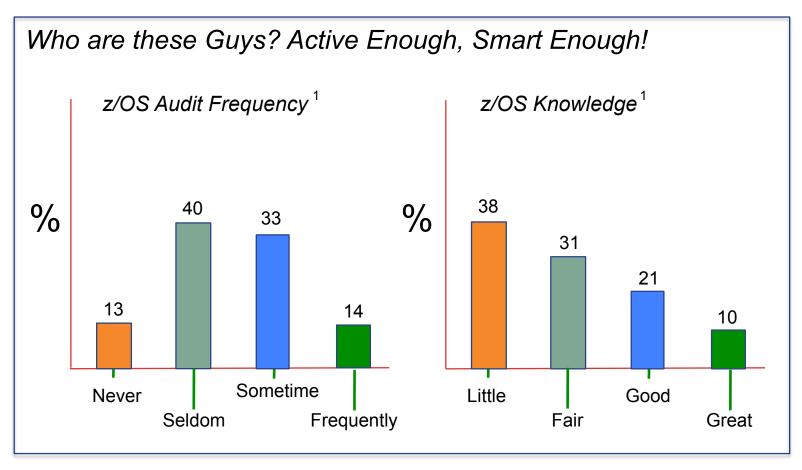
Noted Information System Weaknesses Indicate a Need to Enhance Internal Controls over:

- Financial Reporting
- Intellectual Property
- Customer Data

Audit 12/31/10 - Report 04/30/11







¹ zJournal – zEnterprise Survey – April - May, 2011 – 183 Respondents











Tell a Joke

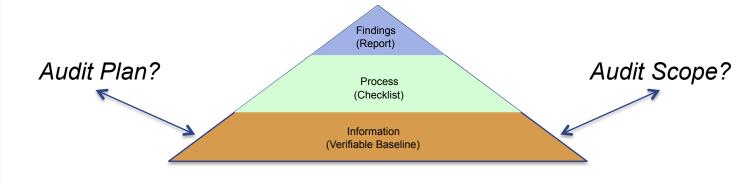




What's the Problem? Conventional Wisdom!

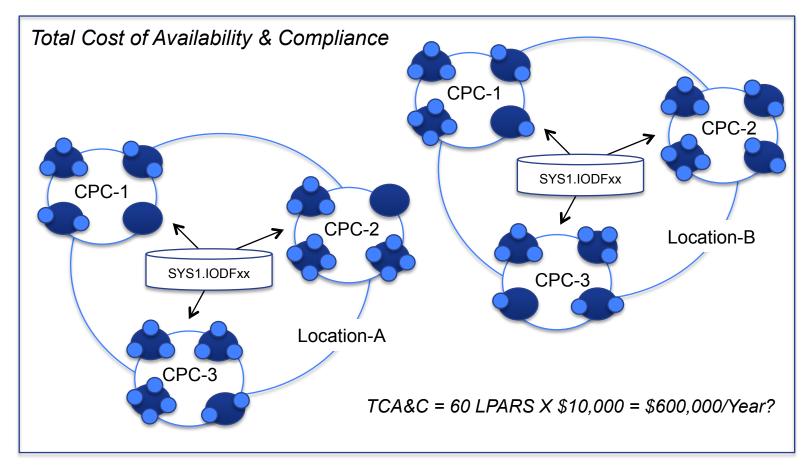
"...the conventional wisdom of many Audit Plans and Tools ignore the obvious and begin deep in the details of the Operating System (OS) and External Security Manager (ESM).

In doing so, these Plans and Tools often fail to establish an independently verifiable System Baseline. Without such a repository of system identity and configuration relationships, zEnterprise System Auditors can become disoriented, losing their way."





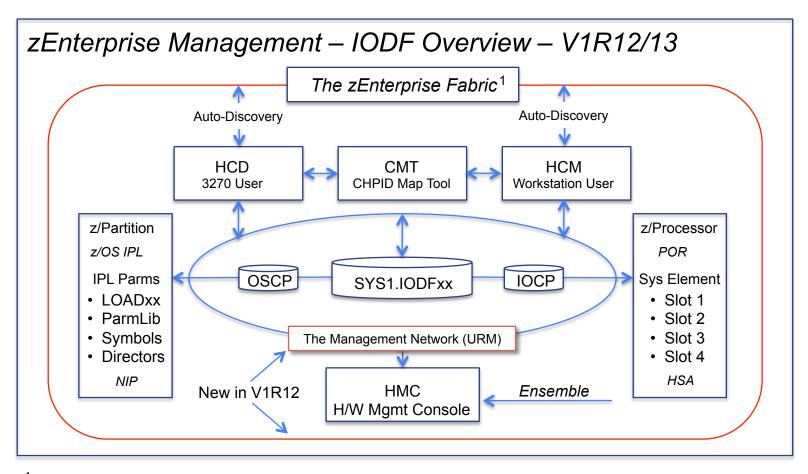




Glenn Anderson – MVS Program Keynote – The zEnterprise: A True Game Changer.





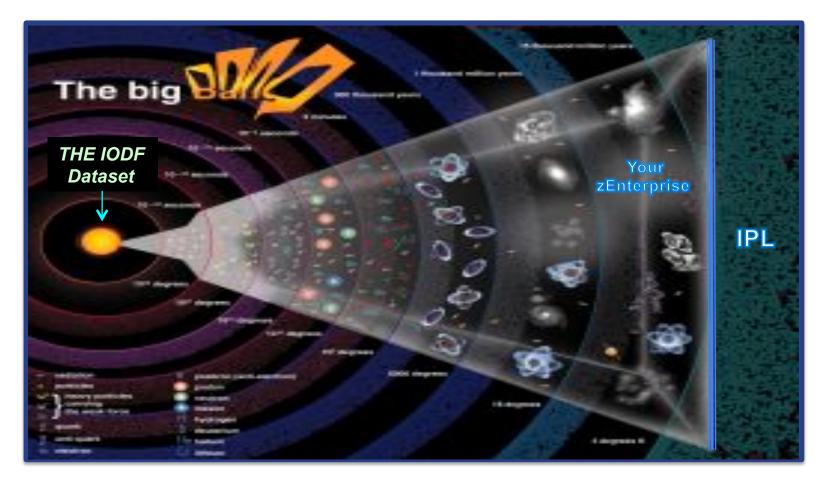


¹The zEnterprise Fabric extends to the edge of the available zInformation System Data Horizon.



Our Mission



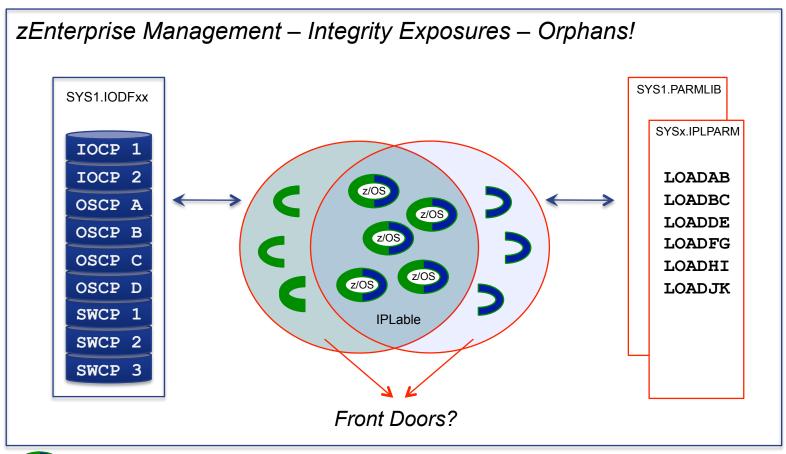




Tell Another Joke









- IPLable - OSCP CONFIGID matching those defined in LOADxx Member

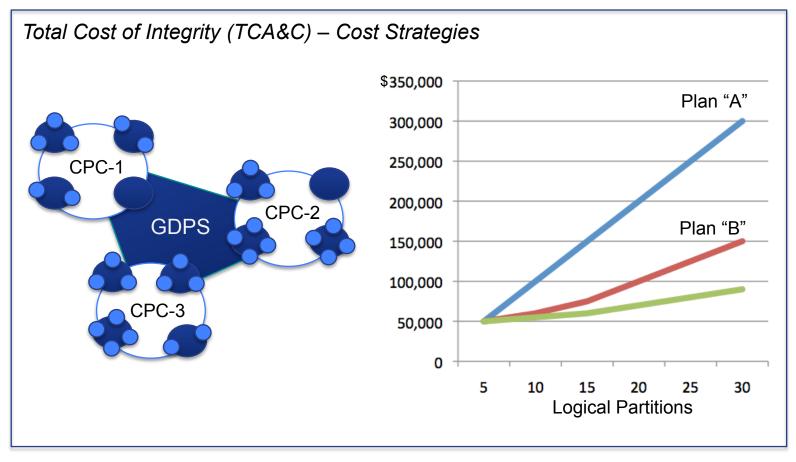




Orphaned OSCP CONFIGID - Orphaned LOADxx Members







Glenn Anderson – MVS Program Keynote – Transition IT from a Cost Center to a Value Center.





Total Cost of Integrity (TCA&C) – Problem Recognition/Remediation					
	History	Real-time	Future		
	□ Data Collection□ Event Filtering□ Post-Processing□ Reporting	Data CollectionDiscriminationRecognitionNotification	Data CollectionPredictive AnalyticsRecognitionNotification		
	Passive	Reactive	Proactive		
		Times Arrow	>		

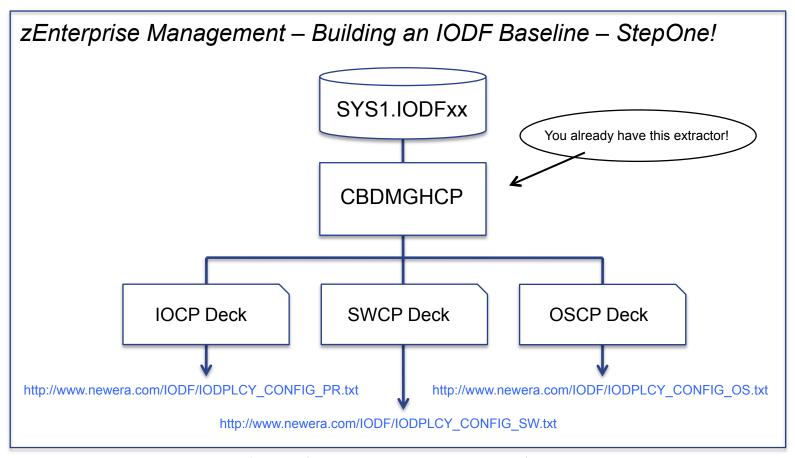




Tell Another Joke







Deck - Named set of Configuration Control Statements in Card Image format





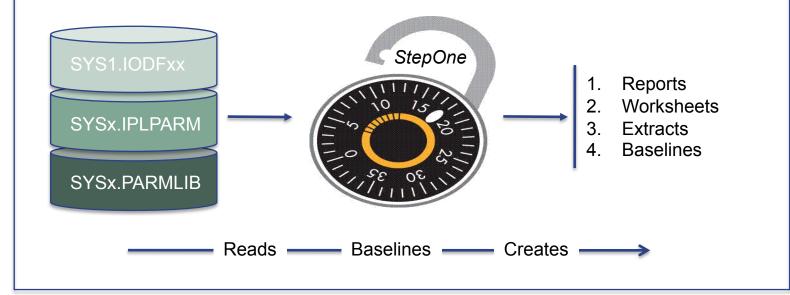
```
zEnterprise Management – Building an IOCP Baseline – StepOne!
                  TITLE 'SYS1.IODFxx - 2013-01-01 00:00:00'
        ID NAME=CDC1CFx, UNIT=2097, MODEL=E26,
              DESC='Coupling Facility 1 CDC1', SERIAL=02DBE22097,
              MODE=LPAR, LEVEL=H080131, LSYSTEM=ONE9330D,
              SNAADDR=(IBM390PS,ONECF1),
              SCR='CDC1CF1 . .M..p.....
                                                     09-05-0113:30:05SYS*
                   IODF4C '
        RESOURCE PARTITION=((CSS(0), (SYS1,4), (SYS2,F), (SYS3,6), (SYS4,2*
              ), (*,1), (*,3), (*,5), (*,7), (*,8), (*,9), (*,A), (*,B), (*,C), *
              (*,D),(*,E)), \underline{MAXDEV} = ((CSS(0),65280,65535)),
              CSSDESCL=('CFB1 CFCP1 CFNZ1',
              DESCL=('SBPLEX PRODUCTION CF LPAR', 'Test LPAR CFB1B', 'TS*
              YS PRODUCTION CF LPAR', 'CMCY PRODUCTION CF LPAR'),
              USAGE=(CF,CF,CF,CF,CF/OS,CF/OS,CF/OS,CF/OS,CF/OS,CF/OS,C*
              F/OS, CF/OS, CF/OS, CF/OS)
        CHPID PATH=(CSS(0,2),05), SHARED,
              PARTITION=((SYS1, SYS2, SYSC, SYSD), (=), REC)), SWITCH=12,
              SWPORT=((12,24)), DESC='DMX3 2500', PCHID=322, TYPE=FC
```





zEnterprise Management – What the Future Looks Like! - StepOne

StepOne is a zEnterprise-based application that unlocks key System Datasets turning their contents into an interactive set of zEnterprisewide system documentation designed to enhance the System Review Process initiated by System Auditors and Consultants that conduct them.







This is No Joke





What Bad News Look Like!

- "...Although progress has been made in correcting previously reported Information Security weaknesses, system control material weaknesses continue to jeopardize the confidentiality, integrity and availability of those formal processes intended to safeguard access to financial, intellectual property and customer data.."
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Information Security

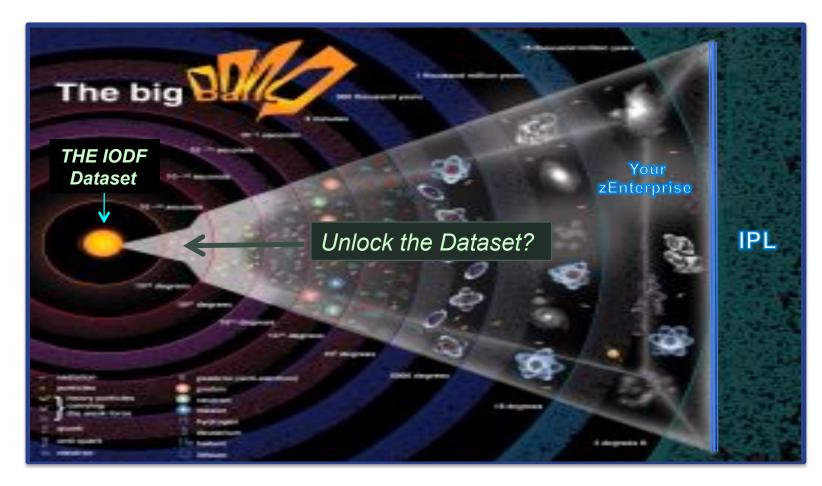
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Audit 12/31/10 - Report 04/30/11









That's it folks, all done!



Session Evaluation - Session Number - 10471

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







Appendix



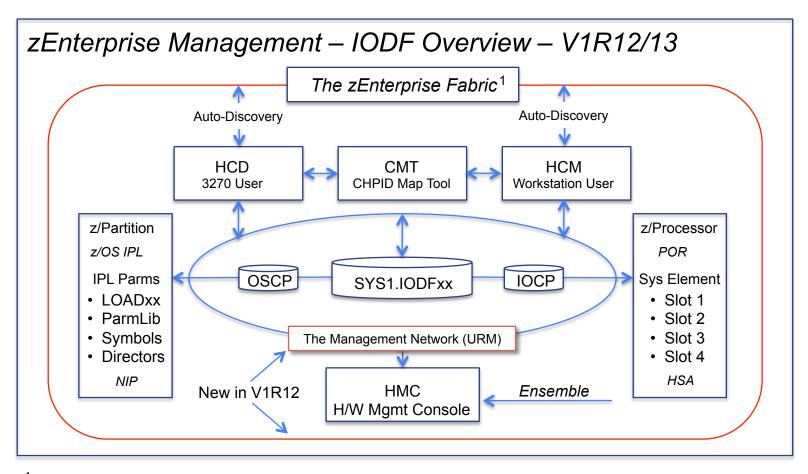


What is the IODF? Why is it Important? Who is Responsible?

- The Input/Output Definition File (IODF) is the set of configuration statements that define a network of z/Platform resources. These resources are generally available to both the z/OS operating system (OSCP) and the z/Platform hardware (IOCP) and any related ESCON/FICON Directors (SWCP).
- Because of its vital role in shaping the environment, the IODF should be viewed as a major Control Point of high informational value in maintaining the accuracy, integrity and security of the z/OS Operating System and its associated z/Platform hardware (The Mainframe).
- The process of shaping the z/Series platform into a unique computing configuration, meeting business requirements, is the role of Hardware Planners, skilled technicians who use IBM's HCD and/or HCM to create and maintain one or more IODF Datasets.



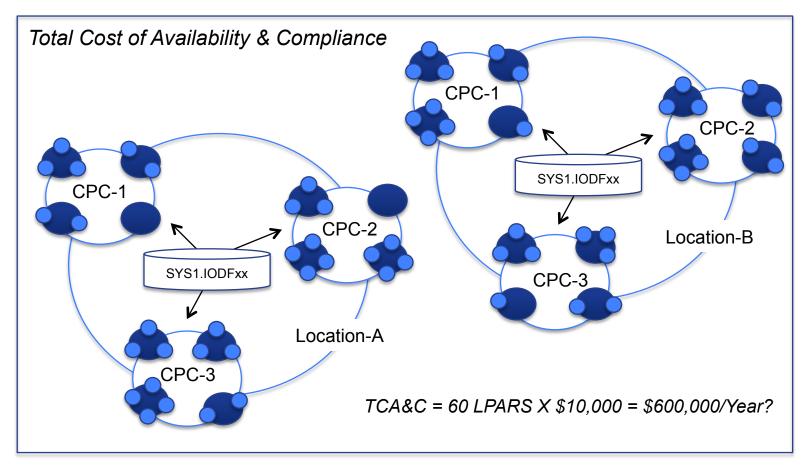




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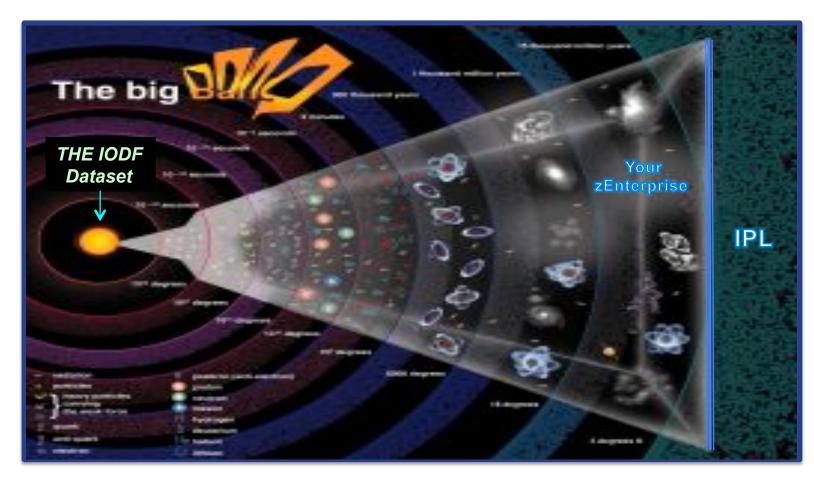


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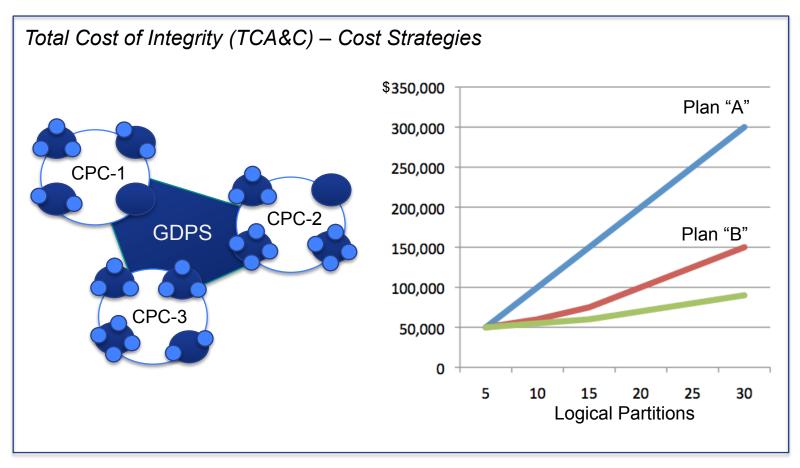


Our Mission









Glenn Anderson – MVS Program Keynote – Transition IT from a Cost Center to a Value Center.

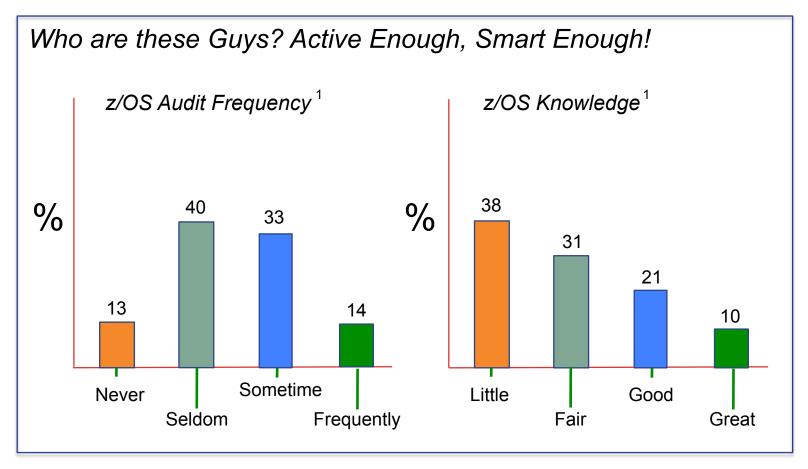




Total Cost of Integrity (TCA&C) – Problem Recognition/Remediation					
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	Passive	Reactive	Proactive		
		Times Arrow	>		







¹ zJournal – zEnterprise Survey – April - May, 2011 – 183 Respondents











The Top Ten Audit Check List - Item #1

☑ Is IODF a Recognized Control Boundary?

It has been noted recently that mismanagement of the IODF Dataset may lead to the very risky sharing of devices with completely different security requirements.

Unfortunately many installations will not acknowledge using the IODF as a boundary control and are now being blistered for their stance and being pressured to view this scenario differently.

An example: hardware staff accidentally connected an entire bank of Production DASD to a newly authorized Test LPAR via configuration cloning and in doing so neglected to update the LPAR and DEVICE Access and/or Candidate List to limit CROSS-LPAR Device access.





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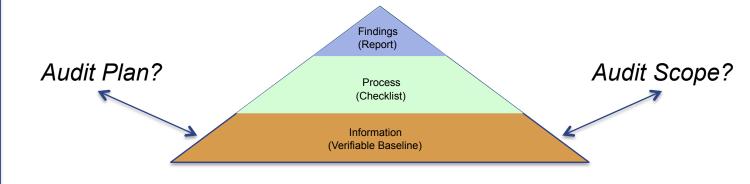




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How to avoid Embarrassing zEnterprise Audit Findings?

Get Ready, Be Prepared!

Session 10107 - How to Monitor & Assure Your System z Security Status Presenter - Simon Dodge - Wells Fargo

Session 09221 - Compliance: How to Manage (Lame) Audit Recommendations Presenter - Brian Cummings – Tata Consultancy Services





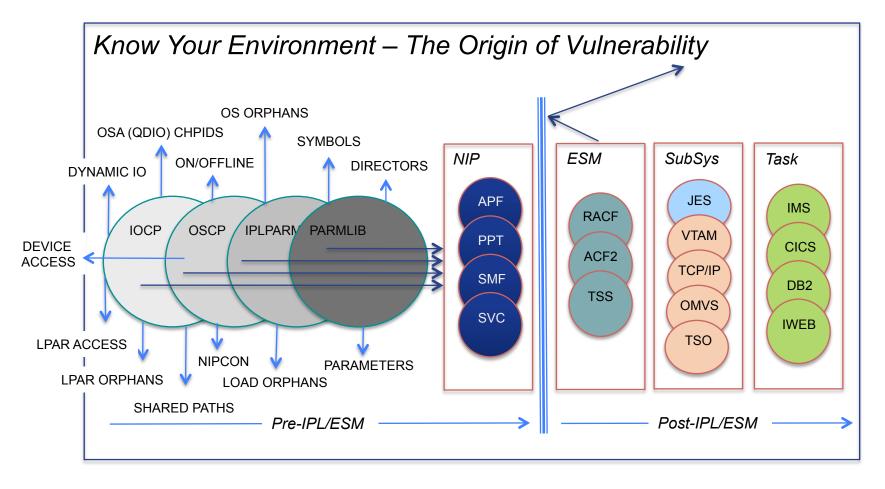
zEnterprise Management – IODF Best Practices!

■ Establish Limits:

- Access to HCD/HCM
- NONE/READ/UPDATE Authority to SYS1.IODFxx
- Access to the Hardware Management Console (HCM)
- Access to the System Element (SE)
- Access to the Management Network (URM)
- Access to LOADxx Members SYSn.IPLPARM
- Access to System Parameters SYS1.PARMLIB
- Access to NIPS and System Consoles
- Require "Activity Logging" ON
- Document and Periodically Review Initialization Process:
 - Power On Reset (POR)
 - Initial z/OS Program Load (IPL)
 - Disaster Recovery/Business Continuity











zEnterprise Management – How OSCP works with LOADxx

```
*---+---5---+---6---+---7
ARCHLVL a
DYNCPAAD {ENABLE | DISABLE}
IEASYM [xx]
       [(xx,yy,zz,...,L)]
INITSQA xxxxK yyyyK
       xxxxM yyyyM
                                    New in V1R12
       xx hiqualif configid id y (S) &
IODF
NUCLEUS n
NUCLST
       nn y
PARMLIB dsn
                                               [volid]
                                               [*****
                                               [*MCAT*]
SCHSET
SYSCAT
       volserxycsdsname
                                                       hlatvc
SYSPARM [xx]
       [(xx,yy,zz,...,L)]
SYSPLEX plexname
```

- 01-04 IODF Keyword
- 10-11 IODF Dataset Suffix, if "01" then Dataset name would be IODF01
- 13-21 IODF Dataset High Level Qualifier, if "SYS!" then fully qualified name would be SYS1.IODF01
- 22-29 OS configuration identifier used to select a named OSCP configuration from the IODF Dataset
- 31-32 The Eligible Device Table associated with a named OSCP configuration
- 34-34 "Y" to load all IODF defined devices and any other dynamically available devices
- 36-36 "S" the subchannel set to be used during an IPL Specify 0 or 1

```
Special rules apply when: IODF Suffix is specified as "++, --, **, ==" IODF HLQ is specified as "========"
```

If the OS ConfigId not found system enters a wait state





The IODF statement identifies Col 36

Subchannel set indicator. Indicates the subchannel set IOS uses for normal base devices that have a special secondary device with the same address.

The following values can be specified:

- O Indicates the normal base devices in subchannel set O are used for the IPL.
- n Indicates the special secondary devices in this subchannel set are used for the IPL.
- * Indicates the subchannel set of the IPL device is used for the IPL.

On systems where special secondary devices are connected, if this value is not specified or is not valid (for example, not a 0, 1, 2, or *), the system will prompt the operator with message IEA111D to determine what subchannel set should be used.

Default: None

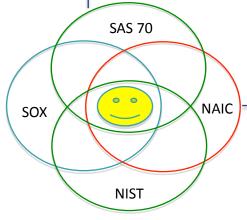
NewEra White Paper – 09/12/2011 - Brief Look at What's New in V1R12 and V1R13





System Compliance Model – What is Compliance?

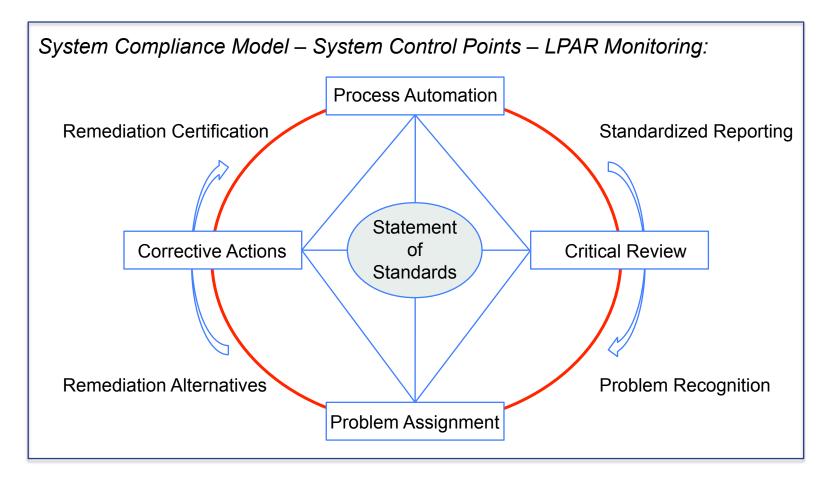
- ✓ Compliance the act of adhering to, <u>and</u> demonstrating adherence to, a standard or regulation.
- ✓ Compliance describes the goal that corporations or public agencies aspire to in their efforts to ensure that personnel are aware of and take steps to comply with relevant laws and regulations.
- ✓ 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









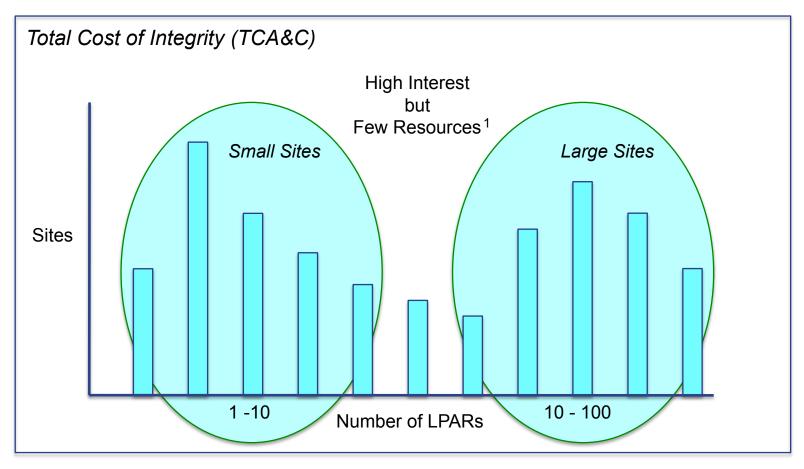


zEnterprise Management – About HCD/HCM – Transparency?

The z/Platform is a highly adaptable general-purpose computer that can be "shaped" into many different forms, formats and configurations to meet varying needs. Some will use the platform exclusively for the z/OS operating system. Others will split the platform between z/OS and z/VM or z/Linux (a form of UNIX). The process of shaping the z/Series platform into a unique computing configuration that will meet business requirements is the role of the z/Hardware Planner.

☑ In doing their jobs, these skilled technicians use IBM's HCD and/or HCM to create and maintain one or more IODF Datasets, each containing one or more unique hardware and/or software configurations. While powerful and required for their intended purpose, HCD and HCM do not provide the content transparency demanded by the "System" Compliance Model".





¹ zJournal – zEnterprise Survey – April - May, 2011 – 183 Respondents





zEnterprise Management – IODF Overview – V1R12 – Auto Discovery

HCD can invoke the Input/Output Subsystem (IOS) to discover I/O hardware in the current configuration that is accessible to the system. Controllers, Control Units and Devices which are currently not yet defined in either the active or currently accessed IODF can be automatically configured.

HCD Auto Configuration presents the discovered Controllers, Control Units and Devices to the user and offers proposals how to configure them. The user can accept or change these definition proposals. On the user's confirmation, the configuration definitions are written to the specified target IODF.

HCD Auto Configuration is available only with the zEnterprise 2817 processors.





zEnterprise Management – IODF Overview – V1R12 – Auto Discovery

- ✓ Auto Configuration *Policy*
 - Auto Configuration Policies defined as a set of keyword values control the automatic discovery of control units and devices and how they will be attributed to defined Logical Partitions and OS Configuration Groups.
- ✓ Auto Configuration *Groupings*
 - Logical Partition Groups LP Group is a set of LPARs in the same sysplex used by Auto Configuration to determine which discovered devices will be assigned to which LPARs.
 - OS Configuration Groups OS group is a set of OS configurations used by Auto Configuration to determine which discovered devices will be assigned to which MVS.
- - Proposed Devices A listing of proposed Device definition details for existing or new devices accessible by the currently processed discovered control units.





zEnterprise Management – IODF Overview – V1R12 – Auto Discovery

- - A given configuration set is considered better than any other set when it contains a fewer number of single failures that can affect device connectivity.
- Spreading the work¹
 - A given configuration set is considered better that any alternative set when it uses fewer common components.
- - A given configuration set is considered better than any alternative configuration set if it satisfies the "Spread Rule" and uses fewer components that are already in use by previous configurations.



¹ The Math: A Djikstra's Algorithm that computes the optimization heuristically



zEnterprise Management – IODF Overview – V1R13 – HCD/HCM

When building a production IODF, HCD checks for each OS configuration of type MVS with a connected 3390D device, that a 3390B device with the same device number is also connected to this OS configuration.

■ LSYSTEM and CSYSTEM Validation

The source and target CHPIDs of a CIB coupling connection are each given the local system name of the processor to which they will connect. Therefore, HCD makes users aware of the consequences whenever local system name changes.

✓ Auto invocation of IODF Checker

HCD now also invokes the IODF checker whenever a general validation of completeness and consistency of the IODF is performed, for example, building a production IODF or a validated work IODF. If the checker detects a defect, HCD informs the user by issuing a severe warning message.





zEnterprise Management – IODF Overview – V1R13 – HCD/HCM

A device subchannel set ID that is used in a device-to-processor definition but not used in any device-to-OS definition for the device is now flagged by HCD prior to the building a production IODF.

☑ CIB (InfiniBand) CHPID Host Configuration Adapter

HCD issues the new warning message when more than four CIB CHPIDs are defined on the same AID (Host Configuration Adapter ID) port.

HCD provides a new function called *Work with CPC images* which you can launch from a selected CPC in the S/390 Microprocessor Cluster List. Use this function to view the operation status and attributes of each defined logical partition for the selected CPC.





zEnterprise Management – IODF Overview – V1R13 – Health Checker for z/OS

■ Device Manager (IBMDMO) - DMO_TAPE_LIBRARY_INIT_ERRORS

Description/Reason for check:

This check reports any tape library initialization errors that were detected during IPL. This is a local check, which will run once per the life of the IPL. Ensures that tape library HCD definitions agree with the tape library hardware definitions.

☑ IOS checks (IBMIOS) - IOS_CMRTIME_MONITOR

Description/Reason for check:

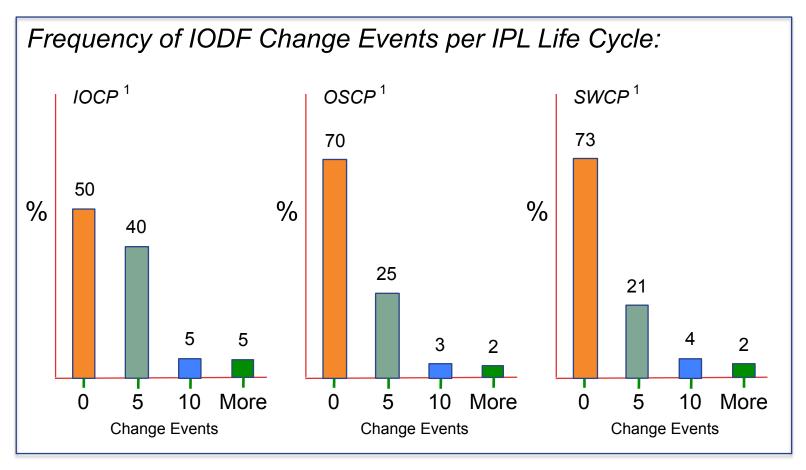
Detects if any control units in the system are reporting inconsistent average initial command response (CMR) time for their attached channel paths. Initial Command Response (CMR) time is a component of Response time and measures the round trip delay of the fabric alone with minimal channel and control unit involvement and thus can be a symptom of potential problems in the fabric: Hardware Error, Misconfiguration and Congestion.







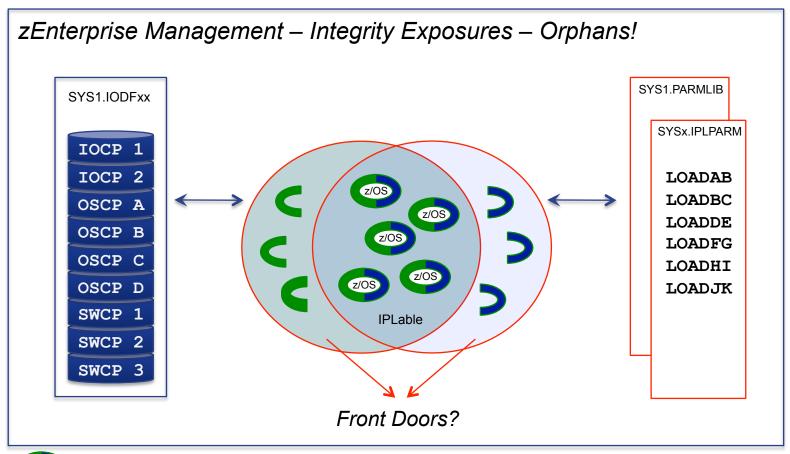




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- IPLable - OSCP CONFIGID matching those defined in LOADxx Member

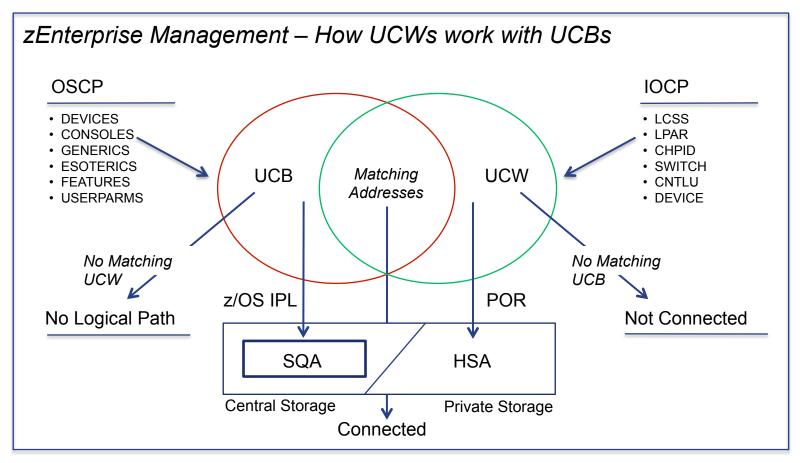




Orphaned OSCP CONFIGID - Orphaned LOADxx Members







UCB - Unit Control Block
UCW - Unit Control Work

SQA - System Queue Area HSA - Hardware Storage Area



Ten "BIG TIME" Gotchas!



Know Your Environment – Macro Vs. Micro World View



The Whole

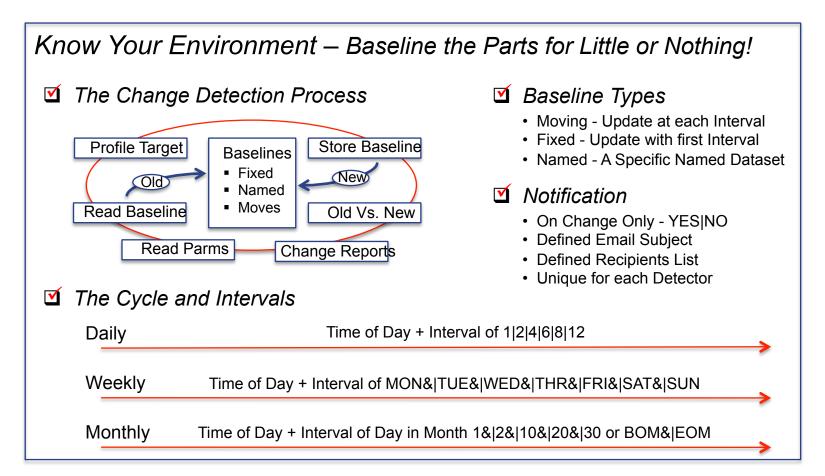


The Parts



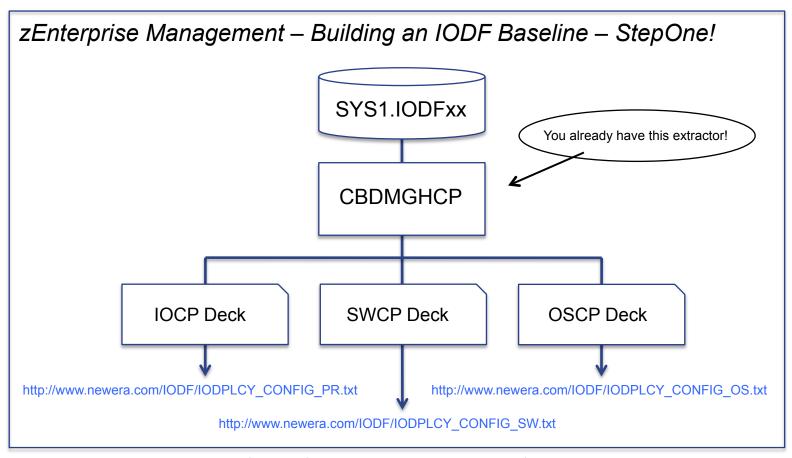
Ten "BIG TIME" Gotchas!











Deck - Named set of Configuration Control Statements in Card Image format





```
zEnterprise Management – Building an IOCP Baseline – StepOne!
                  TITLE 'SYS1.IODFxx - 2013-01-01 00:00:00'
        ID NAME=CDC1CFx, UNIT=2097, MODEL=E26,
              DESC='Coupling Facility 1 CDC1', SERIAL=02DBE22097,
              MODE=LPAR, LEVEL=H080131, LSYSTEM=ONE9330D,
              SNAADDR=(IBM390PS,ONECF1),
              SCR='CDC1CF1 . .M..p.....
                                                     09-05-0113:30:05SYS*
                   IODF4C '
        RESOURCE PARTITION=((CSS(0), (SYS1,4), (SYS2,F), (SYS3,6), (SYS4,2*
              ), (*,1), (*,3), (*,5), (*,7), (*,8), (*,9), (*,A), (*,B), (*,C), *
              (*,D),(*,E)), \underline{MAXDEV} = ((CSS(0),65280,65535)),
              CSSDESCL=('CFB1 CFCP1 CFNZ1',
              DESCL=('SBPLEX PRODUCTION CF LPAR', 'Test LPAR CFB1B', 'TS*
              YS PRODUCTION CF LPAR', 'CMCY PRODUCTION CF LPAR'),
              USAGE=(CF,CF,CF,CF,CF/OS,CF/OS,CF/OS,CF/OS,CF/OS,CF/OS,C*
              F/OS, CF/OS, CF/OS, CF/OS)
        CHPID PATH=(CSS(0,2),05), SHARED,
              PARTITION=((SYS1, SYS2, SYSC, SYSD), (=), REC)), SWITCH=12,
              SWPORT=((12,24)), DESC='DMX3 2500', PCHID=322, TYPE=FC
```





zEnterprise Management – Building an OSCP Baseline – StepOne!

```
TITLE 'SYS1.IODFxx - 2013-01-01 00:00:00

■ IOCONFIG ID=00, NAME=PROD01, TYPE=MVS, DESC='PROD01_NEWPLEX'

■ IODEVICE ADDRESS=(0A70,6), UNIT=3270, MODEL=X, FEATURE=DOCHAR, *
OFFLINE=NO, DYNAMIC=YES, LOCANY=NO, CUNUMBR=0A70
IODEVICE ADDRESS=(0600,16), UNIT=3480, *
FEATURE=(SHARABLE, COMPACT), OFFLINE=YES, DYNAMIC=YES, *
LOCANY=YES, *
USERPRM=((LIBRARY,NO), (AUTOSWITCH,NO), (MTL,NO)), *
CUNUMBR=0603

■ UNITNAME NAME=CART, *
UNIT=((1C00,16), (1C10,16), (1C20,16), (1C30,16), (1C40,16), *
(1C50,16), (1C60,16), (1C70,16), (1C80,16), (1C90,16), (1CA0, *
16), (1CB0,16), (1CC0,16), (1CD0,16), (1CE0,16), (1CF0,16))

■ NIPCON DEVNUM=(0160,0170,0110,0171,0111,0100,0101) *
```

```
DYNAMIC - Specifies if the device is eligible for dynamic I/O configuration

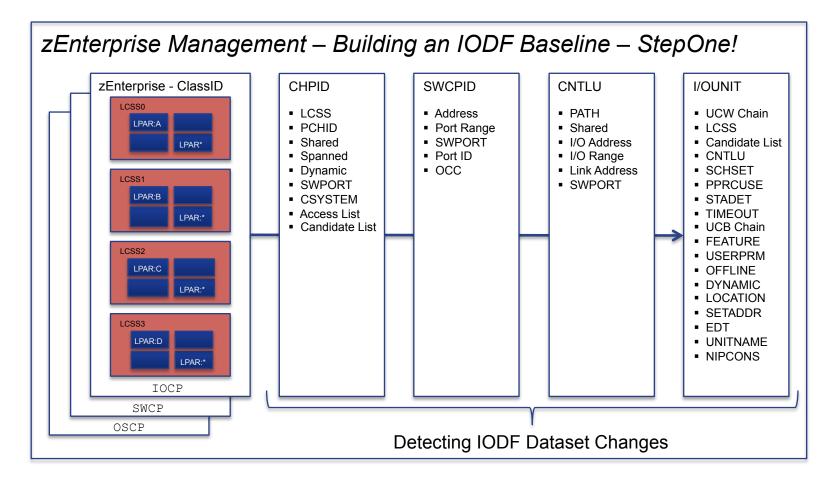
USERPRM - Specifies DEVICE specific OS private parameters

62

OFFLINE - Specifies that a DEVICE ON|OFF line at IPL time
```





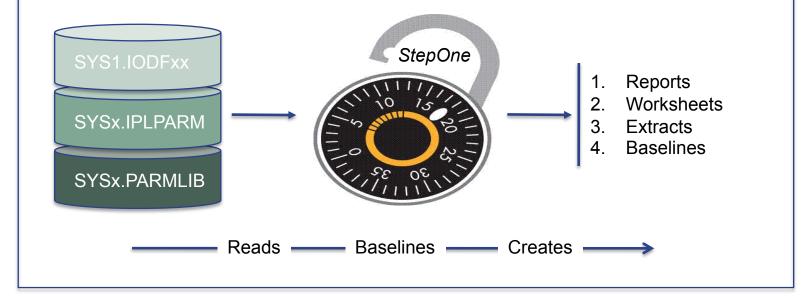






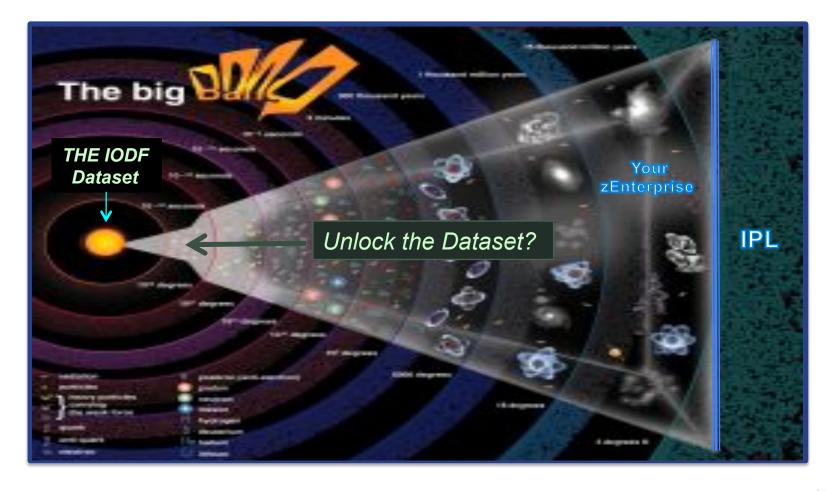
zEnterprise Management – What the Future Looks Like! - StepOne

StepOne is a zEnterprise-based application that unlocks key System Datasets turning their contents into an interactive set of zEnterprisewide system documentation designed to enhance the System Review Process initiated by System Auditors and Consultants that conduct them.











Presentation Outline



- 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. IODF - the Absolute zControl Point! - (3/4)

- ✓ The Basic Elements of the Input/Output Definition File (IODF)
- ✓ Understanding the Origin of Key System Vulnerabilities
- ✓ Increasing Audit Interest in Using the IODF as a System Control Boundary
- ✓ How System Complexity is Driving the Need for New Thinking
- √ The Future of the zEnterprise Configuration Process
- ✓ How to Build an IODF-based Configuration Baseline StepOne

3. Health Checker - Hands-on Lab — Recommended

Session 10601 and Session 10876 or send email to support@newera.com - Send Lab

4. Resources, References and Sessions - Recommended

- ✓ z/Auditing Essentials Volume 1 zEnterprise Hardware An Introduction for Auditors
- ✓ How Barry Schrager Changed Your World Believe it!
 Both Edited By Julie-Ann Williams julie@sysprog.co.uk





Publications:

- ✓ HCD Reference Summary: V1R12 SX33-9032-05

- ☑ CICS Audit Essentials Julie-Ann Williams, Cairns, Warren, and 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





IBM Health Checker for z/OS – Getting Started

✓ 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 selfdirected 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.

⊻ Your Instructor:

Mr. Gordon Daniel, Director of Development NewEra Software, Inc. gordon@newera.com

Requesting the Lab:

Send Email to – support@newera.com
Subject – Send HC Lab





The Very Latest in Self-Help:

- 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
- ▼ The Beginning of Data Security as We Know it Today
 How Barry Schrager Changed Your World
 - www.share-sec.com



Continuing Education Credit







That's it folks, all done!



Session Evaluation - Session Number - 10471

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

- Requesting StepOne:

 Send Email to support@newera.com
 Subject Send StepOne
- ✓ Requesting HC Lab:Send Email to support@newera.comSubject Send HC Lab
- Requesting White Paper:

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