

# WSC Short Stories and Tall Tales

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# Topics

## ■ zBNA Tool

- What and Why
- New SMF 30 field for Max Task CPU%



## ■ Compression and zEDC

- BSAM and QSAM Candidates
- zBNA Support and Sample Reports

## ■ CPU MF Update

- TDSz Support
- zBC12 Update for RNI and LSPR Workload Match
- Request for zEC12 and zBC12 Migration “Volunteers”
- Enable CPU MF Counters!

## ■ z/OS 2.1

- New CPU MF capability
- SMF 30 Instruction Counts

## zBNA Topics

- **Overview**
- **Capacity Planning Information**
- **Introduction**
- **Technical Support and Additional Education**



- **System z Capacity Planning Opportunities:**
  - Per thread (engine) speed improvements for CMOS CPs is slowing dramatically
    - Every CMOS platform is facing this issue
    - Future capacity gains will be by adding more CPs rather than much faster CPs
    - Enhances need for parallel operation and more reliance on parallel sysplex
  - Availability of subcapacity models continues to grow
    - Provide capacity as more, slower processors increasing parallelism
    - Especially useful in environment with large number of LPARs
    - Additional capacity can be acquired in smaller increments
    - Receive benefit since Specialty CPs run at full n-way speed

**Impact of these trends will most likely be seen first in the  
Batch Window**

# Fewer, Faster CPs vs More, Slower CPs

- **Fewer, Faster CPs**

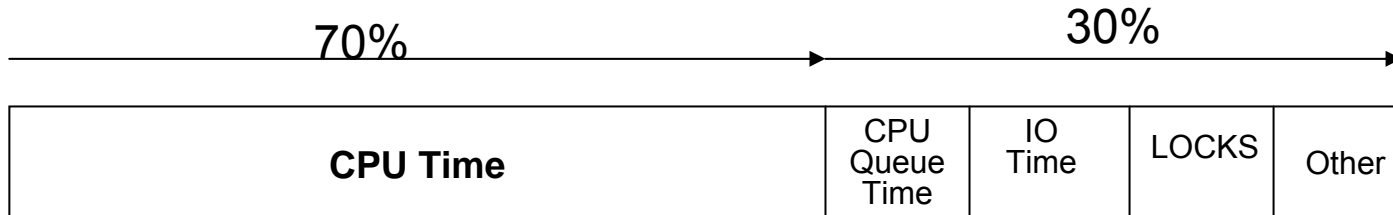
- High priority workloads see great benefits
- Have the ability to monopolize a CP
- On a migration a previously limited workload can now use more capacity
  - Rejoice
  - Control with WLM resource groups
- Availability Issues

- **More, Slower CPs**

- More work units are active
- Can limit a tasks throughput
- Increased parallelism
- Limits the impact of a workload which monopolizes a CP

# Workload Considerations

Online Transaction



Processor	CPU Time	Other Time	Total
z196-708	.028	.012	.040
zEC12-707	.023	.012	.035
zEC12-611	.036	.012	.048

The real issue is in the **batch window** where CPU time can be significant, and CP speed issues can impact elapsed time and job network time

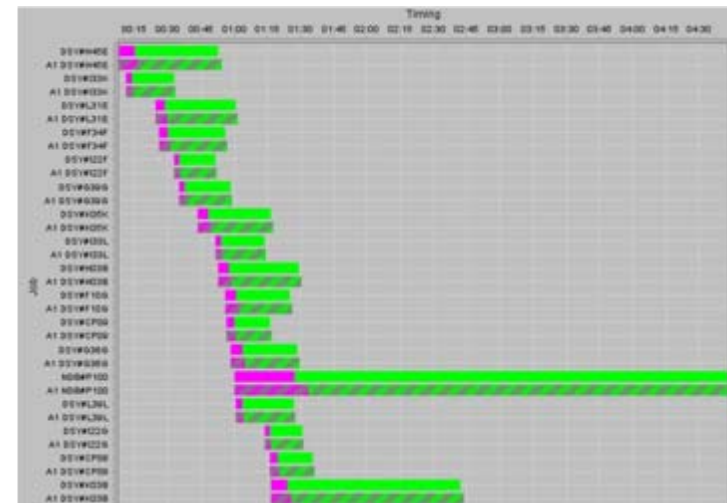


# IBM System z Batch Network Analyzer (zBNA)



- IBM System z Batch Network Analyzer
  - A free, “as is” tool to analyze batch windows
  - Available to Customers, Business Partners and IBMers
  - PC based, and provides graphical and text reports
    - Including Gantt charts and support for Alternate Processors
- Available Now on Techdocs

- <https://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS5132>



# Enhanced SMF 30 Reporting

- APAR OA39629 – New Function
- New SMF 30 function to provide enhanced reporting in the CPU Accounting section
  - z/OS 1.12 and above
  - Support in subtypes; interval (2, 3), step (4), job(5)
- Highest percent of CPU time used by a single task in the address space in the interval, step, or job
  - SMF30\_Highest\_Task\_CPU\_Percent
- Program name associated with the task with the highest percentage of CPU time in the address space
  - SMF30\_Highest\_Task\_CPU\_Program

# zBNA Scope of Analysis

- Data Inputs
  - Provide Extractor job run on client systems to capture the data
  - SMF 70, 72,
  - SMF 30 records (subtype 4 for step info and subtype 5 for job info)
- Scope of Analysis
  - Scope is primarily single batch window of user defined length
  - What if analysis is how that specific batch window would run in a different environment on an alternate processor
  - Single system view
- Tool Filters
  - Discovered from the data
    - Service classes, job classes, account codes
  - Settable by user
    - Time Window, CPU Seconds, CPU Intensity, Task Intensity, Exclude Jobs, Key Jobs
- Output
  - Save the study (filters, and file names)
  - Generate a suite of output reports

## Why use zBNA?

- Perform "what if" analysis and estimate the CPU upgrade effect on batch window
- Identify job time sequences based on a graphical view
- Filter jobs by attributes like CPU time / intensity, job class, service class, etc.
- Review the resource consumption of all the batch jobs
- Drill down to the individual steps to see the resource usage
- Identify candidate jobs for running on different processors
- Identify jobs with speed of engine concerns (top tasks %)

# zBNA Filtering Capability and Job Characteristics

IBM System z Batch Network Analyzer - TEST FILE

File Filters Action Help

Applied Filters

- SERVICE CLASS: BATPROOF, BATCHH, BATTSTDF
- JOB NAME: M4\*, M3\*

Mainframe Information

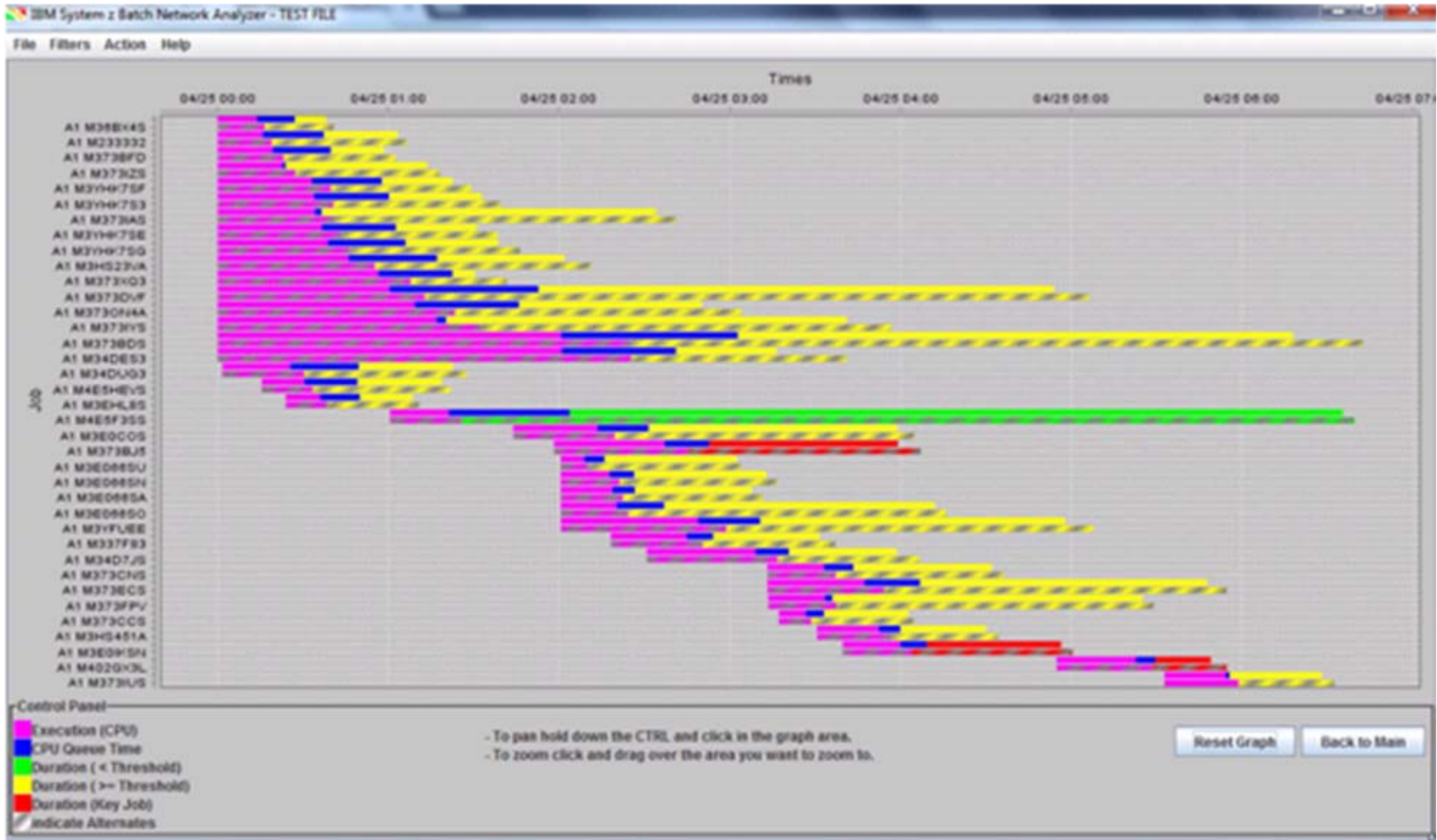
Model: 2817.711  
 Partition Name: PROO  
 SYSID: SYS1  
 Partition Logical Utilization: 93.7%  
 CPC Utilization: 93.7%

Key	Batch	Job Name	Steps	Job Class	Acct Code	Service Class	CPU Time	zAAP Time	zIP Time	Top Task	Top Task %	Condition Code
		M34DES3	6	J	34094432	BATPROOF	7,257.10	0.00	0.00	DSNECP10	92%	0
		M37360G	21	J	37397332	BATPROOF	7,246.09	0.00	0.76	DSNECP10	46%	0
		M373WYS	3	J	37397332	BATCHH	4,618.64	0.00	0.00	DSNECP10	34%	0
		M373ON4A	4	J	37397332	BATPROOF	4,158.59	0.00	0.00	DSNECP10	63%	0
		M373XQ3	5	J	37397332	BATPROOF	3,393.93	0.00	0.00	DSNECP10	87%	0
		M3YFLUE	3	J	3YF3YF32	BATPROOF	2,891.49	0.00	0.00	DSNECP10	21%	0
		M3YH3Y4	3	J	3YH3YH32	BATPROOF	2,762.67	0.00	0.00	DSNECP10	43%	0
		M3738J5	11	J	37397332	BATPROOF	2,338.90	0.00	0.40	SYNCSORT	9%	0
		M3YH475E	26	J	3YH3YH32	BATPROOF	2,327.01	0.00	0.00	DSNECP10	62%	0
		M34D7J5	3	J	34094432	BATPROOF	2,294.83	0.00	0.01	DSNECP10	21%	0
		M3YH475E	26	J	3YH3YH32	BATPROOF	2,198.57	0.00	0.00	DSNECP10	64%	0
		M373BAS	3	J	37397332	BATCHH	2,052.33	0.00	0.00	DSNECP10	26%	0
		M373ECG	3	J	37597532	BATPROOF	2,046.00	0.00	0.00	DSNECP10	25%	0
		M3YH4753	26	J	3YH3YH32	BATPROOF	2,035.22	0.00	0.00	DSNECP10	62%	0
		M3YH475F	26	J	3YH3YH32	BATPROOF	1,987.95	0.00	0.00	DSNECP10	63%	0
		M3E0606	3	J	3E09E032	BATPROOF	1,774.84	0.00	0.00	DSNECP10	26%	0
		M402GK3L	17	J	40242032	BATPROOF	1,674.40	0.00	0.00	ENGEDE	4%	0
		M337F83	5	J	33793732	BATPROOF	1,598.67	0.00	0.00	DSNECP10	26%	0
		M34DUG3	15	J	34094432	BATPROOF	1,431.71	0.00	0.01	DSNECP10	29%	0
		M373ZS	3	J	37397332	BATCHH	1,368.24	0.00	0.00	DSNECP10	22%	0
		M3H5451A	9	J	3H53H532	BATPROOF	1,305.79	0.00	0.00	DSNECP10	23%	0
		M3738J5	14	J	37397332	BATCHH	1,295.75	0.00	0.23	DSNECP10	24%	0
		M3E0635E	66	J	4E595732	BATPROOF	1,243.72	0.00	0.16	DSNECP10	17%	0
		M3E093N	4	J	3E09E032	BATPROOF	1,218.09	0.00	0.00	DSNECP10	8%	0
		M3738J5	9	J	37397332	BATCHH	1,198.47	0.00	0.01	DSNECP10	17%	0
		M373CNS	5	J	37397332	BATPROOF	1,196.57	0.00	0.00	DSNECP10	19%	0
		M3E0665O	2	J	3E09E032	BATPROOF	1,177.61	0.00	0.00	DSNECP10	15%	0
		M3738FD	7	J	37397332	BATPROOF	1,163.47	0.00	0.00	DSNECP10	48%	0
		M3YV654	9	J	3YV3YV32	BATPROOF	1,149.89	0.00	0.00	IEFBC	0%	0
		M402HY4E	18	J	40242032	BATPROOF	1,143.02	0.00	0.00	IEFBC	0%	0
		M3E0665A	2	J	3E09E032	BATPROOF	1,091.93	0.00	0.00	DSNECP10	22%	0
		M3E0665N	2	J	3E09E032	BATPROOF	1,029.75	0.00	0.00	DSNECP10	13%	0
		M3E0665Z	2	J	3E09E032	BATPROOF	976.33	0.00	0.00	IEFBC	0%	0

872 Jobs



# zBNA Graphics and Alternative Processor Analysis



## Additional Information

- Education and Training
    - User's Guide
    - Recorded Demo from June 20 2013
    - Lab Exercise with sample data
  - What's Next?\*
- Update with DASD Data Set Information
    - Process SMF 42 records
      - Information on response times, blocking, I/O rates, read:write ratios, more
    - What data sets are used in a job
    - What are the set of jobs that use a data set - LOADS
  - zEDC BSAM/QSAM Compression Candidates

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# Filter” BATCHHI Service Class, Jobs M4E07\*, >10 sec CPU and >100 sec Elapsed

IBM System z Batch Network Analyzer - TEST FILE

File Filters Action Graph Reports DSNs Help

Applied Filters: SERVICE CLASS: BATCHHI, JOB NAMES: M4E07\*

Mainframe Information: Model: 2817-711, Partition Name: PROD, SYSID: SYS1, Partition Logical Utilization: 93.7%, CPC Utilization: 93.7%

Key Batch	Job Name	Steps	Job Class	Acct Code	Service Class	Elapsed Ti...	CPU Time	zAAP Time	zIP Time	CPU Intensity	EXCPs	Top Program	Top Pgm %	Condition C...
<input type="checkbox"/>	M4E07EMH	99	B	4E595732	BATCHHI	130.0s	10.8s	0.0s	0.0s	8.3%	90,392	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07WWH	126	B	4E595732	BATCHHI	120.0s	11.6s	0.0s	0.0s	9.7%	124,052	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07HZH	128	B	4E595732	BATCHHI	27.8m	114.5s	0.0s	0.2s	6.9%	3,499,688	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07HZF	51	B	4E595732	BATCHHI	108.0s	22.7s	0.0s	0.0s	21.0%	23,613	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07N7H	212	B	4E595732	BATCHHI	180.0s	19.7s	0.0s	0.0s	11.0%	186,397	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07HBH	212	B	4E595732	BATCHHI	144.0s	13.8s	0.0s	0.0s	9.6%	79,513	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E072HH	171	B	4E595732	BATCHHI	129.0s	13.5s	0.0s	0.0s	10.5%	106,668	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07LHH	124	B	4E595732	BATCHHI	248.0s	20.1s	0.0s	0.0s	8.1%	438,290	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E070TH	212	B	4E595732	BATCHHI	271.0s	16.2s	0.0s	0.0s	6.0%	76,878	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07AIH	90	B	4E595732	BATCHHI	135.0s	10.3s	0.0s	0.0s	7.6%	130,425	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E072GH	212	B	4E595732	BATCHHI	18.1m	90.5s	0.0s	0.1s	8.3%	1,182,800	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07APH	131	B	4E595732	BATCHHI	26.3m	121.9s	0.0s	0.0s	7.7%	4,479,181	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07HRH	126	B	4E595732	BATCHHI	107.0s	11.4s	0.0s	0.0s	10.6%	123,460	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07HCH	126	B	4E595732	BATCHHI	120.0s	12.2s	0.0s	0.0s	10.1%	164,071	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E0768H	90	B	4E595732	BATCHHI	115.0s	10.3s	0.0s	0.0s	8.9%	120,118	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E0738H	130	B	4E595732	BATCHHI	129.0s	13.5s	0.0s	0.0s	10.4%	180,207	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E07B0H	132	B	4E595732	BATCHHI	485.0s	36.3s	0.0s	0.1s	7.5%	972,318	IEFIIC	0.0%	0000
<input checked="" type="checkbox"/>	M4E07B1H	132	B	4E595732	BATCHHI	16.5m	74.9s	0.0s	0.1s	7.2%	3,028,474	IEFIIC	0.0%	0000
<input type="checkbox"/>	M4E0715H	90	B	4E595732	BATCHHI	112.0s	10.0s	0.0s	0.0s	9.0%	72,482	IEFIIC	0.0%	0000

19 Jobs



# Job M4E07B1H Job / Data Set Report – Sorted in Total I/O Time Descending

zBNA: Job / Dataset Report

Job Details:

Job Name: M4E07B1H      Key Batch: Yes      Elapsed Time: 992.0 Seconds      CPU Intensity: 7.2%

Start Date: Apr 25, 2013      Start Time: 7:24 AM      End Date: Apr 25, 2013      End Time: 7:41 AM

Step	Step Number	DSN	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconne Time
S4E5N227	92	F2B3PBV.J2B35Y9P.PLNASPD.INDEX	188.0s	1879622	0.1	0.0	0.0	0.0	0.0
S4E5H22E	76	F2B3PB.J2B35Y9P.MEA.EXTRACT.G0217V00	42.1s	619	68.0	0.0	0.1	34.6	33.0
S4E0T8A4	66	V103.I354.TMS	25.0s	249682	0.1	0.0	0.0	0.0	0.0
S4E03FQG	44	F2B8PBV.J2B85Y9P.EXT0HIP.DATA	22.5s	7746	2.9	0.0	0.0	2.8	0.0
S4E5N27G	91	F2B3PB.SORTFILE.J2B35Y9P.G0209V00	19.8s	738	26.8	0.0	0.0	20.7	5.0
S4E5H22E	76	F2B3PB.PB3E0011.J2B35Y9P	19.5s	698	28.0	0.0	0.0	21.5	6.0
S4E03FQ7	36	SYS13115.T072455.RA000.J2B85Y9E.R0798168	15.7s	83	189.0	0.0	1.4	159.3	12.0
S4E5N26F	82	F2B3PB.PB3K004C.J2B35Y9P	15.6s	10401	1.5	0.0	0.0	1.4	0.0
S4E5N24E	75	F2B3PB.PB3K0011.J2B35Y9P	13.2s	145	90.7	0.0	0.0	84.2	6.0
S4E5N27E	89	F2B3PB.EXTRACT.J2B35Y9P.FILE	12.8s	3276	3.9	0.0	0.0	2.5	0.0
S4E5N227	92	F2B3PB.SORTFILE.J2B35Y9P.G0209V00	8.4s	5249	1.6	0.0	0.0	1.5	0.0
S4E03FQJ	47	F2B8PBV.J2B85Y9P.EXT0HIP.INDEX	8.4s	83547	0.1	0.0	0.0	0.0	0.0
S4E5N225	78	F2B3PB.PB3K0031.J2B35Y9P	8.1s	145	56.0	0.0	0.1	45.0	10.0
S4E5N227	92	F2B3PBV.J2B35Y9P.PLNASPD.DATA	8.1s	81184	0.1	0.0	0.0	0.0	0.0

OK

# Job M4E07B1H “Life of a Data Set” F2B3PBV.J2835Y9P.PLNASPD.INDEX Report

zBNA: Life of a Dataset

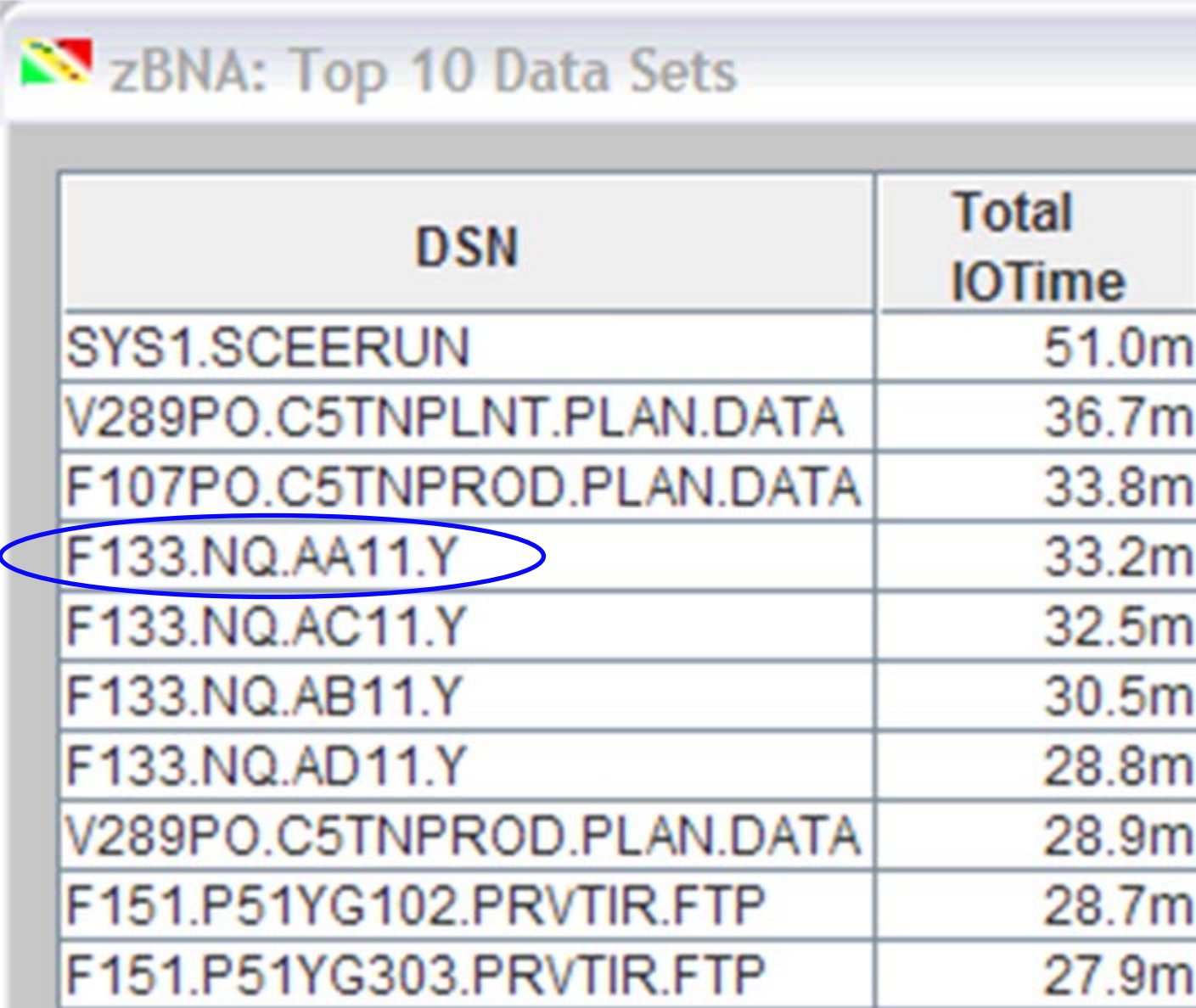
Data Set Details:  
 Data Set: F2B3PBV.J2835Y9P.PLNASPD.INDEX      Number of Job Steps: 2

Job	Step	Step Number	Job Number	Step End	Total I/O Time	I/O Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time
M4E07B1H	S4E5N27D	88	JOB21576	04/25/2013 07:31:53	0.1s	130	1.1	0.0	0.0	1.0	0.0
M4E07B1H	S4E5N227	92	JOB21576	04/25/2013 07:41:01	188.0s	1,879,622	0.1	0.0	0.0	0.0	0.0

**Investigate SMF 64s and consider increasing LSR / NSR buffers to hold Index Set and potentially eliminate ~3 Minutes of I/O time**

OK

# “Top 10” Data Sets Report



The image shows a screenshot of a report window titled "zBNA: Top 10 Data Sets". The window contains a table with two columns: "DSN" and "Total IOTime". The data is sorted by Total IOTime in descending order. The fourth row, "F133.NQ.AA11.Y", is circled in blue.

DSN	Total IOTime
SYS1.SCEERUN	51.0m
V289PO.C5TNPLNT.PLAN.DATA	36.7m
F107PO.C5TNPROD.PLAN.DATA	33.8m
F133.NQ.AA11.Y	33.2m
F133.NQ.AC11.Y	32.5m
F133.NQ.AB11.Y	30.5m
F133.NQ.AD11.Y	28.8m
V289PO.C5TNPROD.PLAN.DATA	28.9m
F151.P51YG102.PRVTIR.FTP	28.7m
F151.P51YG303.PRVTIR.FTP	27.9m



# “Life of a Data Set” (LOADS) Report – F133.NQ.AA11Y - Sorted in Step End Ascending

zBNA: Life of a Dataset

Data Set Details:  
Data Set: F133.NQ.AA11.Y Number of Job Steps: 391

Job	Step	Step Number	Job Number	Step End	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time
M4E5H7S	*NO30*	*NO30*	*NO30*	04/25/2013 00:16:01	1.3s	199	6.7	0.0	0.1	0.1	6.1
M4E5UHS3	VWHS7	11	JOB29797	04/25/2013 00:16:17	0.1s	11	5.1	0.0	0.1	0.3	4.6
M4E077VH	S4E5N27D	46	JOB29932	04/25/2013 00:16:37	0.0s	4	2.4	0.0	0.1	0.1	2.0
M4E0N7GH	S4E5N27D	55	JOB29876	04/25/2013 00:16:40	0.0s	2	3.7	0.0	0.0	0.2	3.5
M4E0N7GF	VWHS2302	25	JOB30315	04/25/2013 00:21:17	0.0s	1	0.3	0.0	0.1	0.1	0.0
M4E0YEDF	VWHS2302	25	JOB30739	04/25/2013 00:31:42	4.6s	860	5.4	0.0	0.1	0.2	4.9
M4E0XCOH	S4E5N27D	80	JOB31288	04/25/2013 00:35:30	0.0s	2	7.4	0.0	0.1	0.1	7.0
M35703S	*NO30*	*NO30*	*NO30*	04/25/2013 00:36:24	0.1s	376	0.3	0.0	0.1	0.1	0.0
M4E0XCOF	VWHS2302	25	JOB31578	04/25/2013 00:37:30	0.0s	1	0.3	0.0	0.1	0.1	0.0
M35700S	*NO30*	*NO30*	*NO30*	04/25/2013 00:40:58	0.3s	76	4.4	0.0	0.1	0.2	3.8
M35702S	*NO30*	*NO30*	*NO30*	04/25/2013 00:55:13	14.8s	7,321	2.0	0.0	0.1	0.2	1.5
M35709G	*NO30*	*NO30*	*NO30*	04/25/2013 01:01:48	1.4s	219	6.2	0.0	0.1	0.8	5.1
M35709H	*NO30*	*NO30*	*NO30*	04/25/2013 01:01:58	1.2s	263	4.7	0.0	0.1	0.9	3.6
M35709E	*NO30*	*NO30*	*NO30*	04/25/2013 01:02:03	1.8s	322	5.4	0.0	0.1	0.8	4.4
M35709F	*NO30*	*NO30*	*NO30*	04/25/2013 01:02:54	2.1s	343	6.2	0.0	0.1	1.6	4.2
M35709D	*NO30*	*NO30*	*NO30*	04/25/2013 01:04:22	2.1s	329	6.5	0.0	0.1	1.4	4.8
M4E0XR6H	S4E5N27D	86	JOB00425	04/25/2013 01:04:41	0.1s	24	3.7	0.0	0.1	0.1	3.3
M4E07D9H	S4E5N27D	55	JOB00486	04/25/2013 01:05:07	0.0s	2	4.8	0.0	0.1	0.2	4.5
M4E07EMH	S4E5N27D	55	JOB00530	04/25/2013 01:06:19	0.0s	4	3.7	0.0	0.1	0.3	3.2
M4E0XR6F	VWHS2302	25	JOB00643	04/25/2013 01:06:58	0.0s	11	0.4	0.0	0.1	0.2	0.0
M4E07D9F	VWHS2302	25	JOB00720	04/25/2013 01:08:57	0.0s	1	0.3	0.0	0.1	0.2	0.0
M4E07EMF	VWHS2302	25	JOB00798	04/25/2013 01:11:09	0.0s	1	0.3	0.0	0.1	0.1	0.0

OK

# “Life of a Data Set” (LOADS) Report – F133.NQ.AA11Y – Sorted in Total I/O Time Descending

zBNA: Life of a Dataset

Data Set Details:  
Data Set: F133.NQ.AA11.Y  
Number of Job Steps: 391

Job	Step	Step Number	Job Number	Step End	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time
M354KQR	*NO30*	*NO30*	*NO30*	04/25/2013 03:43:08	24.8m	281,099	5.3	0.0	0.0	0.3	4.5
M354GJS	*NO30*	*NO30*	*NO30*	04/25/2013 03:27:09	460.0s	82,127	5.6	0.0	0.0	0.5	4.7
M35702S	*NO30*	*NO30*	*NO30*	04/25/2013 00:55:13	14.8s	7,721	2.0	0.0	0.1	0.2	1.5
M4E0YHBH	S4E5N27D	86	JOB10179	04/25/2013 04:20:52	5.6s	1,194	4.7	0.0	0.1	0.6	3.9
M4E0YWGH	S4E5N27D	148	JOB01395	04/25/2013 01:34:20	4.7s	745	6.2	0.0	0.1	2.1	3.8
M4E0YEDF	VWHS2302	25	JOB30739	04/25/2013 00:31:42	4.6s	860	5.4	0.0	0.1	0.2	4.9
M4E5DGAS	VWHS223	3	JOB02930	04/25/2013 02:20:23	3.2s	1,327	2.4	0.0	0.1	0.5	1.5
M4E0XBQH	S4E5N27D	82	JOB20027	04/25/2013 07:10:23	2.8s	467	6.0	0.0	0.1	1.5	4.2
M4E563S	*NO30*	*NO30*	*NO30*	04/25/2013 06:09:26	2.7s	558	4.9	0.0	0.1	0.2	4.4
M35709D	*NO30*	*NO30*	*NO30*	04/25/2013 01:04:22	2.1s	329	6.5	0.0	0.1	1.4	4.8
M35709F	*NO30*	*NO30*	*NO30*	04/25/2013 01:02:54	2.1s	343	6.2	0.0	0.1	1.6	4.2
M35709E	*NO30*	*NO30*	*NO30*	04/25/2013 01:02:03	1.8s	322	5.4	0.0	0.1	0.8	4.4
M35709G	*NO30*	*NO30*	*NO30*	04/25/2013 01:01:48	1.4s	219	6.2	0.0	0.1	0.8	5.1
M4E5H7S	*NO30*	*NO30*	*NO30*	04/25/2013 00:16:01	1.3s	199	6.7	0.0	0.1	0.1	6.1
M35709H	*NO30*	*NO30*	*NO30*	04/25/2013 01:01:58	1.2s	263	4.7	0.0	0.1	0.9	3.6
M4E0XWJH	S4E5N27D	82	JOB21988	04/25/2013 07:32:03	1.2s	314	3.8	0.0	0.1	0.1	3.4
M4E0YTRH	S4E5N27D	46	JOB23296	04/25/2013 07:47:50	1.1s	251	4.3	0.0	0.1	0.2	3.9
M4E07HCH	S4E5N27D	82	JOB18469	04/25/2013 06:42:49	0.7s	153	4.8	0.0	0.1	0.6	3.9
M4E0Y7ZH	S4E5N27D	125	JOB01165	04/25/2013 01:22:44	0.7s	157	4.3	0.0	0.1	0.1	3.9
M4E0XWZH	S4E5N27D	168	JOB01583	04/25/2013 01:40:43	0.6s	134	4.7	0.0	0.1	0.6	3.8
M4E0NWNH	S4E5N27D	92	JOB22314	04/25/2013 07:33:52	0.6s	111	4.3	0.0	0.1	0.2	3.9
M4E0YHBF	VWHS2302	25	JOB11108	04/25/2013 04:33:21	0.6s	337	1.8	0.0	0.1	0.1	1.4

OK

**Investigate I/O technology to reduce I/O Response Times**

# Summary

- CMOS per thread speed concerns will continue to grow and the batch window will need to be reviewed to ensure seamless growth
  - Focus and tune I/O portions
  - Parallelize operations
- zBNA provides an easy to use, graphical interface to identify workloads, if any, which need additional examination
- Use the tool and let us know how you like it
  - Available from
    - <http://w3-03.ibm.com/support/techdocs/atmastr.nsf/WebIndex/PRS5126>
  - Education Tab has:
    - Recently recorded webinar
    - Lab exercise
    - Sample files



# IBM zEnterprise Data Compression (zEDC)

# DFSMS

## *BSAM/QSAM Exploitation\**

- z/OS DFSMS (BSAM/QSAM) introduces a new type of compression (zEDC) for non-VSAM extended format data sets. This will be provided in 4Q2013 via PTF on z/OS V2R1
- Customers who don't currently compress their BSAM/QSAM data may take advantage of the disk space savings available through zEDC compression with minimal CPU overhead. This allows more information to be kept online at a lower cost.
- DASD space requirements for BSAM/QSAM data may be reduced
  - These savings apply to production storage, to copies of production data at remote sites, to data on test systems, and to data archived on disk.
- The CPU cost of compressing BSAM/QSAM data may be reduced
- When using zEDC compression compared to existing BSAM/QSAM compression options, disk space savings may vary depending on the compression options

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# IBM System z Batch Network Analyzer and Compression

*Helping determine if you have files that are candidates for zEDC*

- zBNA will identify zEDC Compression Candidates
  - Post-process customer provided SMF records, to identify jobs and data sets which are zEDC compression candidates across a specified time window, typically a batch window
  - Help estimate utilization of a zEDC Express feature and help size number of features needed
  - Generate a list of data sets by job which already do hardware compression and may be candidates for zEDC
  - Generate a list of data sets by job which may be zEDC candidates but are not in extended format
  - Target availability – 4Q 2013



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# Initial zEDC Compression Reports

- **zEDC Compression Eligible Criteria for DFSMS BSAM/QSAM Data Sets**
  - Non-VSAM
  - Extended Format or Not Extended Format
  - EXCP = NO
  - Cannot be Open for Input and perform writes
  - Data Set Size (Initial Allocation) >8 MB (or >5 MB if no secondary allocation)
  - Not Compressed (although could convert from Generic/Tailored to zEDC compression)
- **Planned Reports**
  - Top zEDC Compression Candidate DASD Data Sets
    - Eligible and Extended Format
    - Eligible and not Extended Format (needs to be converted to Extended Format)
    - Eligible already Compressed (already Extended Format – required by Generic/Tailored compression)
  - Estimate of Number of zEDC Cards Required by Hour

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# Reports: Top zEDC Compression Candidate Data Sets: Not Extended Format – SMF 14/15

SMF 14/15 Non VSAM BSAM or QSAM Extended=N and Compress=N EXCP Descending

SMFID ID	TIMESTAMP DATE	TIME	JBN NAME	STEPNO NUM	DSN NAME	EXCPS COUNT	ACCMETH TYPE	EXTENDED Y/N	COMPWSW Y/N	COMPRW BYTES	UCOMPRW BYTES	COMPSIZE BYTES	UCOMPSIZE BYTES	COMP_PER %
SYSA	13 APR 25	04:11.0	JBN12UTL	0	DSN1.JBN12.SPLAAS.NQ	770,634,108	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	58:35.3	JBN12INS	0	DSN1.JBN12.SPLINS.NQ	492,104,631	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	58:32.7	JBN12INS	0	DSN1.JBN12.SPLTR7.NQ	226,684,637	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	31:04.4	JBN12PEN	0	DSN1.JBN12.SPLAHP.NQ	50,622,426	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	31:02.8	J8JBN12R	0	DSN1.JBN12.SPLRST2.NQ	41,590,428	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	59:35.5	J8JBN12E	0	DSN1.JBN12.SPLLTR7.NQ	21,310,850	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	38:56.4	J8JBN12E	0	DSN1.JBN12.SPLRST5.NQ	15,635,386	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	06:37.5	J8JBN12R	0	DSN1.JBN12.SPLAEL.NQ	13,106,236	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	13:32.9	JBN2MR8H	3	SYS13115.T050034.RA000.JBN2MR8H.R0740865	9,857,367	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	50:18.5	JBN2MR8H	2	SYS13115.T050034.RA000.JBN2MR8H.R0740865	9,857,361	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	26:45.3	J8JBN12E	0	DSN1.JBN12.SPLLTR8.NQ	6,343,541	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	44:27.2	JBN3YDP	7	DSN2.P51YD10.MERGE.SORTOUT	4,052,205	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	50:03.5	JBN3YB2	6	DSN2.P51YB30.PRVNWSP.FILE	3,900,336	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	04:10.0	JBN12UTL	0	DSN1.JBN12.SPLUTL.NQ	3,743,826	BSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	46:28.1	J1VEVERX	5	DSN8.PIID.VEXX.PIRECS.INPUT	2,858,363	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	44:27.2	JBN3YDP	7	DSN2.P51YD10.PRVNTWK.FILE	2,540,860	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	20:15.3	JBN4C10	8	DSN3.ENROL.NOHIS.G3032V00	2,427,205	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	29:57.1	JBN4C61	2	DSN3.LKL.NOHIS.G0145V00	2,427,203	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	59:47.5	JBN3VVP	108	DSN4.P53VV91B.PART.DATA13	2,376,598	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	44:27.2	JBN3YDP	7	DSN2.P51YD10.PRVNSL.SORT2	2,272,518	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	20:44.6	JBN3YLP	2	DSN2.P51YG114.PRVNWSP.FTP	2,266,380	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	39:30.6	JBN3YG3	9	DSN2.P51YG114.PRVNWSP.FTP	2,266,380	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	13:58.2	JBN5XME	35	DSN5.GB86XM31.G0090V00	2,037,952	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	11:14.3	JBN5XME	34	DSN5.GB86XM31.G0090V00	2,037,950	QSAM	N	N	0	0	0	0	0 N/A
SYSA	13 APR 25	13:59.9	JBN6RS1	2	DSN6.YYYYYY.PRD.TSSCFE.OUT	2,002,879	BSAM	N	N	0	0	0	0	0 N/A

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# Reports: Top zEDC Compression Candidate Data Sets: Already Compressed (Generic or Tailored) – SMF 14/15

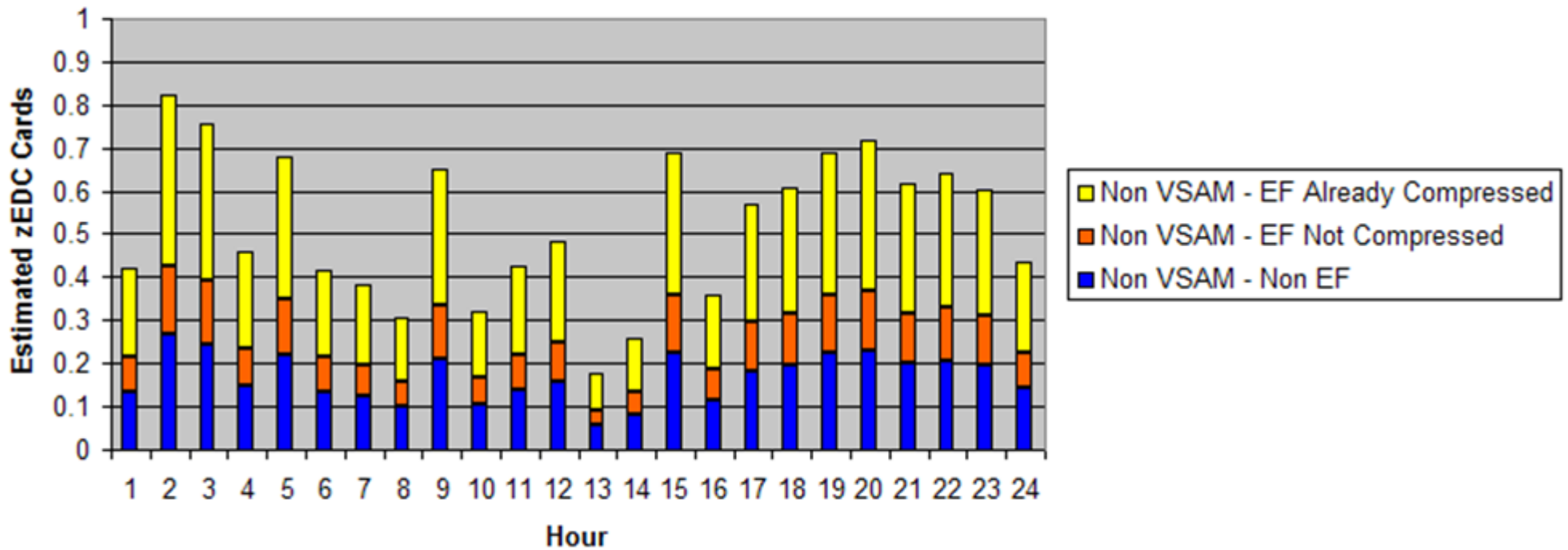
SMF 14/15 Non VSAM Extended=Y and Compress=Y UCOMPRW Descending

SMFID ID	TIMESTAMP DATE	TIME	JBN NAME	STEPNO NUM	DSN NAME	EXCPS COUNT	ACCMETH TYPE	EXTENDED Y/N	COMPSPW Y/N	COMPRW BYTES	UCOMPRW BYTES	COMP SIZE BYTES	UCOMP SIZE BYTES	COMP_PER %
SYSA	13 APR 25	25:07.3	JBN3YG3	5	DSN2.P51YG303.PRVTIR.FTP	20,332,317	BSAM	Y	Y	44,391,826,406	123,037,149,415	44,391,714,636	123,036,840,621	63.9
SYSA	13 APR 25	33:23.4	JBN3YLP	2	DSN2.P51YG303.PRVTIR.FTP	1,588,736	QSAM	Y	Y	44,391,714,636	123,036,840,621	44,391,714,636	123,036,840,621	63.9
SYSA	13 APR 25	55:09.4	JBN3YG3	9	DSN2.P51YG303.PRVTIR.FTP	1,588,736	QSAM	Y	Y	44,391,714,636	123,036,840,621	44,391,714,636	123,036,840,621	63.9
SYSA	13 APR 25	48:35.1	JBN3YF2	3	DSN2.G51YF201.DELTA.PRVAEX.CURRENT.G0066V00	13,274,129	BSAM	Y	Y	35,533,156,166	98,798,506,574	35,533,128,222	98,798,428,539	64.0
SYSA	13 APR 25	57:44.8	JBN3YF2	4	DSN2.G51YF201.DELTA.PRVAEX.CURRENT.G0066V00	1,271,698	QSAM	Y	Y	35,533,128,222	98,798,428,539	35,533,128,222	98,798,428,539	64.0
SYSA	13 APR 25	57:44.8	JBN3YF2	4	DSN2.G51YF201.DELTA.PRVAEX.CURRENT.G0065V00	1,271,575	QSAM	Y	Y	35,529,700,338	98,789,377,518	35,529,700,338	98,789,377,518	64.0
SYSA	13 APR 25	12:04.5	JBN3YG2	3	DSN2.P51YG102.PRVTIR.FTP	13,015,965	BSAM	Y	Y	35,364,314,806	98,306,428,948	35,364,258,924	98,306,273,133	64.0
SYSA	13 APR 25	58:09.0	JBN3YG2	2	DSN2.P51YG102.PRVTIR.FTP	1,265,654	BSAM	Y	Y	35,364,258,924	98,306,273,133	35,364,258,924	98,306,273,133	64.0
SYSA	13 APR 25	26:53.4	JBN3YG3	5	DSN2.P51YG102.PRVTIR.FTP	1,265,654	BSAM	Y	Y	35,364,258,924	98,306,273,133	35,364,258,924	98,306,273,133	64.0
SYSA	13 APR 25	00:33.4	JBN7987A	1	DSN7.F400.RX.HIST10.OHUB	1,486,285	BSAM	Y	Y	41,536,277,751	74,429,838,600	41,536,277,751	74,429,838,600	44.2
SYSA	13 APR 25	07:47.7	JBN7987A	1	DSN7.F400.RX.HIST11.OHUB	1,352,773	BSAM	Y	Y	37,805,317,328	66,447,795,000	37,805,317,328	66,447,795,000	43.1
SYSA	13 APR 25	13:33.1	JBN7987A	1	DSN7.F400.RX.HIST12.OHUB	1,226,496	BSAM	Y	Y	34,276,400,515	59,736,217,200	34,276,400,515	59,736,217,200	42.6
SYSA	13 APR 25	11:02.4	JBN846AX	12	DSN7.F46P.RX370.SUB.EEID1.G1663V00	257,510	QSAM	Y	Y	7,189,840,366	49,016,110,000	7,189,840,366	49,016,110,000	85.3
SYSA	13 APR 25	59:39.4	JBN846AX	11	DSN7.F46P.RX370.SUB.EEID1.G1663V00	257,511	BSAM	Y	Y	7,189,840,366	49,016,110,000	7,189,840,366	49,016,110,000	85.3
SYSA	13 APR 25	11:02.4	JBN846AX	12	DSN7.RX370.SUB.EEID1.G1772V00	257,347	QSAM	Y	Y	7,185,251,273	48,984,842,400	7,185,251,273	48,984,842,400	85.3
SYSA	13 APR 25	01:46.7	JBN874AX	3	DSN7.RX370.SUB.EEID1.G1772V00	257,346	BSAM	Y	Y	7,185,251,273	48,984,842,400	7,185,251,273	48,984,842,400	85.3
SYSA	13 APR 25	18:38.1	JBN874AX	3	DSN7.SUBDTL.SORT82.EEID1	257,347	BSAM	Y	Y	7,185,250,788	48,984,842,400	7,185,250,788	48,984,842,400	85.3
SYSA	13 APR 25	21:10.2	JBN874AX	4	DSN7.SUBDTL.SORT82.EEID1	257,346	QSAM	Y	Y	7,185,250,788	48,984,842,400	7,185,250,788	48,984,842,400	85.3
SYSA	13 APR 25	41:10.0	JBN846AX	11	DSN7.F83P.SUB.FULLFILE.EEID1.G1679V00	257,136	BSAM	Y	Y	7,179,401,287	48,945,854,100	7,179,401,287	48,945,854,100	85.3
SYSA	13 APR 25	09:55.8	JBN846CX	12	DSN7.F46P.RX370.SUB.EEID3.G1663V00	248,501	QSAM	Y	Y	6,938,353,406	46,983,907,100	6,938,353,406	46,983,907,100	85.2
SYSA	13 APR 25	58:13.2	JBN846CX	11	DSN7.F46P.RX370.SUB.EEID3.G1663V00	248,502	BSAM	Y	Y	6,938,353,406	46,983,907,100	6,938,353,406	46,983,907,100	85.2
SYSA	13 APR 25	09:55.8	JBN846CX	12	DSN7.RX370.SUB.EEID3.G1772V00	248,341	QSAM	Y	Y	6,933,861,176	46,953,483,200	6,933,861,176	46,953,483,200	85.2
SYSA	13 APR 25	05:45.9	JBN874CX	4	DSN7.SUBDTL.SORT82.EEID3	248,340	QSAM	Y	Y	6,933,861,176	46,953,483,200	6,933,861,176	46,953,483,200	85.2
SYSA	13 APR 25	02:55.1	JBN874CX	3	DSN7.SUBDTL.SORT82.EEID3	248,341	BSAM	Y	Y	6,933,861,176	46,953,483,200	6,933,861,176	46,953,483,200	85.2
SYSA	13 APR 25	55:23.5	JBN874CX	3	DSN7.RX370.SUB.EEID3.G1772V00	248,340	BSAM	Y	Y	6,933,861,176	46,953,483,200	6,933,861,176	46,953,483,200	85.2

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# Estimated zEDC Cards Report

Estimated Number of zEDC Cards by Hour



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# CPU MF Update

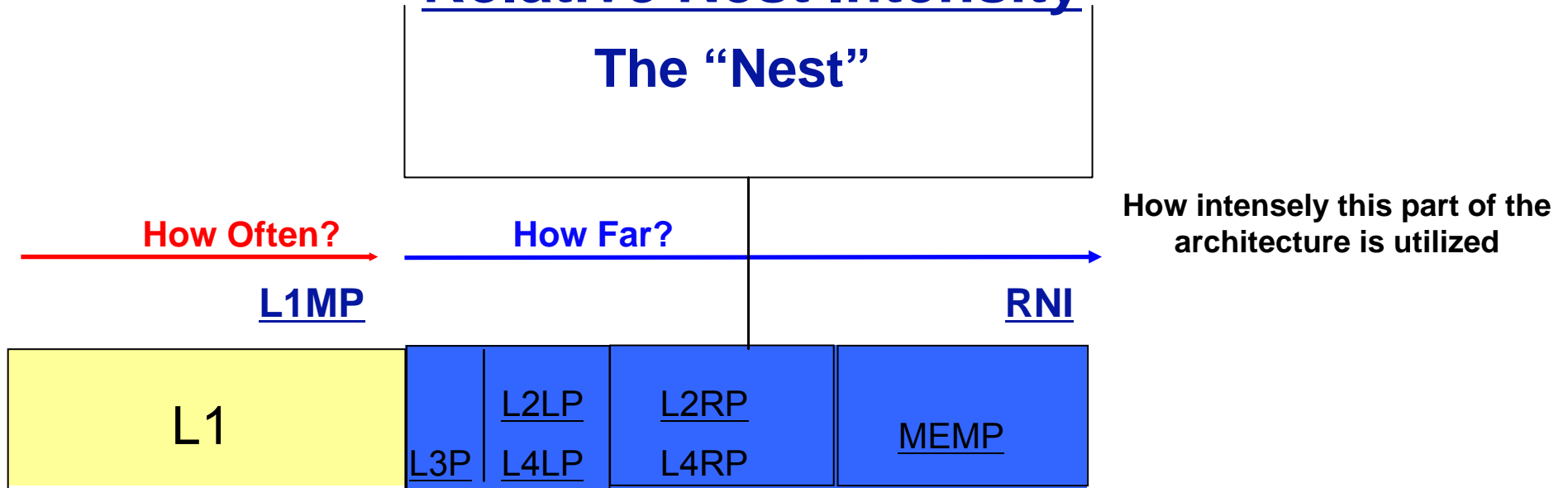
# CPU MF Updates

- **TDSz supports CPU MF Counters and Reporting**
  - APAR PM78418 provides exploitation support for SMF 113-2s
- **zBC12 RNI and LSPR Workload Match same as zEC12**
  - Other zBC12 CPU MF metrics the same as zEC12 also
- **Still looking for zEC12 and zBC12 Migration Volunteers to send in SMF**
- **Summary**

# Relative Nest Intensity (RNI) Metric

- Reflects the distribution and latency of sourcing from shared caches and memory
  - For z10 EC and BC  $RNI = (1.0 * L2LP + 2.4 * L2RP + 7.5 * MEMP) / 100$
  - For z196 / z114  $RNI = 1.67 * (0.4 * L3P + 1.0 * L4LP + 2.4 * L4RP + 7.5 * MEMP) / 100$
  - For zEC12 / zBC12  $RNI = 2.2 * (0.4 * L3P + 1.2 * L4LP + 2.7 * L4RP + 8.2 * MEMP) / 100$

## Relative Nest Intensity



Microprocessor Design

Memory Hierarchy or Nest

\*z196 / z114 RNI Changed July 2012

Note these Formulas may change in the future



## RNI-based LSPR Workload Decision Table

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LIMP	RNI	LSPR Workload Match
<3%	$\geq 0.75$	AVERAGE
	$< 0.75$	LOW
3% to 6%	$>1.0$	HIGH
	0.6 to 1.0	AVERAGE
	$< 0.6$	LOW
$>6\%$	$\geq 0.75$	HIGH
	$< 0.75$	AVERAGE

Notes: applies to z10, z196, z114, zEC12 and zBC12 CPU MF data table may change based on feedback

Note these Formulas may change in the future

## Looking for zEC12 / zBC12 Migration “Volunteers” to send SMF data

- **Want to validate / refine Workload selection metrics**

### Looking for “Volunteers”

(3 days, 24 hours/day, SMF 30s, 70s, 72s, 113s per LPAR)

“Before z10 / z196 / z114” and “After zEC12 / zBC12”

Production partitions preferred

If interested send note to [jpburg@us.ibm.com](mailto:jpburg@us.ibm.com),

No deliverable will be returned

**Benefit: Opportunity to ensure your data is used to influence analysis**

# CPU MF Summary

- **CPU MF Counters provide better information for more successful capacity planning**
- **Same data used to validate the LSPR workloads can now be obtained from production systems**
- **CPU MF Counters can also be useful for performance analysis**
- **Enable CPU MF Counters Today!**
  - Continuously collect SMF 113s for your production systems

# **z/OS 2.1 New Features**

# z/OS 2.1 – CPU MF Summary

- **New HISSERV Service**
    - New Programming Interface for **real time CPU MF access**
  - **ZOS SOFTWARE Counters**
    - New Counter Set (in addition to Basic, Problem, Crypto, and Extended)
    - Only recorded in SMF 113 subtype 1
  - **Command Changes**
    - Modify HIS,SERVICE allows changes to Sampling parameters without having to start/stop,
      - Sampling parameters accept “PERSIST” to use value from previous run
    - New CTRSET options
      - CTRSET=ALL (old, e.g. Basic, Problem, Crypto and Extended)
      - CTRSET=HARDWARE (new, same as ALL)
      - CTRSET=SOFTWARE (new, ZOS Counter Set) – might include performance overhead
      - CTRSET=COMPLETE (new, HARDWARE AND ZOS Counter Set) – might include performance overhead
  - **SMF 113 Record Changes**
    - SMF 113 Subtype 2
      - Interval Start and End Time
      - Machine Sequence Code (e.g. Processor Serial Number)
    - SMF 113 Subtype 1 – New
      - Same as SMF 113 Subtype 2 but **only Delta values**
      - Includes ZOS Counter Set
- Recommendation remains to continuously run CPU MF Counters (Basic and Extended) – collecting SMF 113 Subtype 2 records**
- “F HIS,B,TT='Text',PATH='/his/',CTRONLY,CTR=(B,E),SI=SYNC”**

# z/OS 2.1 Display HIS Command (on zEC12)

```
F HIS,B,TT='BE Counters',CTRONLY,CTR=COMPLETE,SI=SYNC
```

## D HIS

```
HIS015I 17.16.52 DISPLAY HIS 113
```

```
HIS      002A ACTIVE
```

**CTR=COMPLETE to get All Counters, including ZOS**

```
COMMAND: MODIFY HIS,B,TT='BE Counters',CTRONLY,CTR=COMPLETE,SI=SYNC
```

```
START TIME: 2013/07/31 13:57:31
```

```
END TIME:    ----/--/--  ---:---:--
```

```
COMPLETION STATUS: -----
```

```
FILE PREFIX: SYSHIS20130731.135731.
```

```
COUNTER VERSION NUMBER 1: 1  COUNTER VERSION NUMBER 2: 3 ← zEC12 "3"
```

```
COMMAND PARAMETER VALUES USED:
```

```
TITLE= BE Counters
```

```
PATH= .
```

```
COUNTER SET= BASIC,PROBLEM-STATE,CRYPTO-ACTIVITY,EXTENDED,ZOS
```

```
DURATION= NOLIMIT
```

```
CTRONLY
```

```
DATALOSS= IGNORE
```

```
STATECHANGE= SAVE
```

```
SMFINTVAL= SYNC
```

```
HISSERV STATUS: ACTIVE
```

## New HISSERV Programming Interface

```
EVENT
```

**EVENT - Counters: B, P, C, E and ZOS**

```
AUTHORIZED= BASIC,PROBLEM-STATE,CRYPTO-ACTIVITY,EXTENDED,ZOS
```

```
ENABLED= BASIC,PROBLEM-STATE,CRYPTO-ACTIVITY,EXTENDED,ZOS
```

**SAMPLE - Not active**

```
SAMPLE
```

```
AUTHORIZED= BASIC
```

```
ENABLED= NONE
```

```
BUFCNT= 18 (PAGES/PROCESSOR)
```

```
SAMPFREQ= 800000 (SAMPLES/MINUTE)
```

```
PROFILER
```

```
NAME      START          QUERY          SAMPLE
```

```
HISPROF   2013/07/31 13:57:31  00:04:42.111226  -----
```

**HISPROF Profiler captures Counters and Sampling**

## z/OS 2.1 – SMF 30 Instruction Counts Addition

- **Instruction Counts added to SMF 30 Record**
- **Provide a more consistent metric which does not see as much CPU variability due to:**
  - Impacts of hardware caching
  - LPAR configurations
  - Software stack
  - Workload interactions – dispatch rate
- **Potential for alternative CPU charge back metric**
- **Requires CPU MF Counters to be enabled**
  - Basic, but IBM recommends Basic and Extended Counters to be continuously enabled on all partitions
- **Requires new SMFPRMxx to be enabled**
  - “SMF30COUNT”
    - Default is NOSMF30COUNT



# z/OS 2.1 – SMF 30 Instruction Counts – WSC Example

SYSID	Year Mon Day	Time Ended	Job	Program Name	Step Name	EXCPs	Total CPU Time (Sec)	Total Service Units	Total Instructions
<b>z196 z/OS 2.1</b>									
SYSA	20130729	10:49:10	JPBURGSA	IFASMFDP	STEP1	2001	0.01	1086	16,340,482
SYSA	20130729	10:49:11	JPBURGSA	IFASMFDP	STEP2	2001	0.01	1064	16,199,788
SYSA	20130729	10:49:11	JPBURGSA	IFASMFDP	STEP3	2001	0.01	1071	16,347,731
SYSA	20130729	10:49:12	JPBURGSA	IFASMFDP	STEP4	2001	0.01	1068	16,347,867
SYSA	20130729	10:49:12	JPBURGSA	IFASMFDP	STEP5	2001	0.01	1068	16,337,641
SYSA	20130729	10:49:12	JPBURGSA	IFASMFDP	STEP6	2001	0.01	1065	16,483,593
SYSA	20130729	10:49:13	JPBURGSA	IFASMFDP	STEP7	2001	0.01	1065	16,499,524
SYSA	20130729	10:49:13	JPBURGSA	IFASMFDP	STEP8	2001	0.01	1058	16,442,022
SYSA	20130729	10:49:14	JPBURGSA	IFASMFDP	STEP9	2001	0.01	1065	16,320,232
SYSA	20130729	10:49:14	JPBURGSA	IFASMFDP	STEP10	2001	0.01	1073	16,462,418
<b>Average</b>								<b>1,068</b>	<b>16,378,130</b>
<b>zEC12 z/OS 2.1</b>									
SYSD	20130729	10:53:55	JPBURGSD	IFASMFDP	STEP1	1997	0.01	880	17,478,234
SYSD	20130729	10:53:55	JPBURGSD	IFASMFDP	STEP2	1997	0.01	858	16,769,039
SYSD	20130729	10:53:56	JPBURGSD	IFASMFDP	STEP3	1997	0.01	861	16,777,085
SYSD	20130729	10:53:56	JPBURGSD	IFASMFDP	STEP4	1997	0.01	857	16,766,266
SYSD	20130729	10:53:56	JPBURGSD	IFASMFDP	STEP5	1997	0.01	855	16,777,423
SYSD	20130729	10:53:57	JPBURGSD	IFASMFDP	STEP6	1997	0.01	868	16,776,880
SYSD	20130729	10:53:57	JPBURGSD	IFASMFDP	STEP7	1997	0.01	858	16,777,508
SYSD	20130729	10:53:58	JPBURGSD	IFASMFDP	STEP8	1997	0.01	864	16,772,420
SYSD	20130729	10:53:58	JPBURGSD	IFASMFDP	STEP9	1997	0.01	880	16,771,576
SYSD	20130729	10:53:59	JPBURGSD	IFASMFDP	STEP10	1997	0.01	859	16,772,242
<b>Average</b>								<b>864</b>	<b>16,843,867</b>

**Total Instructions may become the preferred metric for charge back because of consistency Vs CPU time**

**We'd like your feedback**

**Warning: These numbers come from a synthetic benchmark and do not represent a production workload**





# z/OS 2.1 – SMF 30 Instruction Counts – WSC Example

Job, Step or Service Class Cycles per Instruction (CPI) can now be derived from SMF 30 records and may become an additional metric to help identify a performance change

SYSID	Year Mon Day	Time Ended	Job	Program Name	Step Name	Total Instructions	Total CPU Time (microseconds)	zEC12 / z196		Total CPI
								Cycles per Microsecond	zEC12 / z196 Total Cycles	

## z196 z/OS 2.1

SYSA	20130729	10:49:10	JPBURGSA	IFASMFDP	STEP1	16,340,482	15,172.750	5208	79,019,682	4.84
SYSA	20130729	10:49:11	JPBURGSA	IFASMFDP	STEP2	16,199,788	14,796.000	5208	77,057,568	4.76
SYSA	20130729	10:49:11	JPBURGSA	IFASMFDP	STEP3	16,347,731	14,915.875	5208	77,681,877	4.75
SYSA	20130729	10:49:12	JPBURGSA	IFASMFDP	STEP4	16,347,867	14,864.500	5208	77,414,316	4.74
SYSA	20130729	10:49:12	JPBURGSA	IFASMFDP	STEP5	16,337,641	14,864.500	5208	77,414,316	4.74
SYSA	20130729	10:49:12	JPBURGSA	IFASMFDP	STEP6	16,483,593	14,813.125	5208	77,146,755	4.68
SYSA	20130729	10:49:13	JPBURGSA	IFASMFDP	STEP7	16,499,524	14,813.125	5208	77,146,755	4.68
SYSA	20130729	10:49:13	JPBURGSA	IFASMFDP	STEP8	16,442,022	14,693.250	5208	76,522,446	4.65
SYSA	20130729	10:49:14	JPBURGSA	IFASMFDP	STEP9	16,320,232	14,813.125	5208	77,146,755	4.73
SYSA	20130729	10:49:14	JPBURGSA	IFASMFDP	STEP10	16,462,418	14,950.125	5208	77,860,251	4.73
<b>Average</b>						<b>16,378,130</b>	<b>14,869.638</b>		<b>77,441,072</b>	<b>4.73</b>

## zEC12 z/OS 2.1

SYSD	20130729	10:53:55	JPBURGSD	IFASMFDP	STEP1	17,478,234	9,278.625	5504	51,069,552	2.92
SYSD	20130729	10:53:55	JPBURGSD	IFASMFDP	STEP2	16,769,039	8,978.875	5504	49,419,728	2.95
SYSD	20130729	10:53:56	JPBURGSD	IFASMFDP	STEP3	16,777,085	9,019.750	5504	49,644,704	2.96
SYSD	20130729	10:53:56	JPBURGSD	IFASMFDP	STEP4	16,766,266	8,965.250	5504	49,344,736	2.94
SYSD	20130729	10:53:56	JPBURGSD	IFASMFDP	STEP5	16,777,423	8,938.000	5504	49,194,752	2.93
SYSD	20130729	10:53:57	JPBURGSD	IFASMFDP	STEP6	16,776,880	9,115.125	5504	50,169,648	2.99
SYSD	20130729	10:53:57	JPBURGSD	IFASMFDP	STEP7	16,777,508	8,978.875	5504	49,419,728	2.95
SYSD	20130729	10:53:58	JPBURGSD	IFASMFDP	STEP8	16,772,420	9,060.625	5504	49,869,680	2.97
SYSD	20130729	10:53:58	JPBURGSD	IFASMFDP	STEP9	16,771,576	9,278.625	5504	51,069,552	3.05
SYSD	20130729	10:53:59	JPBURGSD	IFASMFDP	STEP10	16,772,242	8,992.500	5504	49,494,720	2.95
<b>Average</b>						<b>16,843,867</b>	<b>9,060.625</b>		<b>49,869,680</b>	<b>2.96</b>

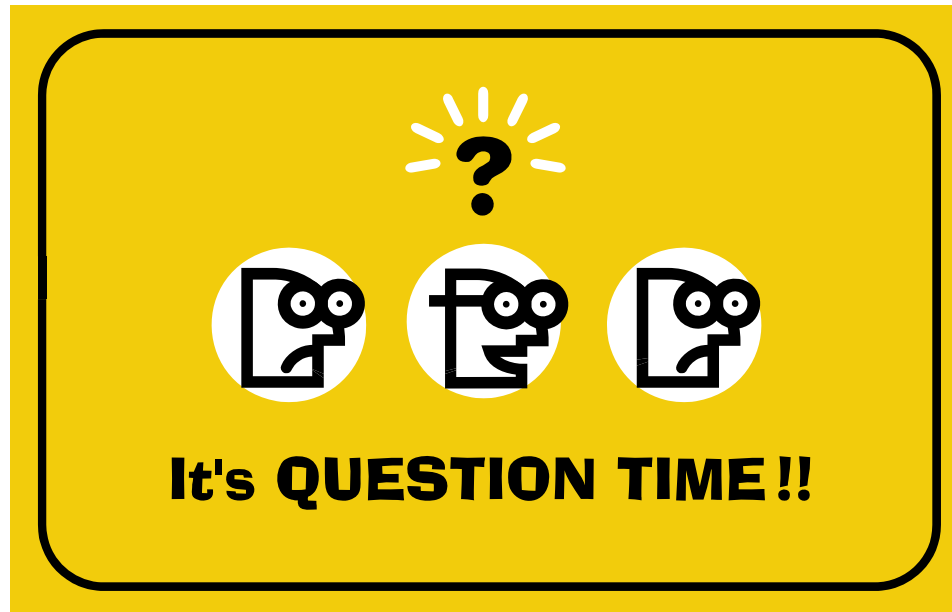
**Warning: These numbers come from a synthetic benchmark and do not represent a production workload**

Overall Change

1.64

zEC12 ITR ==>

1.69



**Thank You for  
Attending!**

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## CPU MF References

- **CPU MF Webinar Replays and Presentations**
  - <http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4922>
  
- **Additional z/OS CPU MF information**
  - <http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TC000066>
  
- **z/VM - Using CPU Measurement Facility Host Counters**
  - <http://www.vm.ibm.com/perf/tips/cpumf.html>