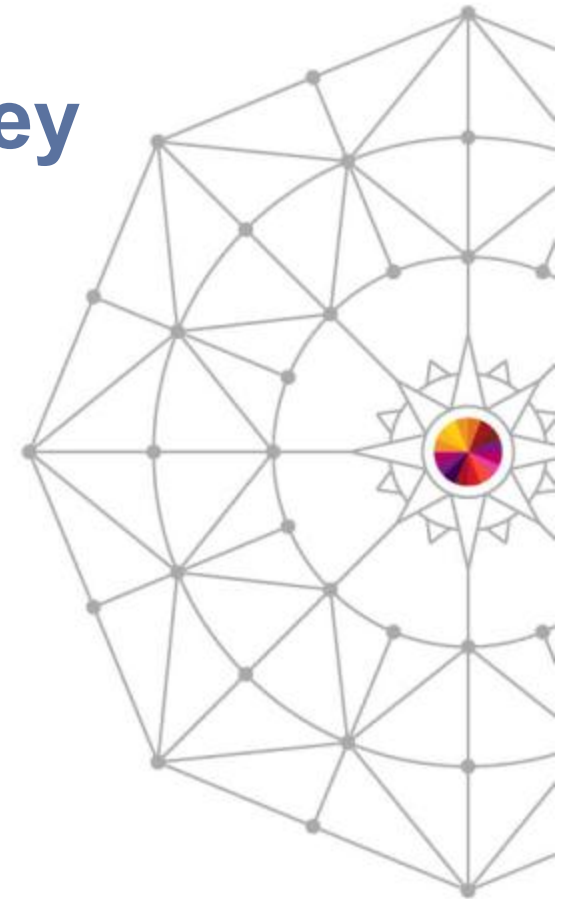




Exploiting z/OS – Tales from the MVS Survey

Cheryl Watson and Frank Kyne
Watson & Walker, Inc.
www.watsonwalker.com
cheryl@watsonwalker.com
frank@watsonwalker.com

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Session 15044



Abstract



The SHARE MVS Program Survey asked members about whether they had exploited certain z/OS enhancements. In many cases, we found that some people weren't sure about whether an enhancement even applied to them. So Cheryl and Frank are taking many of the items and providing information about: what the enhancement does, who can benefit from it, how hard or easy is it to implement, what references are available, how much it costs, and whether people are using it. In addition to the survey enhancements, they'll include other important new functions to either exploit or avoid, including enhancements in z/OS 2.1.



Who we are

- Watson & Walker, Inc.
 - *Cheryl Watson's Tuning Letter*
 - *Cheryl Watson's System z CPU Charts*
 - Software products BoxScore & GoalTender
 - Consulting
 - Classes
 - z/OS advocates

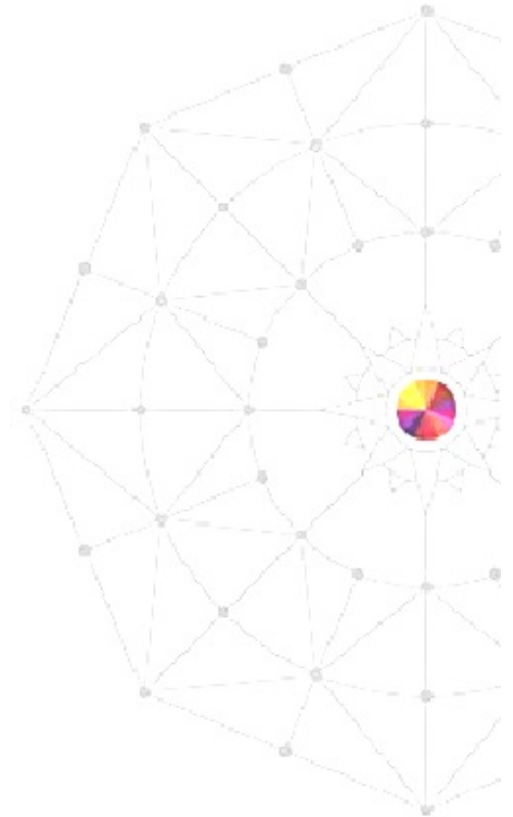


Who we are

- Cheryl Watson
 - Working with IBM machines since 1965.
 - Has a passion for measurement data, especially for MVS performance, capacity planning, chargeback, and reporting.
 - Never met an SMF record she didn't like.
- Frank Kyne
 - Working with IBM machines since 1978, starting in Ireland.
 - Most recently with ITSO as Redbooks project leader, taught classes on 6 continents, led project to create prototype for z/OS Health Checker, worked as consultant, and "led or contributed to more Redbooks than he can remember."
 - Joined Watson & Walker on Saturday as editor, writer, consultant, class developer, and teacher.

Agenda

- MVS Program Survey
- Top Functions That Provided the Most Benefit
- Next Top 4 Functions
- Recent New Functions
- z/OS 2.1 Features
- Exploiting z/OS 2.1 Today



MVS Survey

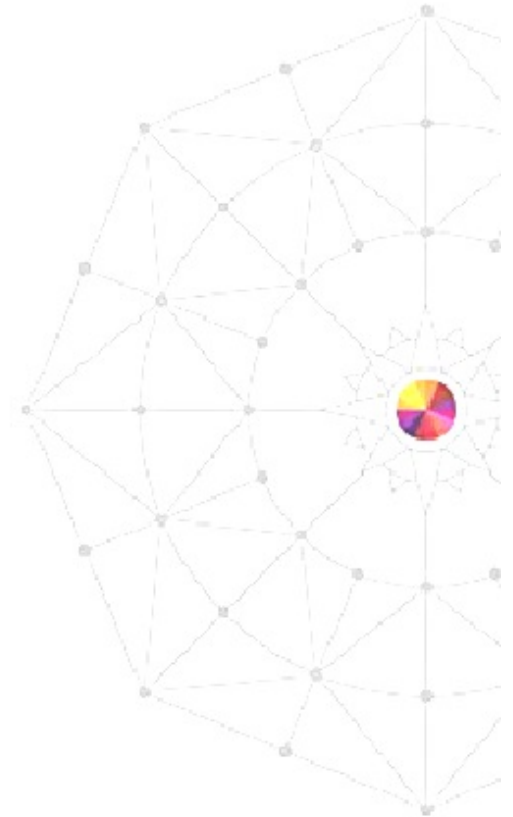
- In July 2012, the MVS program decided to conduct an online survey to determine how and whether installations were exploiting the enhancements in each z/OS release.
- The purpose of this session to explore those results and discuss new exploitation opportunities.
- You can see the full results of the survey by going to www.share.org/mvs and signing up to be a member; then look at the Forum for MVS Program Announcements.
- A new survey will soon be sent out to everyone signed up as a member of the SHARE MVS Program.

Which functions provided the most benefit?

- Presented at 2013 Winter SHARE
 1. Health Checker (21%); 77% have implemented it
 2. HyperPAV (21%); 55% have implemented it
 3. zIIPs/zAAPs (16%); 76% have zIIPs; 25% have zAAPs; 29% planning on zAAP on zIIP facility
 4. zFS (12%); 64% have migrated system files from HFS to zFS; 49% have migrated user files from HFS to zFS
 5. HiperDispatch (11%); 46% have HiperDispatch turned on

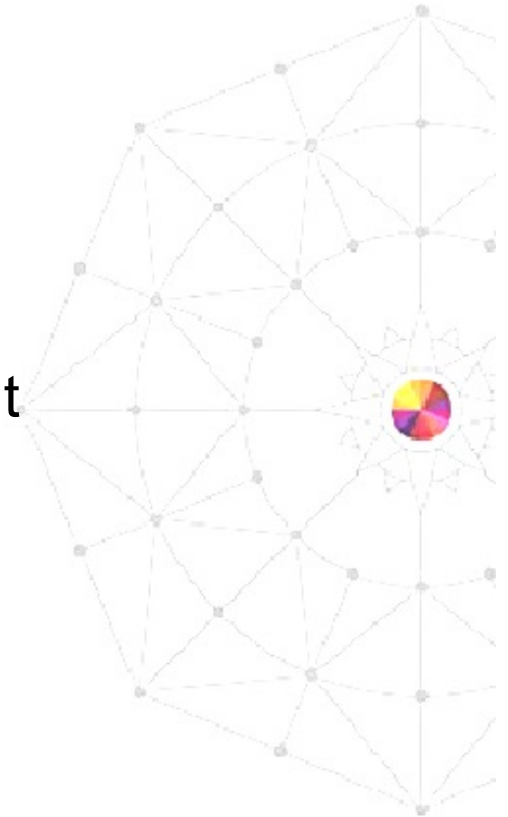
Which functions provided the most benefit?

- Presented at 2013 Summer SHARE
 6. zHPF (21%); 30% have implemented it
 7. BCPii (7%); 35% have implemented it
 8. EAVs (7%); 30% have implemented them
 9. OPERLOG (7%); 51% have implemented it



Which next 4 functions provided the most benefit?

- Next four functions
 10. RLS (5%); 36% have implemented it
 11. z/OSMF (5%); 24% have implemented it
 12. SMF Logger (5%); 20% have implemented it
 13. AUTOIPL (4%); 30% have implemented it



Which next 4 functions provided the most benefit?

10. RLS (5%)

- 36% have implemented VSAM Record Level Sharing (RLS) on production or test systems.
- RLS is a form of VSAM buffering that serializes across LPARs at the record level by use of a coupling facility and its own address space (SMSVSAM).
- Initial inhibitors – code was unreliable; no exploiters; had no coupling facilities.
- Environments – where sharing of VSAM files is needed.

Which next 4 functions provided the most benefit?

10. RLS References

- IBM Manual GY27-7618 – *DFSMSdfp Diagnosis (z/OS 1.13)*
- IBM Manual SC26-7402 – *DFSMS Storage Administration Reference (z/OS 1.13)*
- IBM Manual SC26-7410 – *DFSMS Using Data Sets (z/OS 1.13)*



Which next 4 functions provided the most benefit?

10. RLS References

- IBM Redbook SG24-6105 – *VSAM Demystified*
- IBM Redbook SG24-4892 – *DFSMS/MVS V1R4 Technical Guide*
- IBM Redbook SG24-4766 - *CICS and VSAM Record Level Sharing: Implementation Guide*
- IBM Redbook SG24-4765 - *CICS and VSAM Record Level Sharing: Planning Guide*
- IBM Redbook - SG24-4768 - *CICS and VSAM Record Level Sharing: Recovery Considerations*

Which next 4 functions provided the most benefit?

10. RLS References

- SHARE 2014 Anaheim session 15090, Neal Bohling, *DFSMS Advanced: Leveraging VSAM RLS Best Practices*
- SHARE 2014 Anaheim session 15089, Neal Bohling, *Using RLS with Your Catalogs – a How-To*
- SHARE 2013 Boston session 14153, Neal Bohling, *DFSMS Advanced: RLS Diagnostics and Recovery*
- SHARE 2010 Boston session 8062, Douglas Lehr, *DFSMS Advanced Topics: VSAM Record Level Sharing (RLS) Best Practices*

Which next 4 functions provided the most benefit?

10. RLS References

- H&W Computer Systems - <http://www.hwcs.com>
 - Competitive product to TVS – SYSB-II
 - Many white papers & presentations on RLS and TVS at www.hwcs.com/software/sysb-ii/white-papers and www.hwcs.com/software/sysb-ii/presentations.
- Innovation Data Processing - www.fdr.com/index.cfm
 - Competitive product – IAM and IAM/PLEX
 - White papers and presentations found at www.fdr.com/products/iam/iamplex.cfm under Information tab



Which next 4 functions provided the most benefit?

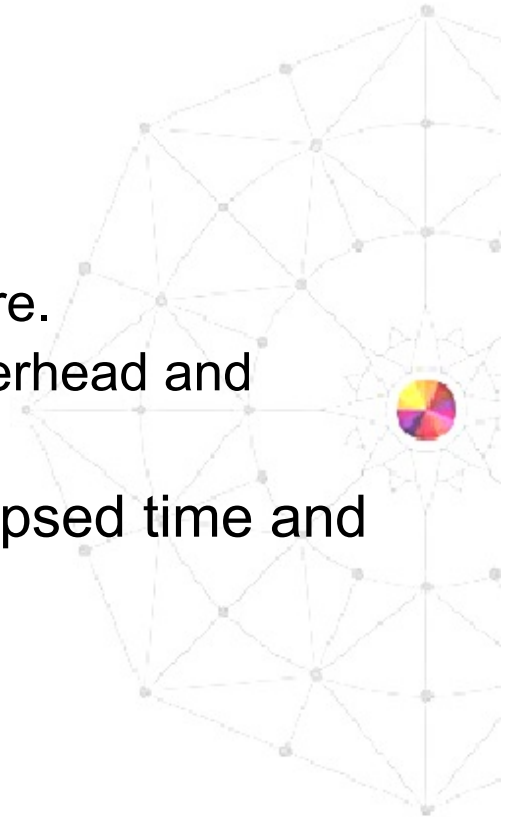
10. RLS Benefits

- Allows simultaneous access from multiple LPARs and multiple applications, but non-recoverable jobs, such as batch, can only open a recoverable data set with READ ONLY.
- Provides high throughput for multiple accesses.
- Provides the base for Transactional VSAM (TVS), which provides recovery capabilities for VSAM RLS users (such as CICS and batch updating VSAM files simultaneously).

Which next 4 functions provided the most benefit?

10. RLS Benefits

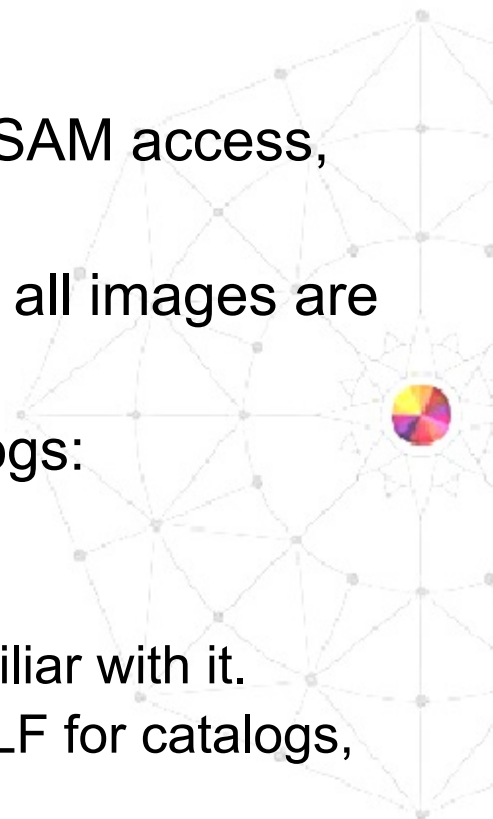
- CICS gets two benefits from RLS:
 - Elimination of FOR removes single point of failure.
 - Reduction of function shipping reduces CPU overhead and reduces response time.
- RLS-managed catalogs provide significant elapsed time and CPU time savings for direct processing.



Which next 4 functions provided the most benefit?

10. RLS Recommendations

- If you are using CICS FORs for multi-image VSAM access, consider RLS to gain the benefits.
- Wait on z/OS 2.1 RLS-managed catalogs until all images are z/OS 2.1, and others have found the APARs.
- Position yourself now for RLS-managed catalogs:
 - Convert all catalogs to SMS-based.
 - Identify all ISV products that touch catalogs.
 - If not already using RLS, start using it to get familiar with it.
 - Get performance improvements now by using VLF for catalogs, and converting catalogs to ECS
 - *check status with: f catalog,allocated*



Which next 4 functions provided the most benefit?

11. z/OSMF (4%)

- 24% have implemented z/OSMF on production or test systems
- z/OS Management Facility is tool to provide multiple sysprog functions in a single GUI interface with the intention to reduce sysprog time for frequent tasks.
- Primary complaint – takes too many resources; and “I have my own way of doing things”
 - Resource usage is dramatically reduced in z/OS 2.1
- Primary misconception – it’s only for new sysprogs

Which next 4 functions provided the most benefit?

11. z/OSMF References

- z/OSMF website - www.ibm.com/systems/z/os/zos/zosmf/
- z/OSMF Information Center
- IBM Education Assistant
- IBM Redbook SG24-7946-00 – *z/OS V1R13 Implementation*
- IBM Redbook SG24-7851-01 – *IBM z/OS Management Facility V2R1*
- IBM Manual SA38-0652 / SA38-0657 (2.1) – *z/OS Management Facility Configuration Guide*
- IBM Manual SA38-0654 (1.13) – *z/OS Management Facility Messages*
- IBM Manual SA32-1066 (2.1) – *z/OS Management Facility Programming*

Which next 4 functions provided the most benefit?

11. z/OSMF References

- SHARE 2014 Anaheim sessions:
 - 15220, Glenn Anderson, *Understanding z/OSMF for the Performance Management Sysprog*
 - 15050, Greg Daynes, *z/OSMF 2.1 Implementation and Configuration*
 - 15122, Anuja Deedwaniya, Ed Webb, Riaz Ahmad, *z/OSMF User Experiences*
 - 15103, Greg Daynes, *New z/OSMF Software Management Capabilities*
 - 15115, Anuja Deedwaniya, *The New and Improved z/OSMF 2.1*
 - 15210, Horst Sinram, *RMF: The Latest and Greatest*

Which next 4 functions provided the most benefit?

11. z/OSMF References

- SHARE Boston sessions:
 - 14247, Anuja Deedwaniya, *z/OSMF Configuration Made Easy*
 - 14253, Anuja Deedwaniya, *Diagnosing Problems on my z/OS System – New Technologies*
 - 14267, Geoff Smith, Dan Hui Fan, *Engaging Users and Reducing Complexity: z/OSMF Software Deployment Project Usability Discussion*



Which next 4 functions provided the most benefit?

11. z/OSMF Benefits

- Improves sysprog and performance analyst productivity.
- Provides easier training for new sysprogs.
- Implements “Best Practices”.
- Provides software management, which is a totally new feature unavailable through other techniques.
- Positions you for use of workflow scenarios to decrease the time to implement other features in z/OS 2.1.



Which next 4 functions provided the most benefit?

11. z/OSMF Recommendations

- Install this on your test or development system as soon as possible (caution – prior to z/OS 2.1, it might run as slow as molasses on a small LPAR, but just have patience and see the benefits).
- For small production LPARs, wait until z/OSMF 2.1 where it uses the WAS Liberty Profile:
 - z/OS 1.13 with WAS OEM – 4,481 cylinders down to 602 cylinders.
 - z/OS 2.1 can start up in seconds versus minutes on small LPAR.

Which next 4 functions provided the most benefit?

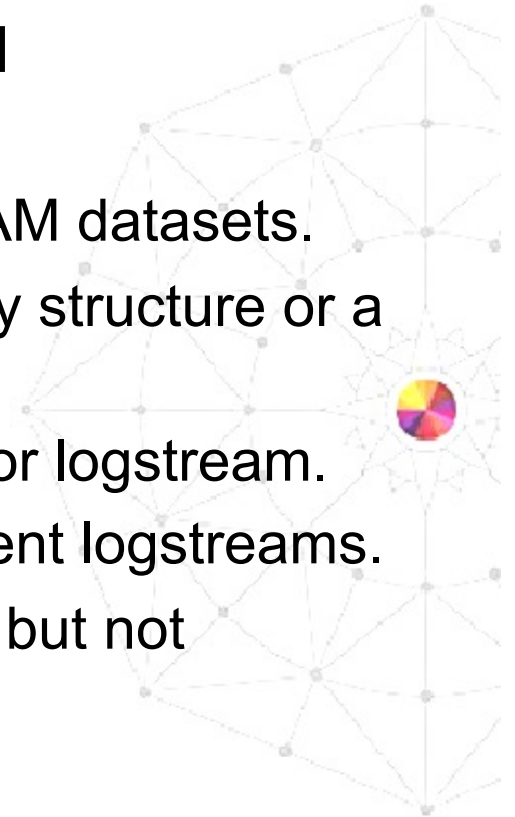
11. z/OSMF Recommendations

- Implement WLM first because it is very easy and very popular;
- ...then software management because it's new information you haven't had access to before;
- ...then configuration assistant for TCP/IP because the download version is going away;
- ...then incident log because it implements best practices and reduces sysprog time (even if it takes a little more setup);
- ...then ISPF because it's fun;
- ...then workflows because they'll save time!

Which next 4 functions provided the most benefit?

12. SMF Logger (5%); 20% have implemented

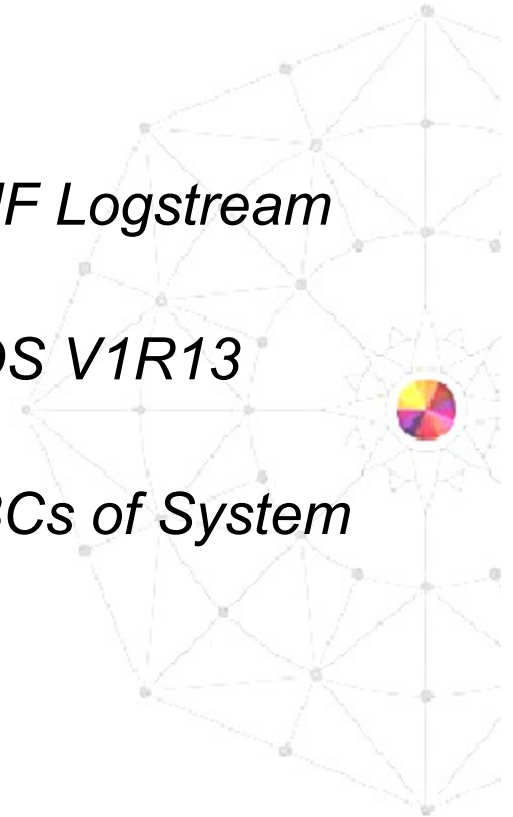
- Initially, SMF was written to pre-initialized VSAM datasets.
- SMF Logger allows writing to a coupling facility structure or a DASD-only logstream.
- Multiple LPARs can record to same structure or logstream.
- You can record different record types to different logstreams.
- Requirements: z/OS 1.9; coupling facility best but not required.



Which next 4 functions provided the most benefit?

12. SMF Logger

- IBM Redbook SG24-7919-00 (Feb2011) – *SMF Logstream Mode: Optimizing the New Paradigm*
- IBM Redbook SG24-7946-00 (Mar2012) – *z/OS V1R13 Implementation*
- IBM Redbook SG24-6985-02 (May2011) – *ABCs of System Programming: Volume 5*



Which next 4 functions provided the most benefit?

12. SMF Logger References

- SHARE 2014 in Anaheim session 15099, Dale Riedy, *zEnterprise Data Compression: What is it and How Do I Use it?*
- SHARE 2014 session 15080, Cecilia C. Lewis, *z/OS zEnterprise Data Compression Usage and Configuration*
- SHARE 2014 in Anaheim session 15219, Glenn Anderson, *Top New z/OS Performance Functions Every Sysprog Should Understand*

Which next 4 functions provided the most benefit?

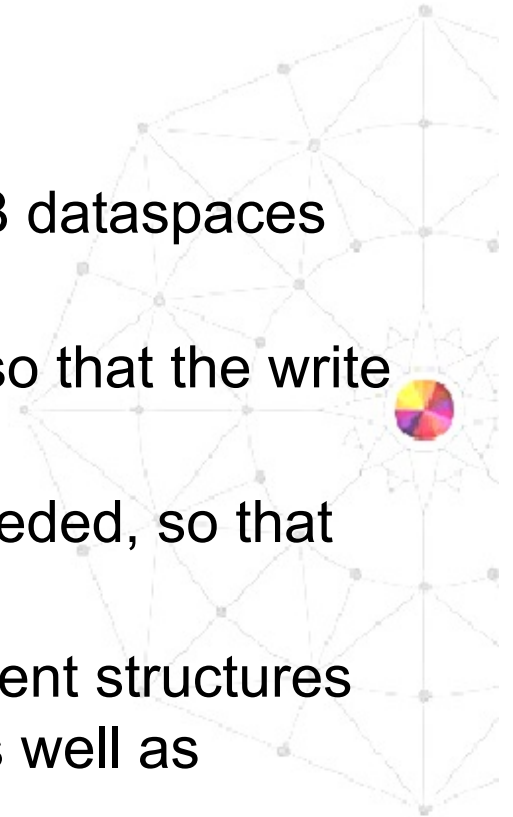
12. SMF Logger References

- SHARE 2013 in San Francisco session 13034, Glenn Anderson, Skip Robinson, *z/OS SMF Logstream Mode: Update and User Experience*
- SHARE 2013 in San Francisco session 13043, Cheryl Watson, *SMF 101: Everything You Should Know and More*
- SHARE 2012 in Anaheim session 11715, Nicholas Jones, *System Logger Update*
- SHARE 2008 in Orlando session 2853, Peter Relson, *Record Your SMF Data to the System Logger!*

Which next 4 functions provided the most benefit?

12. SMF Logger Benefits

- Buffers don't overflow because they're in 2 GB dataspace (as many as needed)
- Each dataspace is managed by its own task, so that the write rate is increased.
- Logstreams are offloaded to DASD files as needed, so that you can't run out of space.
- The ability to separate record types onto different structures and logstreams can increase the write rate, as well as reducing post-processing time.

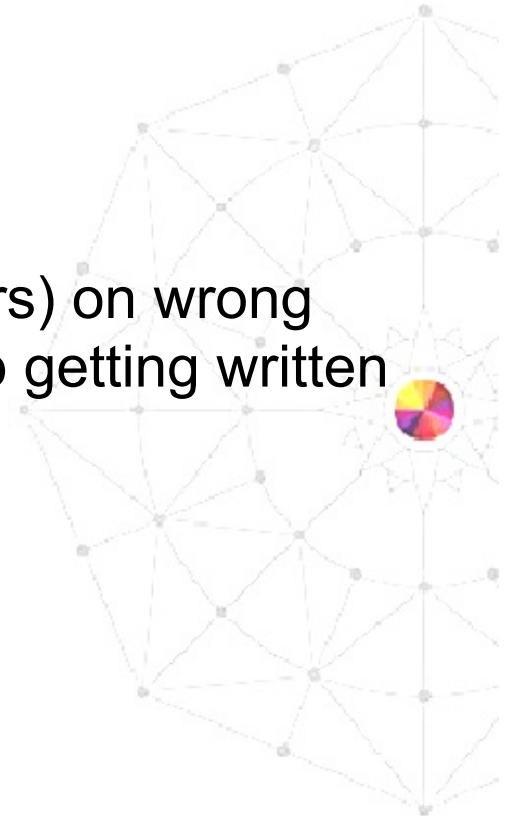


Which next 4 functions provided the most benefit?

12. SMF Logger Benefits

- There is no need to preformat SMF datasets.
- If operator issues 'z eod' (clear out SMF buffers) on wrong system, you can recover the records that keep getting written easily:

```
V  SYSLOG, HARDCPY, ROUT=ALL  
SET  SMF=00
```



Which next 4 functions provided the most benefit?

12. SMF Logger Benefits

- z/OS 2.1 SMF Logger on a zEC12 (GA2) or zBC12 can use new hardware zEnterprise Data Compression (zEDC)
 - This reduces the amount of **space, CPU time, and elapsed time** when recording SMF to the SMF logger.
 - But if you try to read the compressed file on a system prior to z/OS 2.1, you'll need APAR OA41156, which will use software decompression when using IFASMF DL (the dump logger program).

Which next 4 functions provided the most benefit?

12. SMF Logger Recommendation

- Many people have been waiting to install the SMF Logger because there were some problems initially (e.g. duplicate records, difficult to automate, not supported by all products).
- We think those problems are now resolved, and we **HIGHLY** recommend that you migrate to SMF Logger.
- All enhancements from this point on will be for the SMF logger, so if you want new functions, migrate now.

Which next 4 functions provided the most benefit?

13. AUTOIPL (4%); 30% have implemented it

- Introduced in z/OS 1.10.
- The AUTOIPL function is enabled and controlled by a parameter in the DIAGxx member (keyword is AUTOIPL, surprisingly!).
- AUTOIPL can be invoked when a system enters a wait state. You can specify if you want to automatically initiate a standalone dump, or re-IPL z/OS, or both.
- You can also specify that a system being partitioned out of the sysplex should automatically re-IPL itself by specifying the REIPL option on the VARY XCF command.
- NOTE – This function does NOT require BCPii

Which next 4 functions provided the most benefit?

13. AUTOIPL References

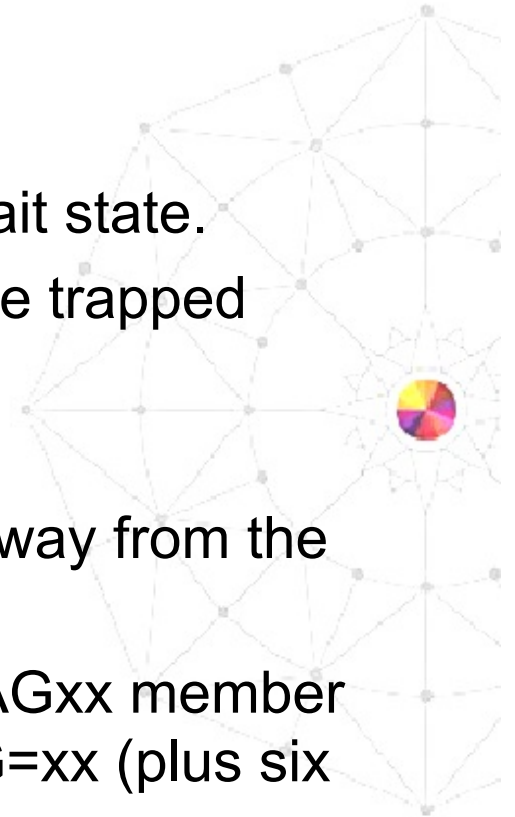
- SHARE 2013 in Boston, 13847: *Recent z/OS Enhancements You Can Use to Reduce Down Time*
- IBM Redbooks SG24-7816-00 – *System z Mean Time To Recovery Best Practices*
- IBM Manual SA22-7601 – *z/OS MVS Planning: Operations*



Which next 4 functions provided the most benefit?

13. AUTOIPL Benefits

- Reduces mean time to recovery following a wait state.
- Lets you ensure that a standalone dump will be trapped following a wait state.
- Reduces operator time.
- Keep operators (and system programmers!) away from the HMC.
- EASY to implement – 2 minutes to update DIAGxx member and activate changed member with SET DIAG=xx (plus six months for change management..).



Which next 4 functions provided the most benefit?

13. AUTOIPL Recommendation

- Implement this as soon as you can (except if you are GDPS/PPRC customer – GDPS/PPRC wants to control all IPLs).
- Review operator procedures to see if they can use V XCF,sysname,OFFLINE,REIPL rather than using HMC for IPL.
 - If you want to IPL using a different sysres, you can update DIAGxx to point at the new sysres
- Test various scenarios in a sandbox system.



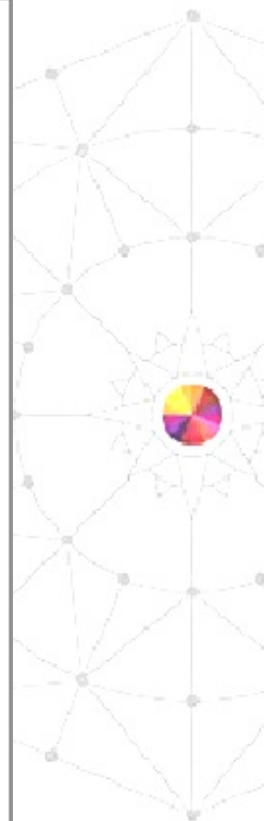
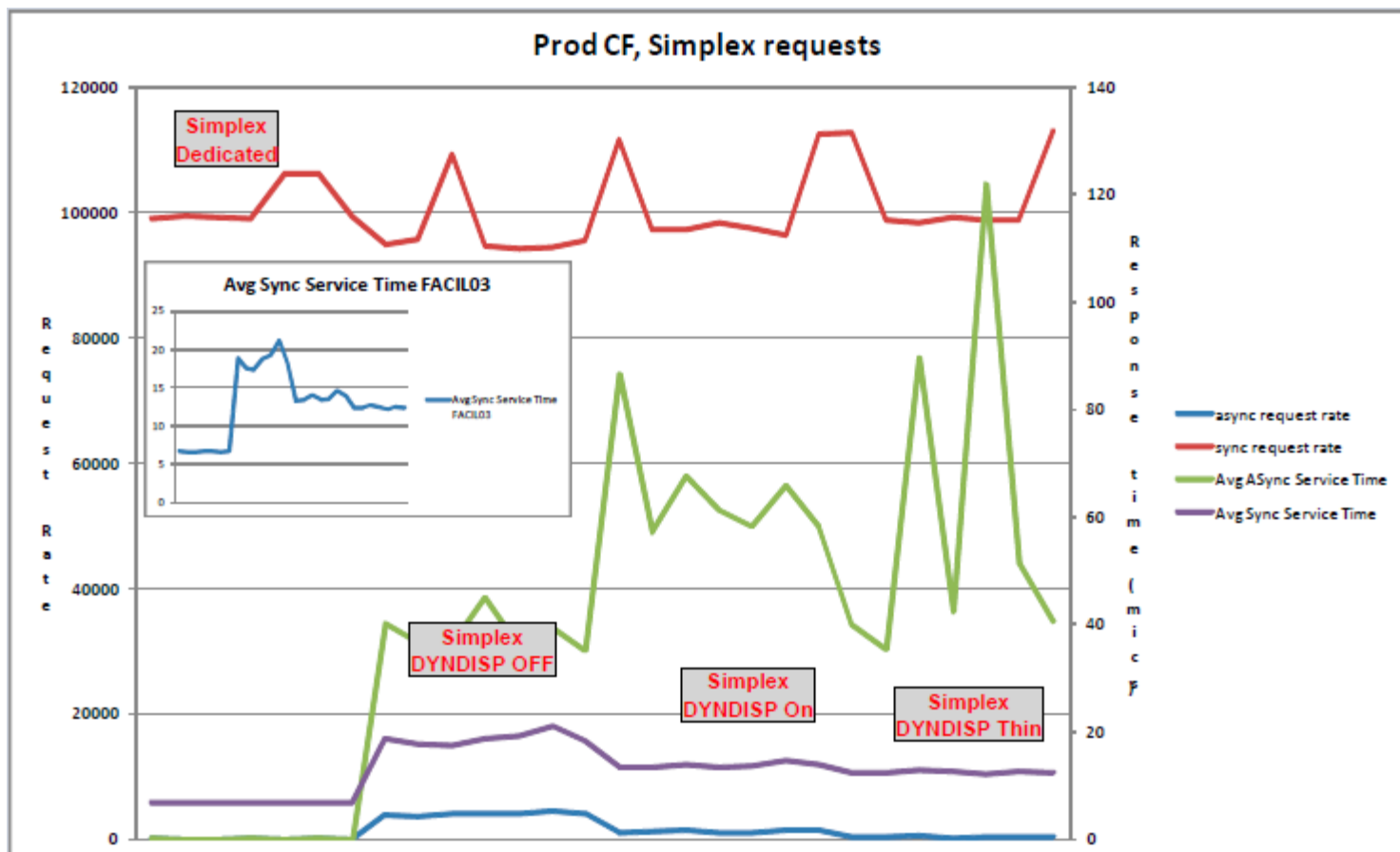
Recent New Functions to Exploit

- New COUPLExx Parameters
 - FUNCTIONS ENABLE(DUPLEXCFDIAG) with CFLEVEL 17 collects data in case of a problem with a SM duplexed structure. (Base z/OS 1.13, but not documented for a year.)
 - FUNCTIONS ENABLE(CFSTRQMON) enables system messages (IXL053E/IXL055I) if asynchronous requests are backed up waiting for a Coupling Facility. (APAR OA41203 on z/OS 1.12-2.1.)
 - APAR also enables fair queueing of CF requests to ensure one structure can't dominate all CF resources
 - Both reduce effort to diagnose CF problems.
 - Both are disabled by default.
 - Recommendation: Enable them both.

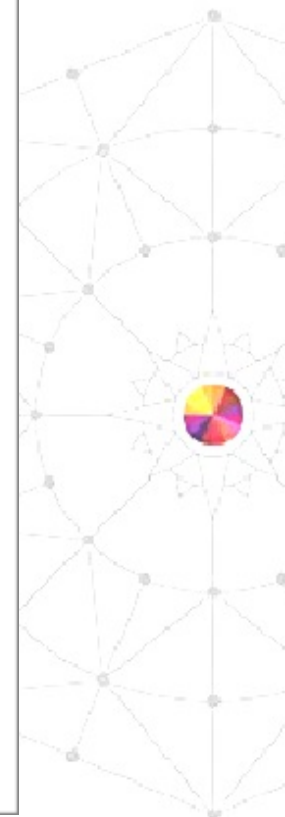
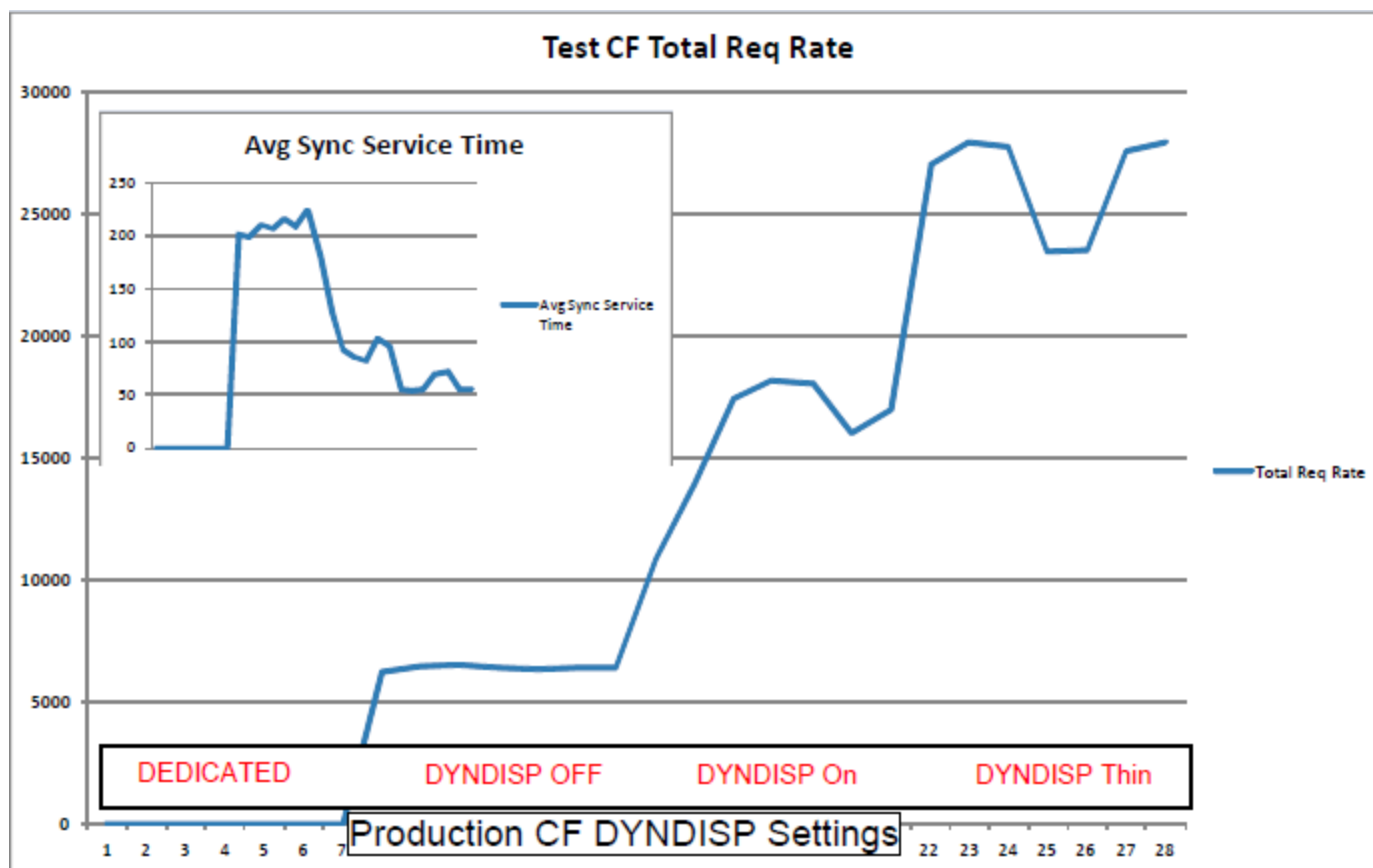
Recent New Functions to Exploit

- Coupling Thin Interrupts
 - Possibly *even better* than sliced bread....
 - New hardware capability with Driver 15 (zBC12, zEC12 GA2)
 - Applies to CF LPARs with shared engines
 - Requires that you explicitly enable it using the DYNDISP CFCC command
 - Applies to *any* z/OS LPAR that is talking to a CF
 - Works with both dedicated and shared z/OS engines.
 - Turned on automatically when running on Driver 15 HW and GA2 PTFs applied
 - Enabling on z/OS and CF are completely independent of each other.

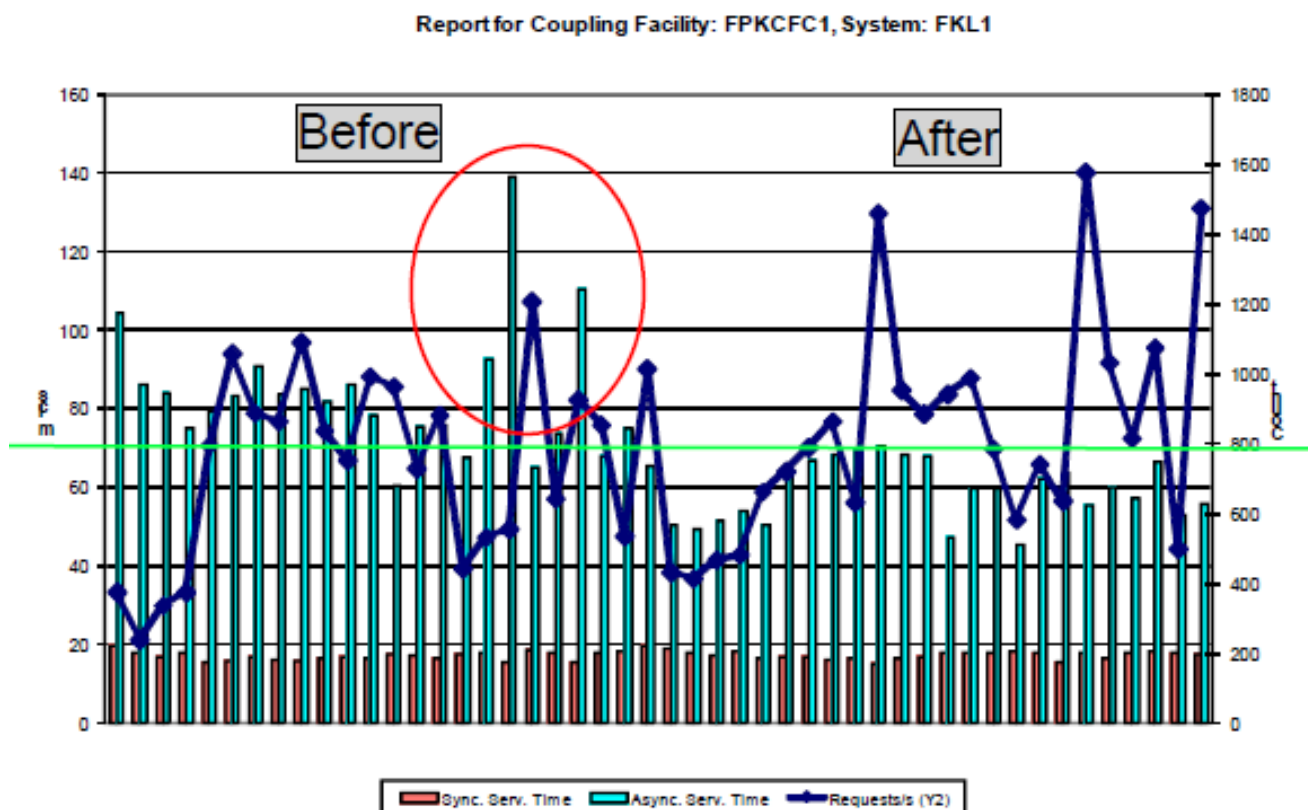
Coupling Thin Interrupts – CF End



Coupling Thin Interrupts – CF End

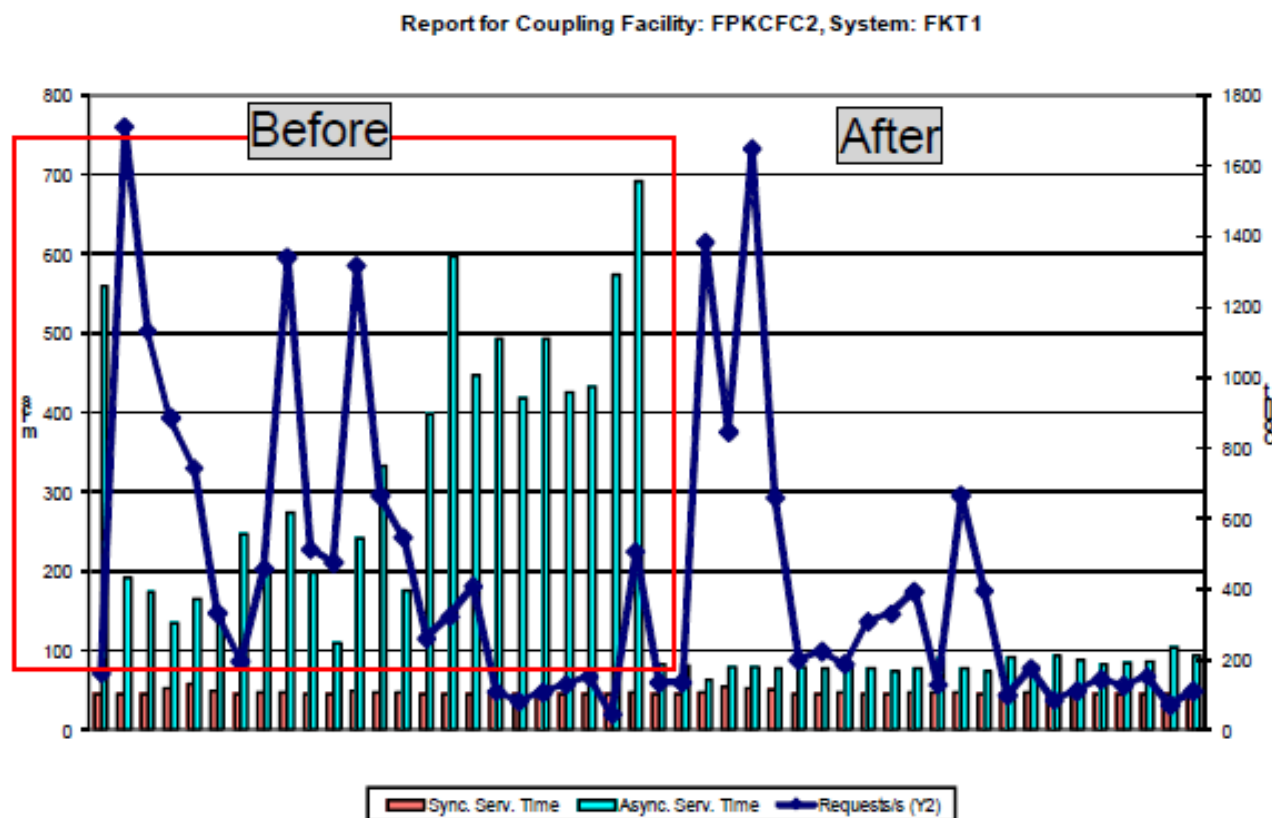


Coupling Thin Interrupts – z/OS End



Production z/OS

Coupling Thin Interrupts – z/OS End



Test z/OS with low weight compared to production LPARs it was sharing engines with

Recent New Functions to Exploit

- Coupling Thin Interrupts on z/OS
 - And the nicest part???
 - IT IS ALL AUTOMATIC!! As long as z/OS is running on Driver 15 CEC and Driver 15 PTFs are applied, this just happens automagically.
 - Although, if you LIKE poor performance, you can turn it off using the SETXCF FUNCTIONS,DISABLE(COUPPLINGTHININT) command.

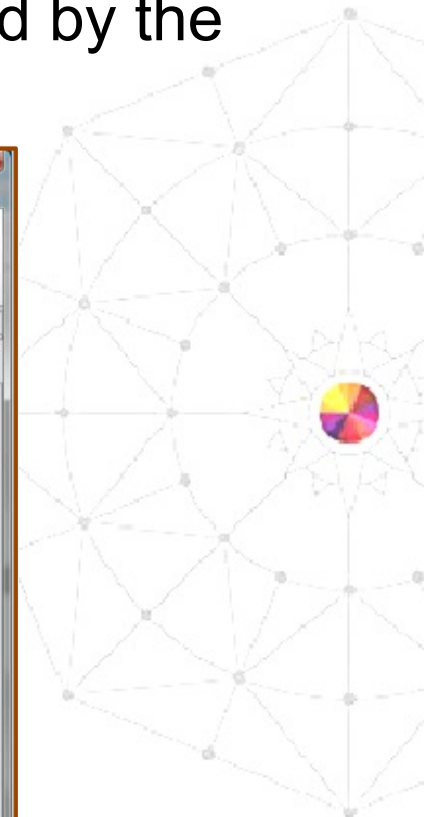
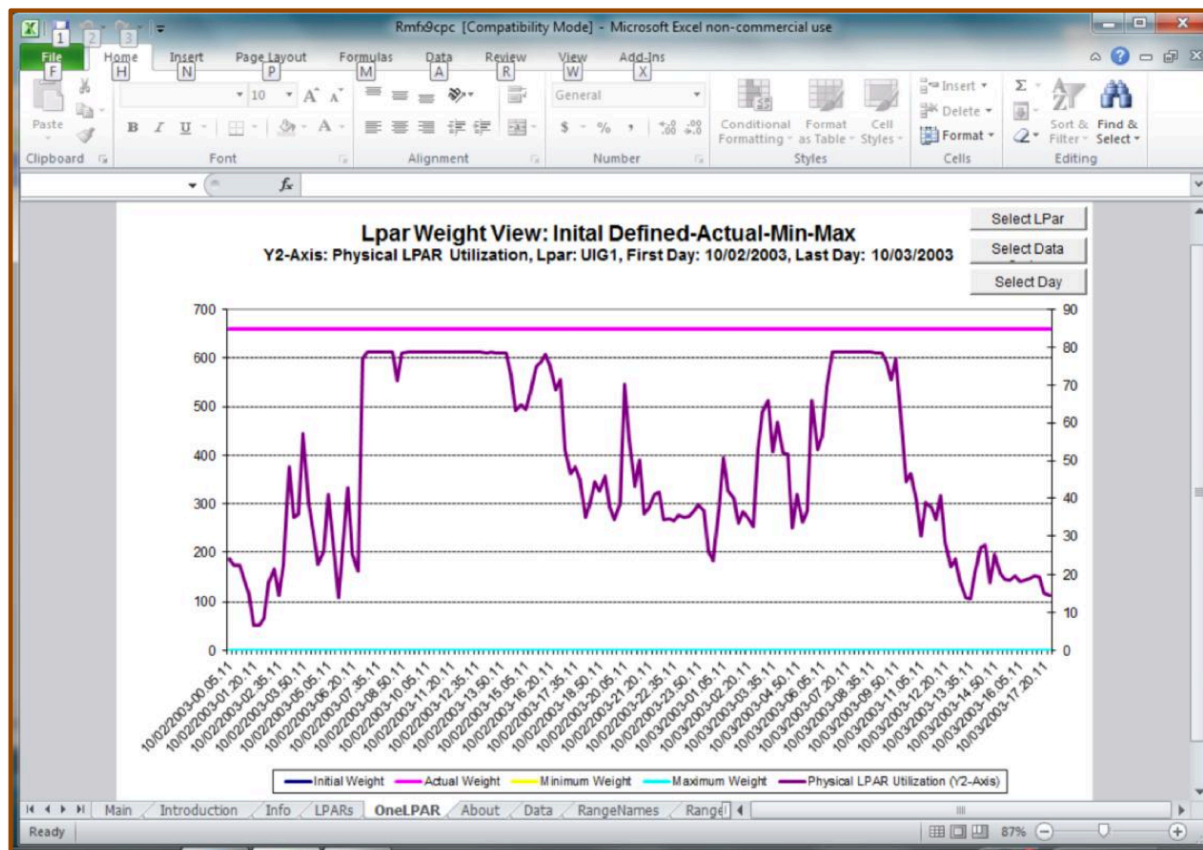


(Not so) Recent New Functions to Exploit

- RMF Postprocessor XML support
 - Nearly all RMF postprocessor reports have been updated to allow producing the reports in XML format.
 - Benefits: Easier to use, can sort by columns, can be converted to CSV and processed by your own programs, can be used for graphing (and there are lots of pre-formatted graphs supplied by the RMF Spreadsheet Reporter).
 - Most recent reports (e.g serialization delays, and PCIe activity like zEDC and RoCE) are available ONLY in XML format.
 - Therefore, you need to learn to use the RMF XML Toolkit and RMF Spreadsheet Reporter.
 - The Spreadsheet Reporter is THE greatest thing since sliced toasted bread. If you have not used it, you don't know what you are missing....

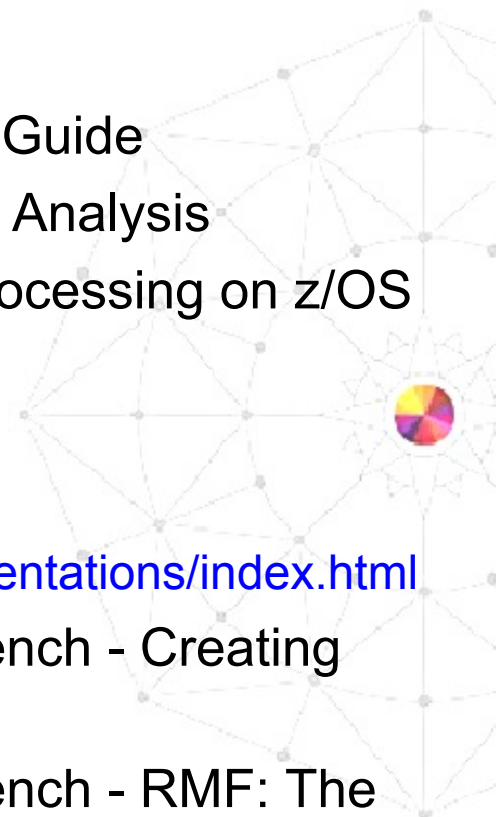
New Functions to Exploit

- Sample RMF Postprocessor report as presented by the RMF Spreadsheet Reporter



New Functions to Exploit

- RMF Monitor I Postprocessor
 - IBM Manual - SC34-2664-00 - z/OS 2.1 RMF User's Guide
 - IBM Manual - SC34-2665-00 - z/OS 2.1 RMF Report Analysis
 - IBM Redbook SG24-7810-00 (16Dec2009) - XML Processing on z/OS
 - IBM RMF home page:
 - <http://www.ibm.com/systems/z/os/zos/features/rmf>
 - IBM RMF Presentations:
 - <http://www.ibm.com/systems/z/os/zos/features/rmf/presentations/index.html>
 - SHARE 2013 in Boston - Session 13955 - Peter Muench - Creating RMF Post-processor XML Reports - Hands On Lab.
 - SHARE 2013 in Boston - Session 14214 - Peter Muench - RMF: The Latest and Greatest.



Recent New Functions to Exploit

- SMF Field Additions:
 - VSAM RLS
 - APARs OA43380 and OA43381 add count of CI and CA split counts for VSAM RLS files.
 - Fields added to SMF type 42, subtype 15 and subtype 16 records (because, at 69 pages of the SMF manual, those records just didn't have enough fields....).
 - DB2 Versions 9, 10, and 11
 - APAR PI08262 corrects error where IFCID doesn't include zIIP-eligible CPU time when run on a CP during a DB2 SORT.

z/OS 2.1 Functions to Exploit

- ALLOCxx Parmlib Member
 - SYSTEM BATCH_RCLMIGDS(SERIAL/PARALLEL) – controls whether migrated data sets that are needed by a batch job are recalled serially (the traditional way) or in parallel.
 - Can reduce job execution time, and user delay time.
 - Old method of SERIAL is default.
 - Recommendation: Change default to PARALLEL.



z/OS 2.1 Functions to Exploit

- DIAGxx Parmlib Member
 - CBLOC parameter identifies structures to be placed in 31-bit virtual instead of 24-bit virtual.
 - z/OS 2.1 added structure IHAASVT (Address Space Vector Table).
 - Default is to keep it in 24-bit.
 - Recommendation: Move it to 31-bit.

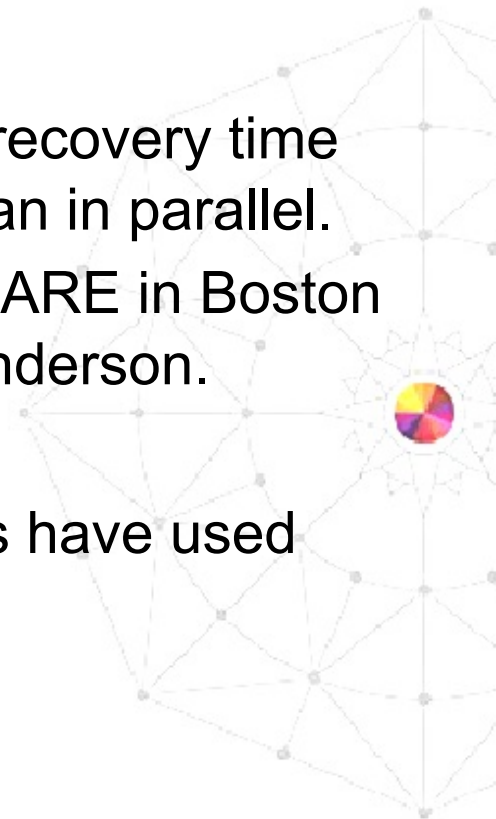


z/OS 2.1 Functions to Delay

- BPXPRMxx Parmlib Member
 - LOSTMSG(ON/OFF) indicates whether detection of lost and duplicate XCF messages is activated.
 - New note in z/OS 2.1 manual (but no change bars):
Tip: Do not use LOSTMSG(ON) when z/OS UNIX sysplex traffic is high, such as when many file systems that are not sysplex-aware are being accessed remotely, because performance might be affected.
 - Recommendation: If CPU time is critical and you have high z/OS Unix traffic, then set this to OFF.

z/OS 2.1 Functions to Delay

- COUPLExx Parmlib Member
 - CFLCRMGMT could reduce CF LOSSCONN recovery time by processing CF structures serially, rather than in parallel.
 - This should reduce rebuild time. See 2013 SHARE in Boston session 14231 by Mark Brooks and Diana Henderson.
 - APAR OA41824 has several fixes for this.
 - Recommendation: Wait until more installations have used this.

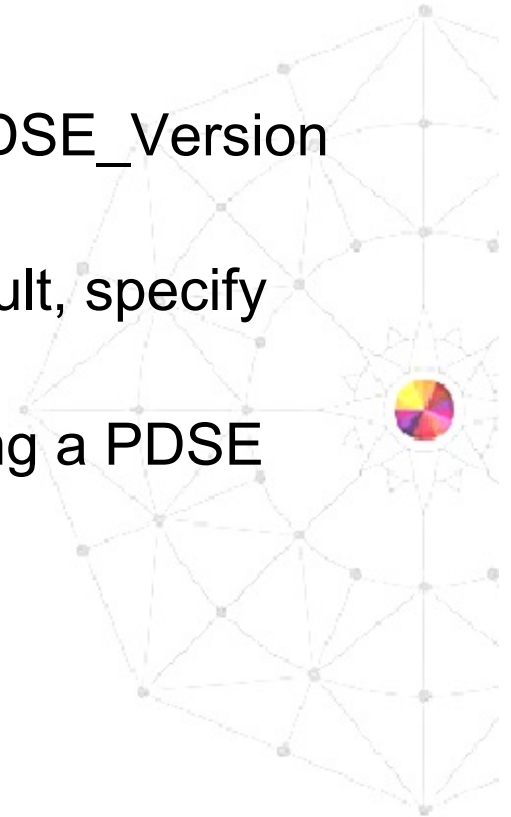


z/OS 2.1 Functions to Delay

- PDSE
 - New type of PDSE data sets – “Version 2”.
 - V2 PDSE data set provide enhanced partial release, consolidation of directory pages, enhanced read performance, reduced virtual storage, and support for PDSE member generations.
 - To “convert” a V1 PDSE to V2 format, you must use IEBCOPY, then rename – it is not possible to convert an existing V1 PDSE into V2 format.
 - If PDSE has variable records and a program uses an OPEN followed by a ‘blind’ point to the end of the member, then keep as a V1 PDSE.
 - Recommendation: Wait until more installations have used this because of enhancements that might come, and ISV support has been tested more thoroughly.

z/OS 2.1 Functions to Delay

- PDSE
 - You control the default PDSE type using the PDSE_Version keyword in the IGDSMSxx member of Parmlib.
 - To get a PDSE type that is different to the default, specify DSNTYPE=(LIBRARY,x) where x is 1 or 2.
 - You can also specify the version when allocating a PDSE using ISPF 3.2.



z/OS 2.1 Functions to Delay

- PDSE
 - PDSE Member Generation
 - V2 data sets can keep multiple generations of a member, controlled by a MAXGENS keyword.
 - Support is provided with APAR OA42358 (and many, many more).
 - DESERV, ISPF, and IPT can provide info about the older members and retrieve them, but you can't access them with TSO commands or JCL.
 - ISVs were not given adequate notice of this enhancement, so check with IBM and your ISV vendor to see if their products are ready to support this feature.
 - Recommendation: This seems like a very powerful and extremely useful and desirable feature, but wait until code stabilizes.

Exploiting z/OS 2.1 Today

(Dupe of last SHARE)

- APARs let you exploit many 2.1 functions on z/OS 1.12 and 1.13 today
- z/OS 1.12 and above:
 - zHPF support for EXCP – OA38185
 - Increase spin data sets for JES2 – OA38944/PM59496
 - XCF performs additional validation – OA40966
 - Basic Hyperswap reduces false freezes – OA37632
 - RACF health checks – OA37164
 - zAAP on zIIP support works if zAAP is available – OA38829
 - Interrupt delay time facility on zEC12 – OA39993

Exploiting z/OS 2.1 Today

(Dupe of last SHARE)

- z/OS 1.12 and above:
 - OA38328 lets you add comments to COMMNDxx, GTFPARM, IEAABD00, IEACMD00, IEADMP00, IEADMR00, IEAPAKxx, IEASYSxx, LPALSTxx, VATLSTxx parmlib members.
- z/OS 1.13:
 - System logger enhancement to use separate tasks – OA38613/OA40633/OA41465/OA41470
 - XCF IXCNOTE note pads – OA38450
 - z/OSMF software management – PM73833/PM80167
 - z/OSMF application linking – PM74502/PM74508/PM74517
 - z/OSMF capacity provisioning – PM74519
 - Additional text for DFSMS abends – OA37957/OS37505/OA39175

See You in Pittsburgh Aug 3-8!

