

Determining the Proper z10/z196 Workload

In the past IBM published workload ratios (which can be converted to MIPS) for types of workloads, such as Batch, CICS, and DB2. But in 2010, they started using a new metric called the Relative Nest Intensity (RNI) for doing capacity sizing with their zPCR tool. If you provide the SMF 113 data to zPCR, it can determine the correct RNI, and thus workload MIPS, for each LPAR. IBM publishes the ratios for each workload (average, high, and low RNI) on the Large Systems Performance Reference (LSPR) website - <https://www-304.ibm.com/servers/resourcelink/lib03060.nsf/pages/lsprindex?OpenDocument>.

For two years, we've been describing the CPU Measurement Facility (CPU MF) for the z10 and z196 machines, and the Hardware Instrumentation Service (HIS) software component. These two facilities produce the SMF type 113 records and can provide insight into the characteristics of each LPAR that is run on your CEC. Because there is very little overhead, and because the information is so valuable, we recommend that everyone on a z10 or z196 turn on collection of the counters that are written to the SMF type 113 records. These records can show you the correct workload to use for each LPAR.

You can find our discussions of this in the following Tuning Letters:

- Tuning Letter 2009 No. 2, pages 8-9 - *z10 CPU Measurement Facility*
- Tuning Letter 2009 No. 3, page 41 - APAR [OA27623](#)
- Tuning Letter 2009 No. 5, page 50-51 - *z10 CPU Measurement Facility*
- *Cheryl's Hot Flashes #21*
- *Cheryl's Hot Flashes #22*
- Tuning Letter 2010 No. 4, pages 27-29 - *Average RNI MIPS*
- Tuning Letter 2010 No. 4, page 48 - APARs [OA30486](#) / [OA33052](#)
- *Cheryl's Hot Flashes #24*

Hot Flashes can be found at <http://www.watsonwalker.com/presentations.html>.

We think that it's critical for every installation to implement this facility for two reasons: The first reason is that IBM uses a new metric called the Relative Nest Intensity (RNI) for doing capacity sizing with their zPCR tool. If you provide the SMF 113 data to zPCR, it can determine the correct RNI, and thus workload MIPS, for each LPAR. If you don't want to use zPCR, the programs below provide additional information you can use to understand your workloads.

The second reason to collect 113 records is to send them to **John Burg**, at WSC. He and others need as much data from installations as they can get in order to validate their calculations for RNI, and to complete other analysis. If you send an email to John at jpburg@us.ibm.com, he can tell you what type of data to send. John has given several presentations on CPU MF, such as the Boston [SHARE 7717](#) session (*CPU MF - the "Lucky" SMF 113s - z196 Update and WSC Experiences*). John will be giving an updated presentation at SHARE in Anaheim, session 8882. This will probably be available at www.share.org by his

presentation on March 3. For additional information on how to collect this new data, please see WSC conference session [TC000041](#).

Here are two MXG/SAS programs that you can run to determine the workload (average, low, or high RNI). You should pick the peak hours for each LPAR, and use the workload determined for that period. IBM recommends that you use the combination of all types of CPs, zIIPs, and zAAPs for the determination, although both programs allow you to analyze each separately just for your information and knowledge. The documentation for running each program is in the SAS program itself. For each program, we provide both the SAS program, and a sample output report. We would love for you to send us any reports you run, so that we can better understand the types of workloads in each installation. We will keep all information confidential.

\$RNIRPTS

[Program](#)

Sample report [by hour](#), [by day](#)

The 'by hour' report combines the CPs, zIIPs, and zAAPs to create a workload recommendation. The 'by day' report shows a 24-day hour view with a separate recommendation for each type of CP. You might get very different recommendations depending on the view you select. For example, S002 by days shows that CPs run as HIGH, while zAAPs and zIIPs run as LOW. But by hour, from 11am to 5pm, S002 with all processors included runs as AVERAGE.

RNIHINT (Corrected 11Jul2011)

[Program](#)

Sample report [by hour in html](#) and [by hour in text](#)

There are two interesting things to notice on this particular report. First of all, it's easy to see how often CPs, zIIPs, and zAAPs are moved during the day. And second, you can see that characteristics of different LPARs produce different workloads. Most LPARs run as a LOW workload all day, but SYSA varies between AVERAGE and LOW, NSYS, PSYS, and RSYS run as AVERAGE and QSYS runs as HIGH.