CPExpert™

Product Update Bulletin 2005-2

This product update forwards updates to both software and documentation. The software update is Release 15.2 of CPExpert. The release number indicates that it is the second release of 2005.

With Release 15.2, CPExpert has been updated to: (1) provide support for z/OS Version 1 Release 7 (V1R7), (2) provide support for IBM's new processor family (the z9 109 server), (3) provide additional analysis of PR/SM performance problems; (4) provide performance analysis of IBM's Intelligent Resource Director (IRD); (5) provide significantly expanded analysis of system logger performance problems, and (6) provide new or revised rules in other areas.

Additionally, Release 15.2 provides (1) updates to the CICS Component, the DB2 Component, the WebSphere MQ Component, and the DASD Component; (2) provides updated documentation on CD; and (3) corrects errors that have been reported.

- **z/OS Version 1 Release 7 (V1R7).** z/OS V1R7 was made Generally Available (GA) by IBM in September 2005. Since Computer Management Sciences is a Business Partner with IBM, I normally can provide support for new IBM releases within 30 days of GA of the new IBM release.

  One of the significant performances changes with z/OS V1R7 relates to how zAAP/IFA processors are handled by the z/OS Dispatcher. These changes have been incorporated into CPExpert's analysis (CPExpert now analyzes zAAP-related performance problems depending on the version of z/OS).

  - All CPExpert components have been updated to provide support for z/OS V1R7.

  - All CPExpert documentation has been updated with references to applicable z/OS V1R7 documents from IBM.

  - Section 4 (Analyzing the Workload Manager) of the WLM Component User Manual has been updated with comprehensive discussion of the zAAP/IFA changes with z/OS V1R7.

- **Support IBM's new z9 109 server**. With the z9 109 server, IBM has introduced changes in the way PR/SM manages special processors (Integrated Coupling Facility processors, Integrated Facility for Linux processors, and Integrated Facility for Applications processors,). With PR/SM for z9 109, these special processors are managed in individual processor pools, rather than a single "Pool 2" processor pool.

IBM requires PR/SM with z890 and z990 processors, and supports up to 30 LPARs in a single Central Processor Complex. With the z9 109 server, PR/SM supports up to 60 LPARs in a single Central Processor Complex.

- All CPExpert components have been updated to provide support for z9 109 server.

- All CPExpert documentation has been updated with references to applicable z9 109 server IBM documentation.

- **Updates to the WLM Component**. The development work in this update primarily concerns the WLM Component. The WLM Component has been updated in the following areas.

  - **Provide additional analysis of zAAP (IFA) performance problems**. The following rules have been added to the WLM Component to provide additional analysis of performance problems with zAAP/IFA processors:

    - Rule WLM536 (*LPAR had high ratio of central processors to IFA processors*) reports that a significant amount of zAAP-eligible work executed on a central processor (CP) rather than executing on an *Integrated Facility for Applications* (IFA). One possible cause of this situation is that the LPAR (1) had IFACROSSOVER=YES specified, (2) had IFAHONORPRIORITY=YES specified, and (3) had a high ratio of central processors to IFA processors. This finding applies only with z/OS V1R6 (changes with z/OS V1R7 have eliminated this problem).

    - Rule WLM537 (*zAAP-eligible work executed with high Goal Importance*) reports a significant amount of zAAP-eligible work executed on a central processor (CP) rather than executing on an *Integrated Facility for Applications* (IFA). One possible cause of this situation is that (1) IFACROSSOVER=YES was specified in IEAOPTnn, (2) IFAHONORPRIORITY=YES was specified, and (3) the zAAP-eligible work executed in a service class period with a high Goal Importance. With z/OS V1R7, this could be a result of Alternate Weight Management deciding that the IFA processors "need help" because the IFA processors are heavily utilized, and IFAHONORPRIORITY=YES had been specified in IEAOPTxx member of SYS1.PARMLIB.

    - Rule WLM540 (*IFA logical processors have excessive share of Pool 2 processors*) reports that *Integrated Facility for Applications* (IFA) logical processors have a high share of the "special processor" (Pool 2) processor pool. This finding applies only with z890 and z990 servers

    - Rule WLM541 (*IFA logical processors have low share of Pool 2 processors*) reports that *Integrated Facility for Applications* (IFA) logical processors have a low share of the "special processor" (Pool 2) processor pool. The total share that results from the inherited weight from LPARs is less than the purchased IFA capacity. This finding applies only with z890 and z990 servers.

- Rule WLM550 (*Weight of IFA is significantly less than weight of LPAR)* reports that the PR/SM weight associated *Integrated Facility for Applications* (IFA) logical processors is significantly less than the weight of the LPAR. This finding applies only with Intelligent Resource Director (IRD) running on Z890 or z990 server.

- Rule WLM551 (*Weight of IFA is significantly more than weight of LPAR*) reports that the PR/SM weight associated *Integrated Facility for Applications* (IFA) logical processors is significantly more than the weight of the LPAR. This finding applies only with Intelligent Resource Director (IRD) running on Z890 or z990 server.

Note: Rule WLM540, Rule WLM541, Rule WLM550, and Rule WLM551 apply only with z880/z990 processors. The situation to which these rules apply has been corrected with z9 109 processors (with PR/SM on z9 109 processors, each processor type is managed in its own pool of identical processor types).

- **Provide additional analysis of LPAR definition and performance in a PR/SM environment**. CPExpert Release 15.1 provided initial analysis of LPAR definition and PR/SM performance problems. CPExpert Release 15.2 expands this analyzes of potential performance problems with LPAR definitions and performance in a PR/SM environment. The following rules have been added to the WLM Component to analyze PR/SM performance problems:

  - Rule WLM814 (*The number of initial + reserved processors was not optimal*) reports that the total number of initial logical processors plus reserved logical processors was not optimal. In order to implement nondisruptive upgrades, the total number of initial plus reserved processors should be increased.

  - Rule WLM816 (*PR/SM could not enforce LPAR's share of central processors*) reports that the weight assigned to an LPAR resulted in a share of central processor capacity that was not enforceable by PR/SM. PR/SM cannot enforce a weight that results in less than 10% of a physical central processor for a capped LPAR, or results in less than 50% of a physical central processor for an uncapped LPAR.

  - Rule WLM817 (*PR/SM could not enforce LPAR's share of special processors*) reports that the weight assigned to an LPAR resulted a share of special processor capacity that was not enforceable by PR/SM. PR/SM cannot enforce a weight that results in less than 10% of a physical special processor for a capped LPAR, or results in less than 50% of a physical special processor for an uncapped LPAR.

- **Provide analysis of Intelligent Resource Director (IRD) performance problems**. CPExpert Release 15.2 provides *initial* analysis of IRD performance problems. This initial analysis essentially automates the analysis and recommendations that are described in the PR/SM Planning Guides and the *z/OS Intelligent Resource Director* Redbook (SG24-5922). The following rules have been added to the WLM Component to analyze IRD performance problems:

- Rule WLM851 (*WLM CPU Management not set for all LPARs in LPAR Cluster*) reports that WLM CPU Management was set for some LPARs in the LPAR Cluster, but was not set for all LPARs in the LPAR Cluster.

- Rule WLM852 (*An LPAR with dedicated processors was in LPAR Cluster*) reports that one or more LPARs in the LPAR Cluster were defined with dedicated central processors, but these LPARs otherwise were eligible to participate in WLM CPU Management algorithms.

- Rule WLM853 (*Capping was specified for some LPARs in LPAR Cluster*) reports that PR/SM Capping was specified for some LPARs in the LPAR Cluster, but these LPARs otherwise were eligible to participate in WLM CPU Management algorithms.

- Rule WLM855 (*LPAR Weights were not specified as 3-digit values*) reports that the weights for LPARs participating in WLM LPAR Weight Management were not specified as 3-digit values.

- Rule WLM856 (*Minimum weight or maximum weight was specified*) reports that a minimum processing weight or maximum processing weight was specified for an LPAR for which WLM LPAR Weight Management had been selected.

- Rule WLM857 (*Minimum processing weight resulted in less than 5% CPU*) reports that a minimum processing weight was specified for an LPAR for which WLM LPAR Weight Management had been selected. This minimum processing weight resulted in a "guaranteed" share of less than 5% of a cental processor capacity.

- Rule WLM858 (*LPAR Processing Weight: (Initial = Minimum = Maximum)* reports that the LPAR has WLM CPU Management enabled, but the Initial Processing Weight, the Minimum Processing Weight, and the Maximum Processing Weight have the same value. This specification effectively turns off WLM LPAR Weight Management algorithms for the LPAR.

- Rule WLM859 (*Initial Processing Weight of LPAR was changed*) reports that the Initial Processing Weight assigned to an LPAR was changed.

- Rule WLM860 (*Inadequate number of initial logical processors defined*) reports that the number of initial logical processors defined for an LPAR was less than the number of shared physical processors in the Central Processing Complex (CPC). As a result, IRD was restricted in its Vary CPU Management algorithms.

NOTE: To use the new IRD analysis in a MXG performance data base, you must be at MXG 23.01 level or above, or you must include the following in your MXG IMACKEEP member:

```
MACRO _KTY70PR
   LPARCPUX
%
```

The LPARCPUX variable is Barry's name for SMF70BDN. This variable was not in TYPE70PR, but has been placed in TYPE70PR with MXG 23.01

- **Expanded system logger analysis**. With Release 15.2, CPExpert's analysis of system logger has been significantly expanded[1]. I have essentially automated the performance analysis described in the *System Programmers Guide to z/OS System Logger* Redbook (SG24-6898), augmented by Redbooks related to specific exploiters of system logger. The analysis is general to all exploiters of system logger, and is specific to many exploiters of system logger (e.g., IMS, Resource Recovery Services (RRS), Transactional VSAM (DFSMStvs), APPC/MVS protected conversations, CICS, OPERLOG, etc). The new analysis applies only with a MXG performance data base, and is based on MXG files related to coupling facility structure statistics and system logger statistics (TYPE74ST, TYPE88, and TYPE8811).

  The following new rules have been added to the WLM Component resulting from CPExpert expanded analysis of system logger performance constraints:

  - Rule WLM720 (*Excessive offloads for active log stream used by DFSMStvs*) reports that there were excessive offloads for an active log stream used by Transactional VSAM (DFSMStvs).

  - Rule WLM721 (*IGWLOG and IGWSHUNT log streams were in same structure*) reports that two DFSMStvs active log streams were in the same coupling facility structure.

  - Rule WLM723 (*Activity keypoint frequency might be too low for DFSMStvs*) reports that the AKP (activity keypoint frequency) value might be too low for an instance of Transactional VSAM (DFSMStvs).

  - Rule WLM724 (*Activity keypoint frequency might be too high for DFSMStvs*) AKP (activity keypoint frequency) value might be too high for an instance of Transactional VSAM (DFSMStvs).

  - Rule WLM725 (*HIGHOFFLOAD or LOWOFFLOAD incorrect for IGWLOG* reports that either the HIGHOFFLOAD or LOWOFFLOAD keywords were incorrectly specified for the IGWLOG log stream. The IGWLOG log stream is used by Transactional VSAM (DFSMStvs).

  - Rule WLM726 (*HIGHOFFLOAD or LOWOFFLOAD incorrect for IGWSHUNT*) reports that either the HIGHOFFLOAD or LOWOFFLOAD keywords were incorrectly specified for the IGWSHUNT log stream. The IGWLOG log stream is used by Transactional VSAM (DFSMStvs).

  - Rule WLM730 (*Excessive offloads for IMS Common Queue Server log stream*) reports that there were excessive offloads for an active log stream used by IMS Common Queue Server (CQS).

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[1]Thanks to **Craig Collins**, State of Wisconsin, for suggesting this enhancement to CPExpert's analysis of system logger performance problems.

- Rule WLM731 (*IMS CQS full function and fast path log streams in same structure*) reports that the Common Queue Server (CQS) full function and fast path EMH log streams were assigned to the same coupling facility structure.

- Rule WLM732 (*IMS CQS log streams share structure with another log stream*) reports that the Common Queue Server (CQS) full function or fast path EMH log streams were assigned to the same coupling facility structure as another log stream.

- Rule WLM735 (*MAXBUFFSIZE keyword incorrect for IMS CQS structure*) reports that the MAXBUFFSIZE was specified incorrectly for the coupling facility structure to which the IMS Common Queue Server (CQS) was assigned.

- Rule WLM740 (*Excessive DASD-shifts occurred for RRS log streams*) reports that excessive log stream DASD-shifts occurred for Resource Recover Services (RRS) log streams.

- Rule WLM 741 (*RRS Archive log stream was defined*) reports that the Resource Recover Services (RRS) Archive log stream was connected to a coupling facility structure.

- Rule WLM742 (*RRS log streams in same structure or not grouped correctly*) reports that Resource Recover Services (RRS) log streams were not assigned to individual coupling facility structures, or specific log streams were not grouped together in a coupling facility structure.

- Rule WLM743 (*RRS log stream shared a structure with non-RRS log stream*) reports that a Resource Recover Services (RRS) log stream shared a coupling facility structure with another log stream, and the other log stream was not an RRS log stream.

- Rule WLM745 (*APPC/MVS log shared a structure with another log stream*) reports that the APPC/MVS protected conversations ATBAPPC.LU.LOGNAMES log stream shared a coupling facility structure with another log stream.

- Rule WLM746 (*OPERLOG shared a structure with another log stream*) reports that the OPERLOG log stream shared a coupling facility structure with another log stream.

- Rule WLM755 (*Excessive log streams were assigned to a structure*) reports that an excessive number of log streams were assigned to a coupling facility structure.

- **Increased the number of volumes in the WLM Component User Manual**. With CPExpert Release 15.2, the documentation for the WLM Component rules has increased to the point that the two volumes are unwieldy for users who wish hard-copy documentation. The WLM Component now has almost 1500 pages of documentation. Consequently, I have added **Volume 3** to the WLM Component User Manual.

- • **Volume 1**. Volume 1 contains instructions for installing the WLM Component, describes how to alter guidance variables to tailor the analysis to your site, and contains documentation for findings related to the WLM Service Definition.

  Volume 1 also contains documentation for findings that relate from analysis of general system performance areas (paging subsystem analysis, SAP/IOP analysis, excessive SYSTEM/SYSSTC CPU time analysis, WLM-managed initiator analysis, etc.).

- • **Volume 2**. Volume 2 contains documentation for findings that result from analysis of why service class periods missed performance goals.

- • **Volume 3**. Volume 3 contains documentation for findings that result from analysis of zSeries Application Assist Processor (zAAP) performance problems; documentation for findings that result from analysis of XCF and Coupling Facility performance problems; documentation for findings that result from analysis of System Logger performance problems; and documentation for findings that result from analysis of PR/SM and Intelligent Resource Director performance problems.

- • **Add support[2] for PR/SM analysis for CPExpert users with a NeuMICS performance data base**. When CPExpert Release 15.1 was issued, I was unable to provide PR/SM analysis for CPExpert users with a NeuMICS performance data base. I did not have comprehensive test data for a NeuMICS performance data base in which PR/SM was running. While I had contrived NeuMICS test data, I did not feel comfortable claiming to support both MXG and NeuMICS with the PR/SM analysis without actual data from user sites. Consequently, I stated that the PR/SM analysis could not be done until I had comprehensive test data. Two user sites kindly provided test data and Release 15.2 supports PR/SM analysis with a NeuMICS performance data base.

- • **Updates to the CICS Component**. Support has been added for CICS/TS for z/OS Version 3, Release 1 (V3R1). This support involves updating the code to support CICS/TS V3R1, and updating the documentation with references to relevant CICS/TS V1R3 documentation. Please note that no new analysis has been added that is specific to CICS/TS V3R1. In fact, some previous analysis (e.g., Java hot-pooling analysis) is not applicable with CICS/TS V3R1.

  Additionally, the CICS Component has been updated to support z/OS Version 1 Release 7, and to correct errors reported by users.

- • **Updates to the DB2 Component**. The main changes to the DB2 Component for CPExpert Release 15.2 are to update the DB2 Component to support z/OS Version 1 Release 7, and to correct errors reported by users.

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[2]Thanks to **Marty Stahl** (Social Security Administration, Maryland) and **Kris Ferrier** (State of Washington, Washington) for providing test data from a NeuMICS performance data base!

- **Updates to the DASD Component**. The main changes to the DASD Component for CPExpert Release 15.2 are to update the DASD Component to support z/OS Version 1 Release 7, and to correct errors reported by users.

- **Updates to the WebSphere MQ Component**.   With Release 15.2, a "wild card" feature[3] has been added to allow users to select WebSphere MQ subsystems based on leading characters. The other changes to the WebSphere MQ Component for CPExpert Release 15.2 are to update the WebSphere MQ Component to support z/OS Version 1 Release 7, and to correct errors reported by users.

- **Updated documentation on CD**. This release provides all updated documentation to reflect new or revised rules. The CPExpert documentation is accessible via Adobe Acrobat Reader. A free version of Adobe Acrobat Reader is available at *http://www.adobe.com/products/acrobat/readstep2.html*.

- **Add log of changes to code**. I've added a log of changes to the CPExpert code for Release 15.2. This log is titled CHANGES and shows each module changed (except when the change is minor). Interested users can review the CHANGES log to see what code changes have been made, and can easily identify new guidance variables. I've followed the MXG model for releases (that is, the CHANGES log shows changes in the new release, while the CHANGESS log is an accumulation of changes.

- **Add log of errors reported**. I've added a log of all errors reported by users. This error log is in the GENER151 module in SOURCE.

FTP download

CPExpert Release 15.2 (both code and documentation) is available via ftp download from my ftp server. If you prefer this method of obtaining the update, please send an email to Don_Deese@cpexpert.com to obtain instructions for ftp download, obtain your user id, and obtain your password.

Installation

I suggest that you use the following steps to install Release 15.2:

- Create a new PDS titled "prefix.CPEXPERT.V152.SOURCE".

- Create a new PDS titled "prefix.CPEXPERT.V152.USOURCE".

- Install CPExpert into the "prefix.CPEXPERT.V152.SOURCE" using the normal installation procedures described in the *CPExpert Installation Guide*.

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[3]Thanks to **Markus Bansemir** (HUK-Coburg, Germany) for suggesting this new feature

- Copy your **old** USOURCE members into "prefix.CPEXPERT.V152.USOURCE". This step should be done so you do not have to recreate all of your unique parameters[4].

  Please remember that you **MUST** change any of the CHKxxxx guidance variables if you wish the WLM Component to analyze areas other than the basic analysis of the Service Policy and service class period performance constraints.

- If you elected to receive updates to CPExpert on CD, the software is distributed on the CD that contains the CPExpert user documentation.

  - **Installing CPExpert from CD to MVS**. Copy the *source.ebc* file from cd:\source\source.ecb as binary, to CPEXPERT.TAPE.REL152, allocated as RECFM=FB,LRECL=80,BLKSIZE=0,AVGREC=M,SPACE=(80,2,1). The *source.ecb* file is in standard IEBUPDTE format.

    Use the JCL described in Exhibit 2-1 of the *CPExpert Installation Guide* to install the CPExpert software. Copy your old USOURCE members as described above.

  - **Installing CPExpert from CD to PC**: Copy the SOURCE directory on the CD to prefix\cpexpert\rel152\source. Copy your old USOURCE members as described above. Make sure that you update your USOURCE(GENGUIDE) member to specify **%LET SOURCE =user_directory;** statement to point to the new SOURCE directory.

- If you have installed the CPExpert option to produce output to SAS Output Delivery System (ODS) and if you have exercised the LINKPDF option so you can "click" on a rule in the html output to see the documentation, **please remember to load the new documentation onto your system**.

- If you chose to implement the xxxHTML option (e.g,. WLMHTML) to provide your own SAS ODS HTML statement parameters, please place your own macros into USOURCE and concatenate the USOURCE pds ahead of the SOURCE pds.

Special note of SAS/ITRM users of CPExpert: With CPExpert Release 15.2, you must have **MXG TYPE8811** file structure (whether populated or not) in your performance data base if you specify CHKLOGER=Y so CPExpert analyzes System Logger problems. SAS gives an invalid return to the %sysfunc(exist(file)) macro with SAS/ITRM, so TYPE8811 must be in your pdb, even if it is a null file.

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[4]The exception to this statement is if you chose to use the "yesterday" option in selecting data. The "yesterday" calculation is done by a PREVIOUS macro contained in USOURCE(GENGUIDE). The PREVIOUS macro is placed in USOURCE so you can select "yesterday" as the immediate previous day, or can define "yesterday" as any other previous day you chose. Placing the PREVIOUS macro in USOURCE(GENGUIDE) allows you to make such a modification, without your altering a SOURCE member. Consequently, if you copy your old USOURCE(GENGUIDE) member to CPEXPERT.V152.USOURCE, you may wish to append the PREVIOUS macro from the Release 15.1 USOURCE into your USOURCE(GENGUIDE) member.

Thanks

I would like to say "**Thank you**" to the following individuals. These folks have discovered errors, proposed new features, graciously sent me test data, or suggested documentation changes since the last Update Bulletin:

Markus Bansemir (HUK-Coburg, Germany)
Robert Blackburn (Dominion Resource Services, Inc., VA)
Glenn Bowman (Wakefern Food Corporation, NJ)
Craig Collins (State of Wisconsin, WI)
Michael Duffy (Lloyds TSB, United Kingdom)
Rodger Foreman (Transunion/AXION, IL)
Kris Ferrier (State of Washington, WA)
Wayne Hammond (Bank of America, GA)
Chuck Hopf (MBNA, TX)
Hugh Lapham (Royal Canadian Mounted Police, Canada)
Chuck Knapp (United Health Technologies, WI)
Barry Merrill (Merrill Consultants, TX)
Normand Poitras (IBM Canada Ltd., Canada)
Harald Seifert (HUK-Coburg, Germany)
Al Sherkow (I/S Management Strategies, Ltd., MN)
Marty Stahl (Social Security Administration, MD)
Ralph Snyder (Social Security Administration, MD)
Bruce Widlund (Merrill Consultants, TX)

Please send me an email or phone if you have suggestions, you want new features, or you would like to see more or different reporting done by CPExpert.

Best regards,

Don Deese

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October, 2005