

## Product Update Bulletin 2011-1

This product update forwards changes to both software and documentation. The software update is Release 21.1 of CPEXPERT. The release number indicates that it is the first release of 2011.

With Release 21.1, CPEXPERT has been updated to: (1) provide additional analysis and features in the WLM Component; (2) provide updated documentation on CD; and (3) correct errors that have been reported.

- **Updates to the WLM Component.** The following rules and features have been added to the WLM Component:

- **Added new rules.** The following rules have been added to the WLM Component:

**Rule WLM037** (*Capacity changed for central processor complex (CPC)*) reports that there was a capacity change in the central processor complex. The capacity change could be caused by the setting of a manual control, caused by an internal machine condition, or caused by an external machine exception. This finding applies only with z/OS V1R12.

**Rule WLM260** (*Excessive queuing for a processor, pre-z/OS V1R12*) reports that SMF Type 70 data available pre-z/OS V1R12 showed that there was excessive queuing by address spaces for processor resources. This finding applies to pre-z/OS V1R12 and provides information to assess the amount and normal causes of the processor contention.

**Rule WLM261** (*Queuing for a processor, pre-z/OS V1R12*) reports that SMF Type 70 data available pre-z/OS V1R12 showed that there was queuing by address spaces for processor resources. This optional finding applies to pre-z/OS V1R12 and provides information to assess the amount and normal causes of the processor contention. This optional finding is similar to Rule WLM260, with the exception that all RMF intervals are displayed, without considering the amount of queuing. The purpose of this rule is to provide a perspective by RMF interval of all queuing, with intervals of excessive queuing flagged in the margin.

**Rule WLM262** (*Excessive queuing for a processor, with z/OS V1R12*) reports that SMF Type 70 data available with z/OS V1R12 showed that there was excessive queuing by work units for processor resources. This finding applies with z/OS V1R12 and provides information to assess the amount and normal causes of the processor contention.

**Rule WLM263** (*Queuing for a processor, with z/OS V1R12*) reports that SMF Type 70 data available with z/OZ V1R12 showed that there was queuing by work units for processor resources. This optional finding applies to z/OS V1R12 and provides information to assess the amount and normal causes of the processor contention. This optional finding is similar to Rule WLM262, with the exception that all RMF intervals are displayed, without considering the amount of queuing. The purpose of this rule is to provide a perspective by RMF interval of all queuing, with intervals of excessive queuing flagged in the margin.

**Rule WLM266** (*Excessive queuing for a processor, and low number of servers, with HiperDispatch*) reports that excessive queuing for processor resources potentially was caused by an inadequate number of servers (logical processors) assigned and not parked for the LPAR.

**Rule WLM268** (*Excessive queuing for a processor, but LPAR did not use entitled capacity share*) reports that excessive queuing for processor resources did occur, but some performance constraint existed since the LPAR did not use its capacity share.

**Rule WLM270** (*Excessive queuing for a processor, but large queuing on PR/SM Logical Processor Ready Queue*) reports that excessive queuing for processor resources could be caused by logical processors in the LPAR queuing on the PR/SM Logical Processor Ready Queue. Since the logical processors were not dispatched to a physical processor, the logical processors were not executing and the LPAR could experience excessive processor queuing.

**Rule WLM271** (*Excessive queuing for a processor, but LPAR experienced large influx of work*) reports that there was excessive queuing for processor resources, but there was a temporary large influx of work for the LPAR and temporary queuing for processor resource is to be expected.

**Rule WLM275** (*Excessive queuing for a processor, but LPAR experienced a capacity reduction*) reports that there was excessive queuing for a processor, but the LPAR experienced a capacity reduction during the measurement interval. The capacity reduction could have been expected (e.g, a “power-steering” option was invoked by site personnel), or could have been caused by a hardware issue.

**Rule WLM872** (*HiperDispatch activated for LPAR but weight was less than recommended*) reports that HiperDispatch was specified for one or more LPARs within a central processor complex (CPC). However, at least one LPAR had a weight that resulted in less than 1.5 physical processors for the LPAR. HiperDispatch can be activated for an LPAR with such a low weight, but a console message is issued as a warning that the system was not configured as recommended by IBM. Rule WLM872 is issued because performance analysts might not be aware of the console message.

**Rule WLM894** (*HiperDispatch will be automatically activated for LPAR*) reports that the number of logical processors assigned to the LPAR is approaching the maximum allowed before HiperDispatch is automatically turned on for the LPAR. HiperDispatch will automatically be turned on when more than 64 logical processors are assigned

to an LPAR. This finding gives an early warning that HiperDispatch will automatically be turned on if the additional logical processors are assigned to the LPAR.

- **Modified rules.** The following WLM Component rules have been modified:

**Rule WLM871** (*HiperDispatch could not be activated for LPAR with low weight*) was disabled (replaced by new Rule WLM872).

- **New analysis area.** Since the WLM Component can analyze so many areas, a series of analysis area control variables was added with Release 15.2 in 2005. The control variables allow users to specify which general areas should be analyzed and reported during any particular execution of the WLM Component. Selecting only areas of interest limits the amount of output produced and limits the processing time required to run CPEXpert. The number of control variables increases as new analysis areas are added to the WLM Component.

The new analysis area introduced with CPEXpert Release 21.1 focuses on processor contention experienced by logical processors assigned to an LPAR.

If an address space or work unit (with z/OS V1R12) is dispatched to a logical processor or is queued awaiting dispatch, its state is referred to as *InReady*, since it is either dispatched or ready to be dispatched. SMF writes *InReady* information that was collected based on a sampling process by the SRM. The SRM samples the state of each address space or work unit. The *InReady* information is interesting to monitor and analyze since it can show processor contention.

With z/OS V1R12, there are three sets of *InReady* measures maintained by SRM and recorded in SMF Type 70 records:

- **SMF70R00-SMF70R15 variables.** The SMF70R00-SMF70R15 variables relate to *InReady address space* queuing for processor resources.
- **SMF70Q00-SMF70Q12 variables.** The SMF70Q00-SMF70Q12 variables relate to *InReady address space* queuing for processor resources where address space queuing is relative to the number of online logical processors.
- **SMF70U00-SMF70U15 variables.** The SMF70U00-SMF70U15 variables relate to *InReady work unit* queuing for processor resources where work unit queuing is relative to the number of logical processors that were online (and not parked with HiperDispatch).

Each of the above variables shows the number of address spaces or work units that are either dispatched to a logical processor, or are queued awaiting dispatch to a logical processor. The address spaces or work units that are dispatched to a logical processor are considered to be using processor capacity. Those address spaces or work units that are queued awaiting dispatch to a logical processor are considered to be in contention for processor resources.

This processor contention often has been described as “latent demand” in the literature, and is generally thought to be a processor capacity issue. CPEXpert’s

analysis shows that “latent demand” often is only one potential interpretation of processor contention reported by SMF, and often has nothing whatsoever to do with inadequate processor capacity. There typically are other causes of processor contention as shown by the SMF information, and these causes can be eliminated by performance tuning.

Even if the cause of processor contention shown by the SMF Type 70 variables cannot be eliminated by performance tuning, the processor contention might be a normal result of system behavior. If so, the processor contention is no cause for alarm nor an indication of inadequate capacity that would be expected to flow from a “latent demand” finding.

With CPEXpert Release 21.1, the WLM Component **optionally** analyzes performance problems with excessive queuing by address spaces or work units for processor resources. The current analysis is described above in the WLM26(series) and WLM27(series) rules, and the analysis is controlled by the **CHKCPUQ** analysis area variable.

The following guidance variables in USOURCE(WLMGUIDE) now control which system areas that the WLM Component will analyze in any specific execution of the WLM Component:

VARIABLE	DESCRIPTION
CHKCPUQ	Analyze queuing for processor resources?
CHKENQ	Analyze resource contention problems?
CHKGOL	Analyze service class periods to determine reasons goals were missed?
CHKINIT	Analyze problems with WLM-managed initiators?
CHKIOP	Analyze problems with IOP/SAP imbalance?
CHKLOGGER	Analyze problems with System Logger?
CHKPAGE	Analyze problems with paging subsystem?
CHKPLCY	Analyze problems with WLM service policy definition?
CHKRPT	Analyze report class periods to determine reasons goals were missed?
CHKPRSM	Analyze problems with LPAR definitions and other PR/SM issues?
CHKSMF	Analyze problems with System Management Facilities (SMF)
CHKSYS	Analyze problems with SYSTEM/SYSSTC excessive CPU use?
CHKXCF	Analyze problems with coupling facility and XCF?
CHKZAAP	Analyze problems with System z Application Assist Processors (zAAP)?
CHZIIP	Analyze problems with System z <i>Integrated Information Processor</i> (zIIP)?

- **Other Changes.** Other changes to the WLM Component with CPEXpert Release 21.1 are to correct errors reported by users.

- **Updates to the CICS Component.** Changes to the CICS Component with CPEXpert Release 21.1 were to correct minor errors reported by users.
- **Updates to the DB2 Component.** Changes to the DB2 Component with CPEXpert Release 21.1 were to correct minor errors reported by users.
- **Updates to the DASD Component.** Changes to the DASD Component with CPEXpert Release 21.1 were to correct minor errors reported by users.
- **Updates to the WebSphere MQ Component.** Changes to the WebSphere MQ Component with CPEXpert Release 21.1 were to correct minor 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 a log of changes to code.** A log of changes to the CPEXpert code for Release 21.1 has been included, and additions or changes to USOURCE members are included in the changes log. 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. CPEXpert follows 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 a log of errors reported.** A log of all errors reported by users for CPEXpert Release 20.2 has been added. This error log is in the GENER202 module in SOURCE.

## FTP download

CPEXpert Release 21.1 (both code and documentation) is available via ftp download from the CPEXpert ftp server. If you prefer this method of obtaining the update, please send an email to [Don\\_Deese@cpexpert.com](mailto:Don_Deese@cpexpert.com) to obtain instructions for ftp download, obtain your user id, and obtain your password. **If you have requested ftp download in past, the ftp download instructions will automatically be sent to you.**

## Installation

I suggest that you use the following steps to install Release 21.1:

- Create a new PDS titled "prefix.CPEXPERT.V211.SOURCE".

- Create a new PDS titled "prefix.CPEXPRT.V211.USOURCE".
- Install CPEXpert into the "prefix.CPEXPRT.V211.SOURCE" using the normal installation procedures described in the *CPEXpert Installation Guide*.
- Install CPEXpert into the "prefix.CPEXPRT.V211.USOURCE" using the normal installation procedures described in the *CPEXpert Installation Guide*. This step will cause the email macros to be loaded into USOURCE.
- Copy your **old** USOURCE members into "prefix.CPEXPRT.V211.USOURCE". This step should be done so you do not have to recreate all of your unique parameters<sup>1</sup>.
- 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.211.ebc* file from cd:\software\ as binary, to CPEXPRT.TAPE.RELV211, allocated as DSORG=PS,RECFM=FB,LRECL=80,BLKSIZE=0,AVGREC=K,SPACE(80,(150,50)), DSN=CPEXPRT.RELV211.IEBUPDTE. The *source.211.ebc* 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 cd:\software\source\ on the CD to prefix\cpexpert\rel211\source. Copy the cd:\software\usource\ on the CD to prefix.cpexpert\rel211\usource using the normal installation procedures as described in the *CPEXpert Installation Guide*. This step will cause the email macros to be loaded into usource. 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.
- **Downloading via ftp:** If you elected to download updates from my ftp server, you can copy the *source.211.ebc* file to CPEXPRT.TAPE.RELV211, allocated as DSORG=PS,RECFM=FB,LRECL=80,BLKSIZE=0,AVGREC=K,SPACE(80,(150,50)), DSN=CPEXPRT.RELV211.IEBUPDTE. The *source.211.ebc* file is in standard IEBUPDTE format.

The updated CPEXpert user documentation also will be available on the ftp site. It is your option whether you wish to download only the manuals, or also download the individual rule documents. If you wish to download the individual rule documents, they will be available as pdf files in *Individual\_Rule\_Documentation.zip* on the ftp site.

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<sup>1</sup>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 altering a SOURCE member. Consequently, if you copy your old USOURCE(GENGUIDE) member to CPEXPRT.V211.USOURCE, you may wish to append the PREVIOUS macro from your old USOURCE(GENGUIDE) into your new USOURCE(GENGUIDE).

- If you have implemented the CPEXpert option to produce output to the 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 individual rule 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.
- If you chose to implement the CPEXpert email option, please update the xxxEMAIL modules in USOURCE to reflect your unique email requirements.

## Thanks

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

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**Tom Kelman** (Commerce Bank, KS)  
**Sam Knutson** (GEICO, MD)  
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**Kelly Vogt** (Humana, KY)

Please send me an email 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

Computer Management Sciences, Inc.  
634 Lakeview Drive  
Hartfield, Virginia 23071-3113  
(804) 776-7109 FAX: (804) 776-7139  
**www.cpexpert.com**  
Don\_Deese@cpexpert.com