

# Cheryl's Hot Flashes #24

Cheryl Watson  
Watson & Walker, Inc.

[www.watsonwalker.com](http://www.watsonwalker.com) - home of Cheryl Watson's Tuning Letter,  
CPU Charts, BoxScore and GoalTender

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**SHARE** in Boston

# No more OCG!



zSeries Cheryl



zEnterprise Cheryl

# Agenda

- zEnterprise Observations
- *If I Ran* the Site
- User Experiences
- Interesting SHARE Sessions

# zEnterprise Observations

- In my opinion, the July 22<sup>nd</sup> announcement was the most significant in the last decade. (As an aside – I’ve been watching IBM announcements since 1965.)
- Realize that there are really three parts of a zEnterprise –
  - z196 – faster processor, better memory management, 100 new instructions, new pricing, lower cost specialty engines
    - This is the piece that most installations will see in the next couple of years.
  - zBX – blade servers closely linked to z196/z10s. Initial benefit comes from reduction in network costs/response, smaller footprint, reduction in energy, reduction in TCA, reduction in people costs.
  - URM – Unified Resource Manager. This has potential.

# zEnterprise Observations

- Biggest benefit will come from analytic processing and new industry solutions.
  - How about a 4-hour DB2 query completing in just seconds?
  - See the IBM Smart Analytics Optimizer for DB2 on z/OS SHARE sessions.
- Okay, I'm sold, but what aren't you seeing? What questions should you be asking? What does it mean for the majority of sites today?
  - All of IBM's benefits (of course, but you've heard these)
  - Lower specialty processor costs
  - Chargeback and capacity planning complexity with zBXs
  - MIPS have changed

# z196 Specialty Engines - IFL

Status	U.S. Price	Avg RNI MIPS (single IFL)	\$ per MIPS
New z9-BC	\$95,000	459	\$207
New z9-EC	\$125,000	560	\$223
New z10-BC	\$75,000	661	\$113
New z10-EC	\$75,000	901	\$83
<b>New z196</b>	<b>\$55,000</b>	<b>1204</b>	<b>\$46</b>
z9-EC to z10-EC Upgrade	\$0	+341	\$138
z9-EC to z196 Upgrade	\$33,000	+644	\$131
z10-EC to z196 Upgrade	\$16,500	+303	\$75

MIPS estimates come from *Cheryl Watson's CPU Charts, July 29, 2010*

# z196 Specialty Engines – zIIP/zAAP

Status	U.S. Price	Avg RNI MIPS (single IFL)	\$ per MIPS
New z9-BC	\$95,000	459	\$207
New z9-EC	\$125,000	560	\$223
New z10-BC	\$125,000	661	\$189
New z10-EC	\$125,000	901	\$139
<b>New z196</b>	<b>\$100,000</b>	<b>1204</b>	<b>\$83</b>
z9-EC to z10-EC Upgrade	\$0	+341	\$139
z9-EC to z196 Upgrade	\$60,000	+644	\$153
z10-EC to z196 Upgrade	\$30,000	+303	\$128

MIPS estimates come from *Cheryl Watson's CPU Charts, July 29, 2010*



# z/OS zBX Issues





## z/OS zBX Issues

- When you do capacity planning and chargeback for DB2, Java, etc., how do you deal with CPU time accumulated on a zIIP or zAAP?
  - Example: A CICS transaction issues a request to DB2, which runs part of the query on a zIIP.
    - Some days it runs on the zIIP, some days it doesn't.
    - When it all runs only on the z10, it accumulates CPU time at speed of z10.
    - When part of it runs on the zIIP, it accumulates CPU at speed of zIIP (can be several times faster than z10).
    - The SMF records contain a normalization factor so you can charge the zIIP time at native speed or normalized speed. It's your option.

## z/OS zBX Issues

- Now add a zBX
  - Using same example, assume that DB2 and IBM Smart Analytics Optimizer decide to send the query to a blade server.
  - The zBX does not have MIPS assigned, so there is no normalization factor.
  - One day it could cost a user \$10 for a request if it used the zBX, but the next day it might cost \$500.
  - We don't yet know what metrics will be available for the time spent on the zBX.
  - How will you charge? How will you plan the capacity?

# z/OS 1.11 LSPRs

- Large System Performance Reference (LSPR)
- Location of LSPR website has changed.
  - <https://www-304.ibm.com/servers/resourceLink/lib03060.nsf/pages/lsprindex?OpenDocument>
- July 22, 2010 – New LSPRs published
  - Software stack is now z/OS 1.11 versus z/OS 1.9.
  - Workloads are based on Relative Nest Intensity (RNI) as low, average, and high versus older workloads of CB-L, ODE-B, WASDB, OLTP-T, OLTP-W, MIX, LoIO-Mix, and TI-Mix.
  - RNI can be estimated using values in the SMF Type 113 records.
  - Most installations found that LoIO-MIX came closest to their own workloads.
  - IBM Publishes PCI (Processor Capacity Index) – same values as average MIPS.
  - PCI has been “adjusted” to more closely match the LoIO-MIX.
  - zPCR will be updated in mid-August with new LSPRs.

## z/OS 1.11 LSPRs

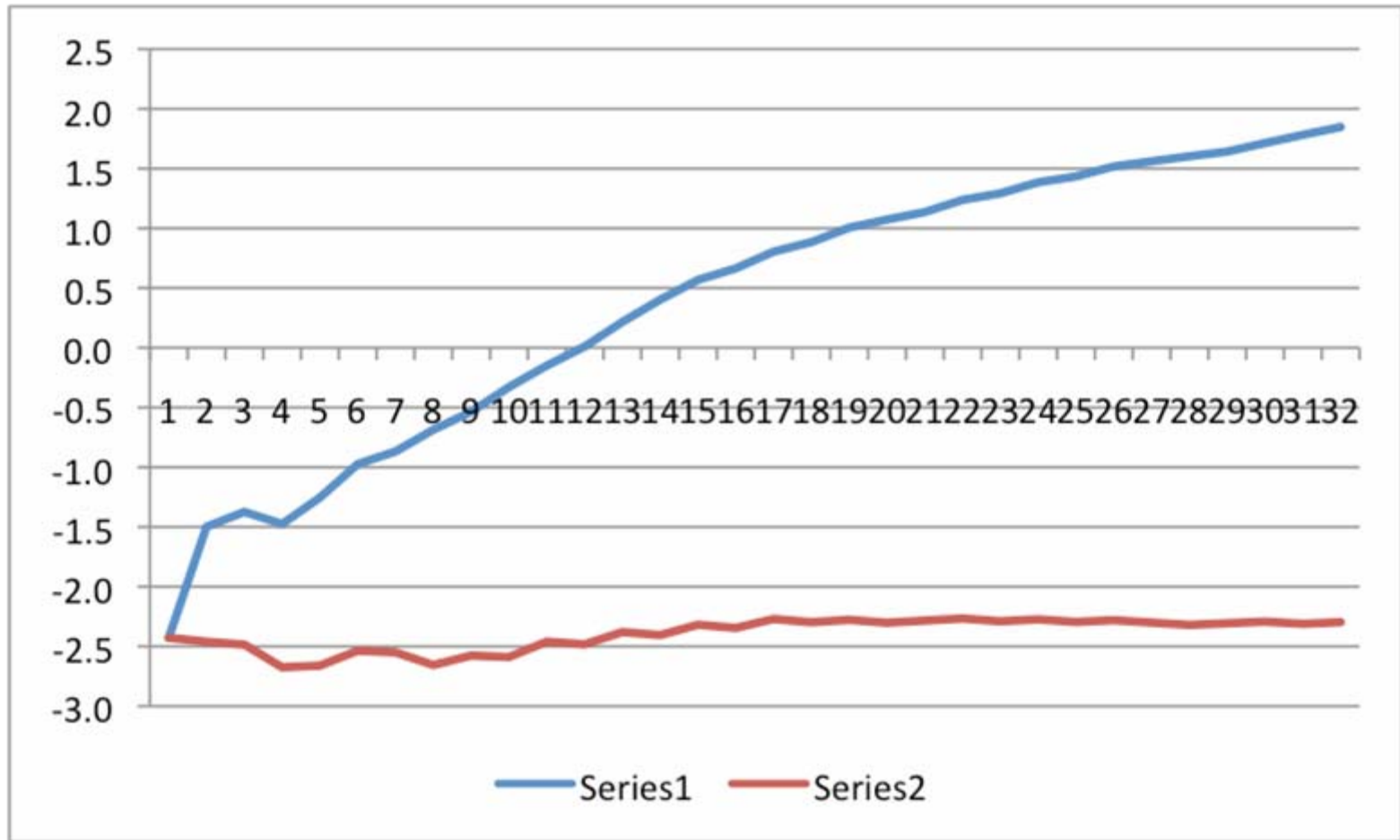
- Most important notes here –
- Run CPU MF and HIS in order to collect SMF type 113s
- Process 113s to determine RNI workload
- Run zPCR to determine expected capacity
- Should also use this for any type of change – adding, deleting CPs, LPs, LPARs, etc.

## z/OS 1.11 LSPRs

- Caution – your MIPS may change
- The next slide shows the percent change in MIPS between the MIPS derived from z/OS 1.9 LSPRs and the z/OS 1.11 LSPRs for the first 32 processors.
- Notice that “average MIPS” are lower on the smaller z/OS 1.9 LSPRs and higher on the larger z/OS 1.9 LSPRs.
- Notice that the “average RNI MIPS” based on z/OS 1.11 are about 2.5% lower than the Low I/O MIPS, but that’s pretty even across all sizes.
- If you used Low I/O in the past, then new MIPS will average about 2.5% lower for the z10-EC with 1 to 32 CPs



# z/OS 1.11 LSPRs



# zEnterprise Pricing

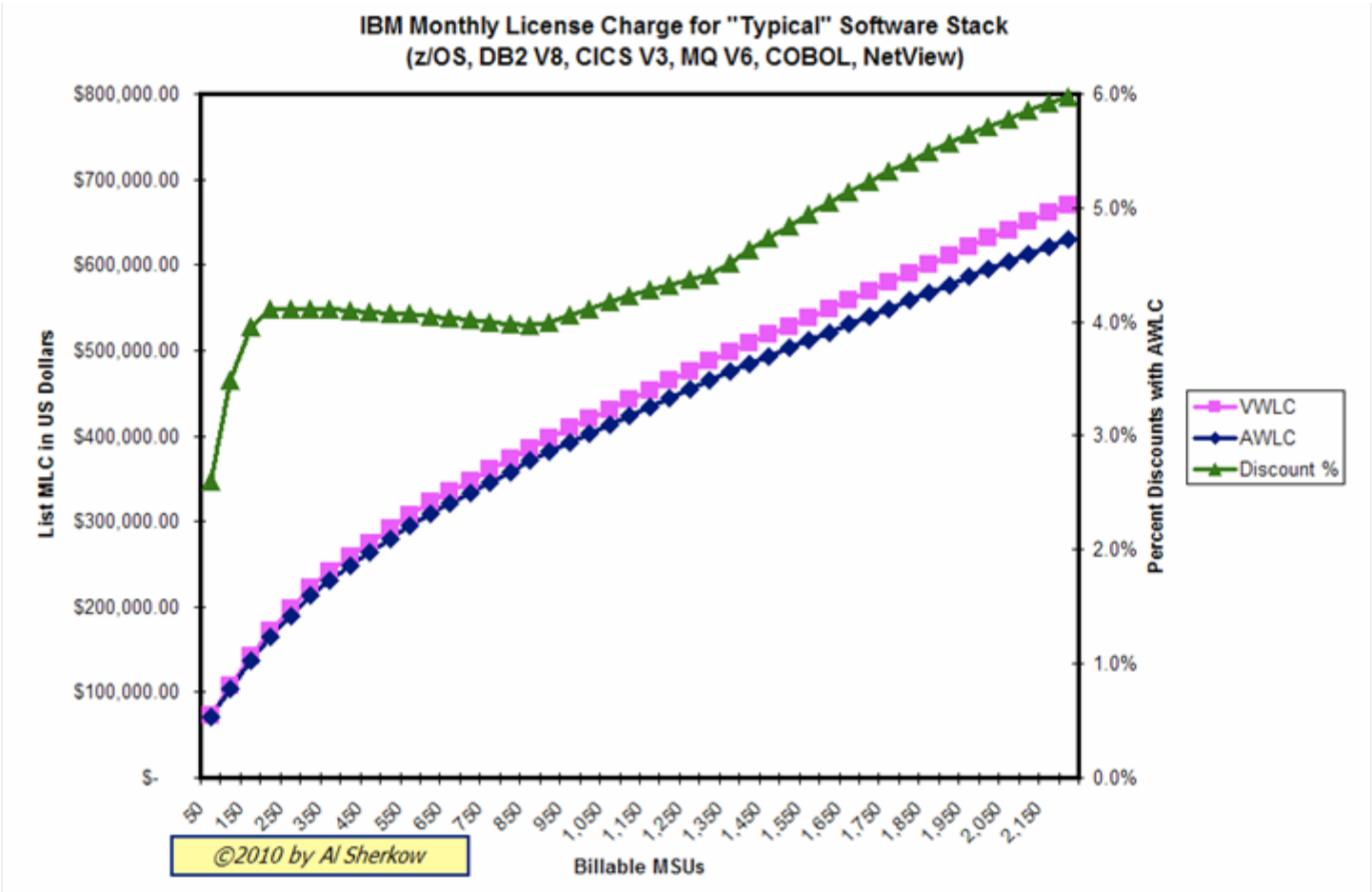
- z196 Software Prices
  - There is no “tech discount” obtained from a reduction in MSU assignments for the z196.
  - In the past, there was up to a 10% reduction in MIPS/MSU, but that is no longer true for the z196.
  - The MIPS/MSU remains the same.
  - But new pricing method, AWLC, is now available for zEnterprise machines.
  - VWLC pricing above 575 MSUs has no discount for subsystems such as DB2, CICS, IMS, etc. sites).
  - AWLC pricing provides discounts up to about 2,000 MSUs.

# zEnterprise Pricing

- Al Sherkow (Mr. Pricing)
- Al analyzed the new pricing and published a paper yesterday (announced on IBM-Main)
  - <http://www.sherkow.com/updates/z196awlc.html>
- The chart on the next slide is from his presentation (Thanks, Al!)
- You should really investigate his pricing tool to help lower your software costs – LPAR Capacity and Software Usage Analysis (LCS) Software



# zEnterprise Pricing



# If I Ran the Site

“It’s a pretty good site,”  
Said young Sally Ann White,  
“and the people who run it  
Are really quite bright.”

“But if *I ran* the site,  
Said young Sally Ann White,  
“I’d make a few changes.  
And I’d do it right . . .”



With thanks to Dr. Seuss.

## If I Ran the site . . .

- While attending SHARE this week, I kept seeing suggestion after suggestion to improve the data center. Many of these are the same recommendations that have been given for years.
- Why aren't people doing them?
  - Not enough staff.
  - It takes so much time to install a release, roll it out, and maintain it, that there's no time left to exploit it.
  - Managers don't want any changes that could impact production.
  - Too many inexperienced people.
  - Internal politics.
  - Green screen is faster.

## If I Ran the site . . .

- I'd start with baby steps, such as:
  - Schedule an hour a week, an hour a day, one day a month to work on enhancements.
- The next few slides show some of the areas I would start with (most assume that you're on z/OS 1.11).
- If not on z/OS 1.11, then start planning for z/OS 1.12. I would rather be on 1.12 than on 1.11 because of added performance benefits and features.
- Do all of these on your test system first!
- There is no specific priority or order here.

## If I Ran the site . . .

- Automate as much as possible (that is, let the system do some of your work!)
  - Turn on and use IBM Health Checker (z/OS 1.10+)
    - See SHARE sessions from Peter Relson, Paul Robichaux
    - See Seattle SHARE session 2240
    - <http://www.ibm.com/systems/z/os/zos/hchecker/>
  - Start using AUTOIPL (z/OS 1.10+)
    - See SHARE sessions from Mark Brooks
  - Implement sysplex-aware DAE (Dump Analysis and Elimination)

## If I Ran the site . . .

- Automate (continued)
  - Exploit SMF Logger
    - See Denver and Seattle sessions
    - Consider CA's SMF Director product
  - Upload SMF data into different archive logs with different retentions
    - Some data needs to be kept several years (e.g. type 30s when doing chargeback).
    - Some data needs to be kept for only a few days or weeks (e.g. type 99s, type 74s, network records).
    - Some data is so large that you want only one program reading it, not everyone who has to look at SMF (e.g. DB2 101).

## If I Ran the site . . .

- Automate (continued)
  - Use both Operlog and Syslog
    - They serve different purposes and provide backup
  - Turn on HiperDispatch
    - Why waste up to 10% of your MIPS?
    - See SHARE sessions from John Burg, Gary King, and Kathy Walsh
  - Set MSO Service Definition Coefficient (SDC) to 0.0
    - I'll cover the reason later
  - If you have z/OS CA products, run (don't walk) to get CA's Mainframe Software Manager (MSM)
    - It's free, and makes installation a breeze!
    - I've heard great feedback from customers

## If / Ran the Site

- Automate (continued)
  - Implement Sysplex Failure Management (SFM) with BCPii
    - See SHARE sessions from Mark Brooks & Steve Warren
    - See Seattle SHARE sessions 2251 and 2227 (Mark Brooks, Riaz Ahmed, Steve Warren)
  - Implement a display of IPLINFO at startup or periodically
    - See Mean Time to Recovery (MTTR) Redbook – [SG24-7816-00](#)
  - Use IBM defaults wherever possible in Parmlib members (such as IEASYSxx, IEAOPTxx, etc.), because IBM changes the defaults for best practices (i.e. don't code the values)
  - Use system symbolics whenever possible to reduce versions of parmlib members



## If I Ran the site . . .

- Exploit Newer Features
  - Implement z/OSMF
    - See SHARE sessions by Anuja Deedwaniya and Greg Daynes
    - Yes, WAS OEM can be a hard install, so let someone new do it.
    - If you tried before March, try again with new doc and scripts.
    - z/OSMF 1.12 will provide a lot more benefit.
    - I really believe this is our/your future!
    - Start with simplifying problem determination.
  - Migrate HFS systems to zFS systems
    - It's an easy migration, and HFS is going away.
  - Install and use Sysplex Timer Protocol (STP)
    - z196 requires it. (You've had six years!)

## If / Ran the site . . .

- Exploit Newer Features (continued)
  - Exploit IFLs, zIIPs, and zAAPs
    - Greatest benefit is on z196
  - Investigate all new pricing options, especially VWLC, eWLC, and now AWLC on z196
    - Proper alignment of LPARs could save millions!
  - Run the CPU Measurement Facility (MF) and the Hardware Instrumentation Services (HIS) address space continually
    - The measurements are done in the microcode, and the z/OS piece is really minimal cost
    - Collect the SMF type 113 records – send them to John Burg (especially before going to a z196)
    - See sessions from John Burg, Gary King, and Peter Enrico

# If / Ran the Site

- Exploit New Features (continued)
  - Learn to use zPCR!
    - I mention this every SHARE, but more people need to use this (especially for z196)!
    - See previous “Hot Flashes” and search SHARE sessions from John Burg and Kathy Walsh
  - Exploit the Coupling Facility
    - Some sites still do minimal work on CF
    - Exploit it when possible
    - See SHARE sessions on Coupling Facility

# If / Ran the Site

- Exploit New Features (continued)
  - Stay on most current CFCC level for your Coupling Facility
    - Don't get behind, or you may miss performance improvements
  - Use newest hardware when it's beneficial
    - Best example – be sure to replace ISC links on a z196 with Infiniband links
    - Several SHARE sessions on Infiniband
    - Next slide comes from two IBM presentations from Mark Brooks and Gary King on CFs. (Thanks so much.)

# Coupling Technology versus Host Processor Speed

Host effect with primary application involved in data sharing

Chart below is based on 9 CF ops/Mi - may be scaled linearly for other rates

Host CF	z890	z990	z9 BC	z9 EC	z10 BC	z10 EC	z196
z890 ISC	13%	15%	16%	17%	19%	21%	NA
z890 ICB	9%	10%	10%	11%	12%	13%	NA
z990 ISC	13%	14%	14%	15%	17%	19%	NA
z990 ICB	9%	9%	9%	10%	12%	13%	NA
z9 BC ISC	12%	13%	14%	15%	17%	19%	23%
z9 BC PSIFB 12X	NA	NA	NA	NA	13%	14%	16%
z9 BC ICB	8%	9%	9%	10%	11%	12%	NA
z9 EC ISC	12%	13%	13%	14%	16%	18%	22%
z9 EC PSIFB 12X	NA	NA	NA	NA	13%	14%	16%
z9 EC ICB	8%	8%	8%	9%	10%	11%	NA
z10 BC ISC	12%	13%	13%	14%	16%	18%	22%
z10 BC PSIFB 12X	NA	NA	11%	12%	13%	14%	15%
z10 BC ICB	8%	8%	8%	9%	10%	11%	NA
z10 EC ISC	11%	12%	12%	13%	15%	17%	22%
z10 EC PSIFB 12X	NA	NA	10%	11%	12%	13%	15%
z10 EC ICB	7%	7%	7%	8%	9%	10%	NA
z196 ISC	NA	NA	11%	12%	14%	16%	21%
z196 PSIFB 12X	NA	NA	9%	10%	11%	12%	14%

With z/OS 1.2 and above, synch->asynch conversion caps values in table at about 18%

PSIFB 1X links would fall approximately halfway between PSIFB 12X and ISC links

IC links scale with speed of host technology and would provide an 8% effect in each case

## If / Ran the Site

- Exploit New Features (continued)
  - If you have RMF, use the Distributed Data Server (DSS)
    - This only needs to run on a single image in the sysplex
    - Collects RMF data from all images
    - Can be used to get sysplex view without running merged (and sorted) post-processor data
    - Is used by z/OSMF 1.12 for monitoring performance
    - Can be CPU-intensive if you aren't careful about cycle and interval times – turn off data that you don't need
  - If you have z196, exploit FICON Discovery and AutoConfiguration (zDAC)

# User Experiences

- DFSMSdss
  - z/OS 1.8 to 1.10 (APAR OA25644) and z/OS 1.11 added CSI (Catalog Search Interface) filtering
  - **OA32165** – While Doing Generic Filtering During COPY,DUMP, Using Filter of \* as the First Char of First Qualifier Won't Find any DS's (OPEN)
  - **OA32120** – New 1.11 CSI Filtering Causes Increase in Job Runtime (17Jun2010)
  - **OA25644** – Catalog Filtering Enhancement (20Aug2009)
  - Runtime increase only seen when using INCAT on the DSS command
    - Thanks to Michael Friske, Fidelity Investments

# User Experiences

- Problem: CICS response time was terrible on one region.
  - Initial review saw that some timing fields were wrapping.
  - WLM simulates a restart of the address space (this was happening several times a day)
  - What caused the wrapping?
  - Service unit accumulation:
    - OUCBCPU – 0754237D
    - OUCBIOC – 00028CD1
    - OUCBMSO – E87A0E93
    - OUCBSRB – 00358831
    - Due to CPU=1.0, IOC=0.5, MSO=0.0001, SRB=1.0
  - Lesson – set MSO=0.0



# User Experiences

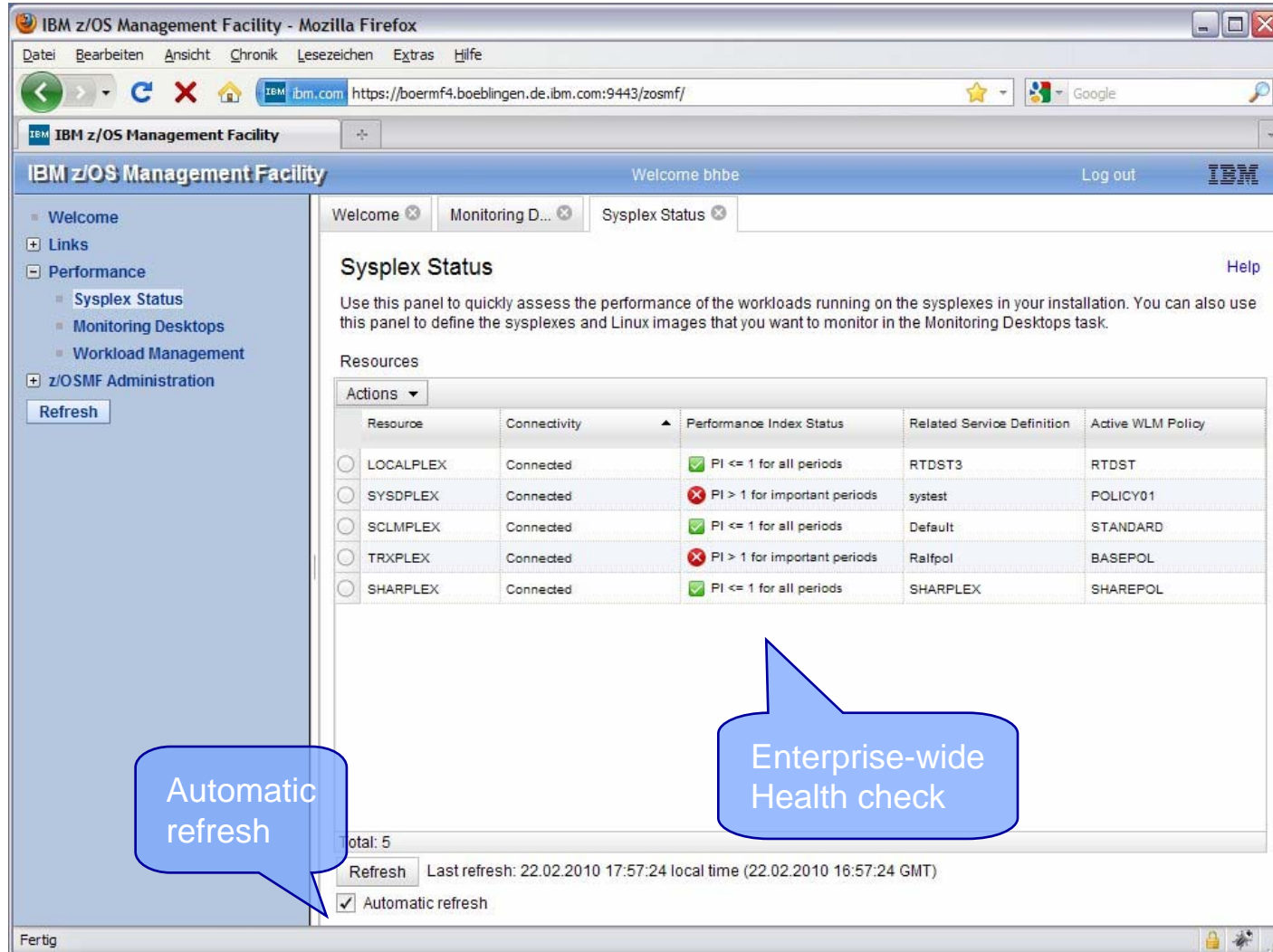
- DB2 Lock Structure Duplexing Problem
  - Duplexing broke frequently
  - **OA31254** – IXC522I Break Duplex (27Jan2010)
  - This caused another problem:
    - Reestablishing duplexing on a DB2 lock structure caused a 5 to 10 second delay in the IMS apps.
    - Changing the structure definition from ENABLED to ALLOWED eliminated the problem when duplexing stops

# Interesting SHARE Sessions

- Peter Muench, IBM
  - SHARE Session – RMF: The Latest and Greatest
  - Showed RMF Enhancements, including
    - Enhanced Group Capacity Reporting
    - Monitor II OPT Report
    - Postprocessor XML Formatted Reports
    - HTTP API to Access Historical Data
    - Distributed Data Server (DSS) Report Selection
    - In-Ready Work Unit Queue Distribution
    - z/OSMF Resource Monitoring (**my favorite!**) – see next two slides from his presentation. Thanks, Peter

# IBM z/OSMF Management Facility

## Resource Monitoring – Sysplex Status Task



The screenshot shows the IBM z/OSMF Management Facility interface in Mozilla Firefox. The browser address bar shows the URL: <https://boermf4.boeblingen.de.ibm.com:9443/zosmf/>. The page title is "IBM z/OS Management Facility" and the user is logged in as "bhbe". The main content area is titled "Sysplex Status" and includes a "Refresh" button. A table lists the resources and their performance index status.

Resource	Connectivity	Performance Index Status	Related Service Definition	Active WLM Policy
<input type="radio"/> LOCALPLEX	Connected	✓ PI ≤ 1 for all periods	RTDST3	RTDST
<input type="radio"/> SYSDPLEX	Connected	✗ PI > 1 for important periods	system	POLICY01
<input type="radio"/> SCLMPLEX	Connected	✓ PI ≤ 1 for all periods	Default	STANDARD
<input type="radio"/> TRXPlex	Connected	✗ PI > 1 for important periods	Ralfpol	BASEPOL
<input type="radio"/> SHARPLEX	Connected	✓ PI ≤ 1 for all periods	SHARPLEX	SHAREPOL

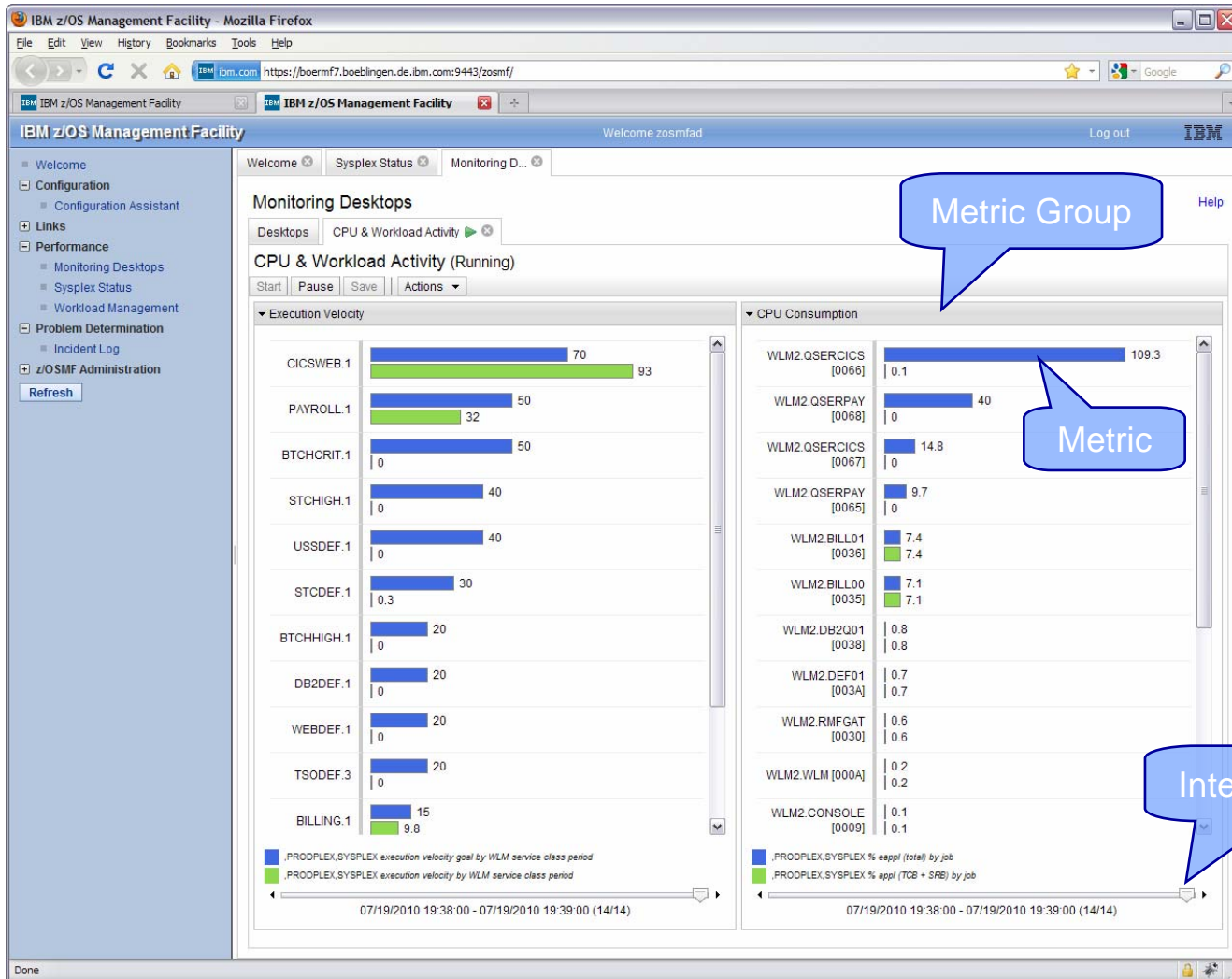
At the bottom of the page, there is a "Refresh" button and a checkbox for "Automatic refresh" which is checked. The status bar at the bottom left shows "Fertig".

Automatic refresh

Enterprise-wide Health check

# Resource Monitoring – Monitoring Desktops

## At a Glance



# Interesting SHARE Sessions

- Meral Temel, Garanti Technology
  - See her SHARE session on *Performance Management Hints Using RMF data: Customer Experience*
  - It's a big large (32 MB), but worth the download time
  - See how performance can be automated
- Greg Daynes, IBM
  - See his SHARE session on *z/OS Software Positioning for the IBM zEnterprise System*
  - 96 pages – this is a requirement if you're planning on a z196

# Best Reasons to Return to SHARE

- zEnterprise
- zBX
- z196
- z/OS 1.12
- Unified Resource Manager
- BladeCenter
- Blades
- Hypervisors
- Firmware
- Ensembles . . . My brain is full!

# See You in Anaheim!

Cheryl Watson Walker with partner,  
husband, and best friend Tom Walker  
in Athens in June



- **Email:** [technical@watsonwalker.com](mailto:technical@watsonwalker.com)
- **Web site:** [www.watsonwalker.com](http://www.watsonwalker.com)