System z Batch Network Analyzer (zBNA) Tool – Because Batch is Back!

John Burg
IBM

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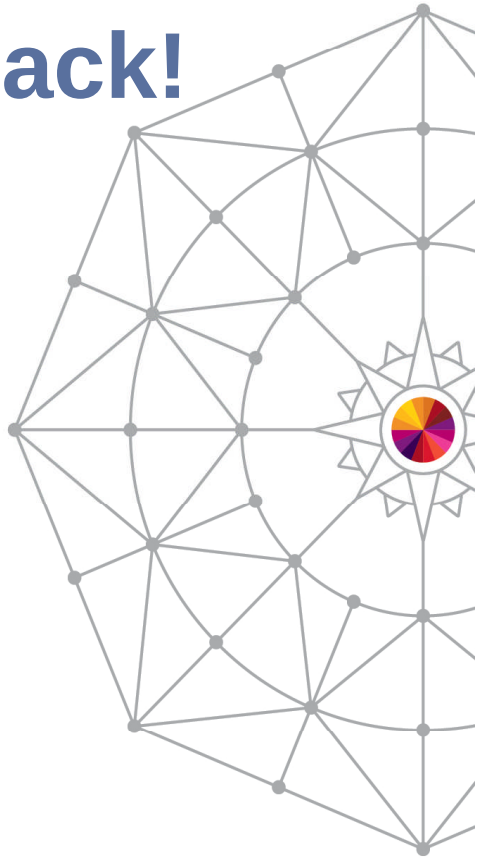

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zBNA Topics

- **Capacity Planning Information**
- **Introduction**
  - What and Why
  - New SMF 30 field for Max Task CPU%
  - Sample flow and reports
- **What's New**
  - SMF 42.6s – *new September 2013*
  - Compression and zEDC – *new December 2013*
    - BSAM and QSAM Candidates
    - zBNA Sample Reports
- **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

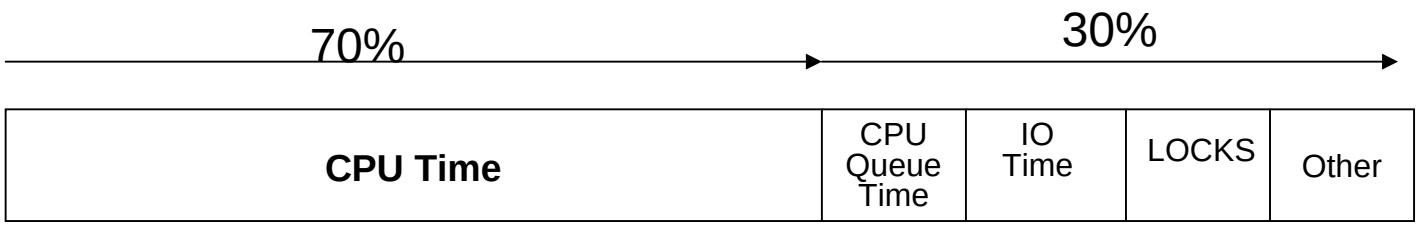
Impact of these trends will most likely be seen first in the Batch Window

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 task's throughput**
  - **Increased parallelism**
  - **Limits the impact of a workload which monopolizes a CP**
  - **Can trade-off slower CP speeds with a reduction in CPU queue delay**

Workload Considerations

Online Transaction

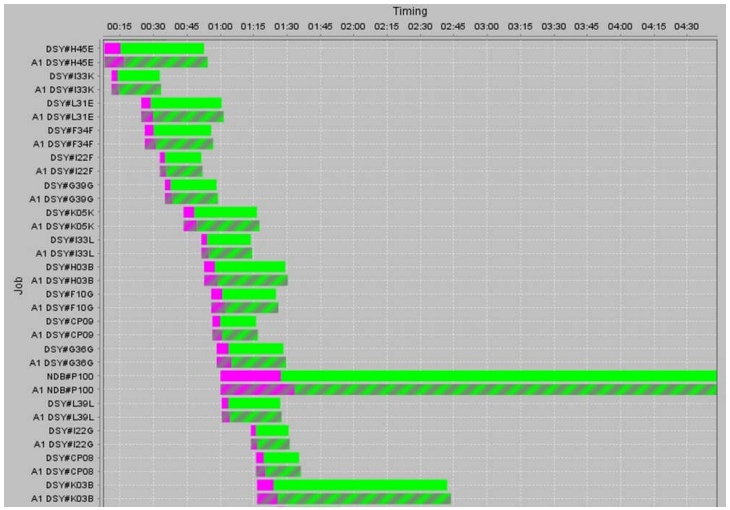


Processor	CPU Time	Other Time	Total
z196-708	.028	.012	.040
zEC12-707	.023	.012	.035
zEC12-611	.036	.012	.048

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

Need SMF 30 Interval recording to get values in subtype 4s and 5s and thus zBNA 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)
  - SMF 42 records (subtype 6 for DASD Data Set information)
  - SMF 14, 15 records (for BSAM/QSAM data set compression information)
- 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?

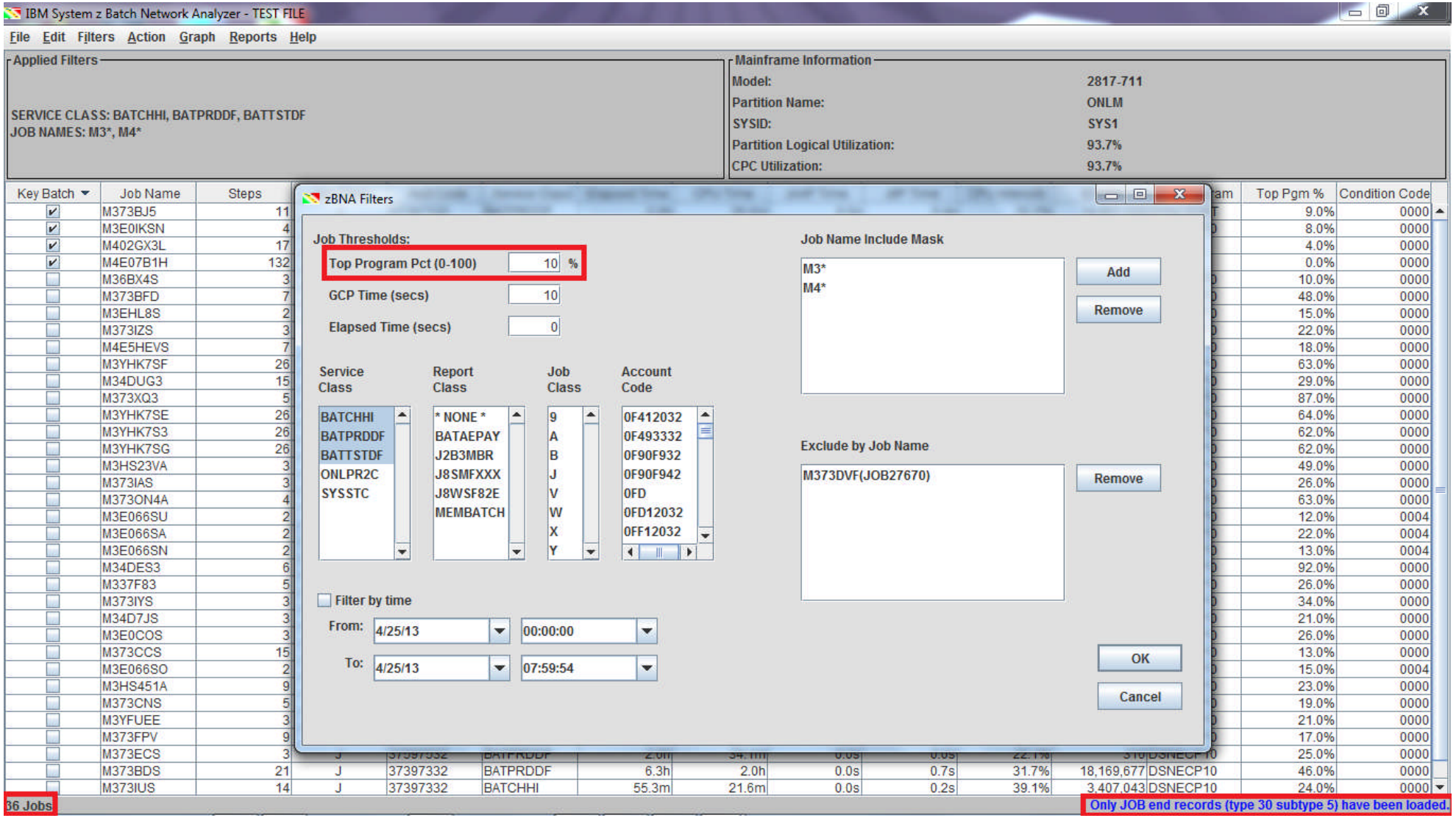
- Indentify Batch Resource Usage
  - Filter jobs by attributes like CPU time / intensity, job class, service class, etc.
  - Review the resource consumption of batch jobs
  - Drill down to the individual Steps to see resource usage and DASD Data Sets used
  - Identify job time sequences based on a graphical view

- Help Reduce the “Batch Window” by Identifying Technology Options: CPU, I/O
  - Identify candidate jobs for running on different processors
  - Identify jobs with speed of engine concerns (top tasks %)
  - Perform "what if" analysis and estimate the CPU upgrade effect on batch window
  - Identify DASD Data Sets used by jobs, and Top10 DASD Data Sets overall
  - Identify BSAM/QSAM Compression candidates and estimate number of zEDC Express cards

Typical zBNA Flow

- Load the Data
- Filter the Jobs
  - Graph / Report
  - Additional Information
    - Load the Step Detail for the Filtered Jobs
    - Load the DASD Data Set Detail for the Filtered Jobs
    - Load the DASD Data Set Detail for the Top 10 DASD Data Sets
  - Create Alternate CPU analysis
    - Graph / Report
  - Request zEDC study
- Save the zBNA File

zBNA Filtering Capability



zBNA – Job Details for Filtered Jobs – Elapsed Time Descending

IBM System z Batch Network Analyzer - TEST FILE

File Edit Filters Action Graph Reports Help

Applied Filters

SERVICE CLASS: BATCHHI, BATPRDDF, BATTSTDF
JOB NAMES: M3*, M4*

Mainframe Information

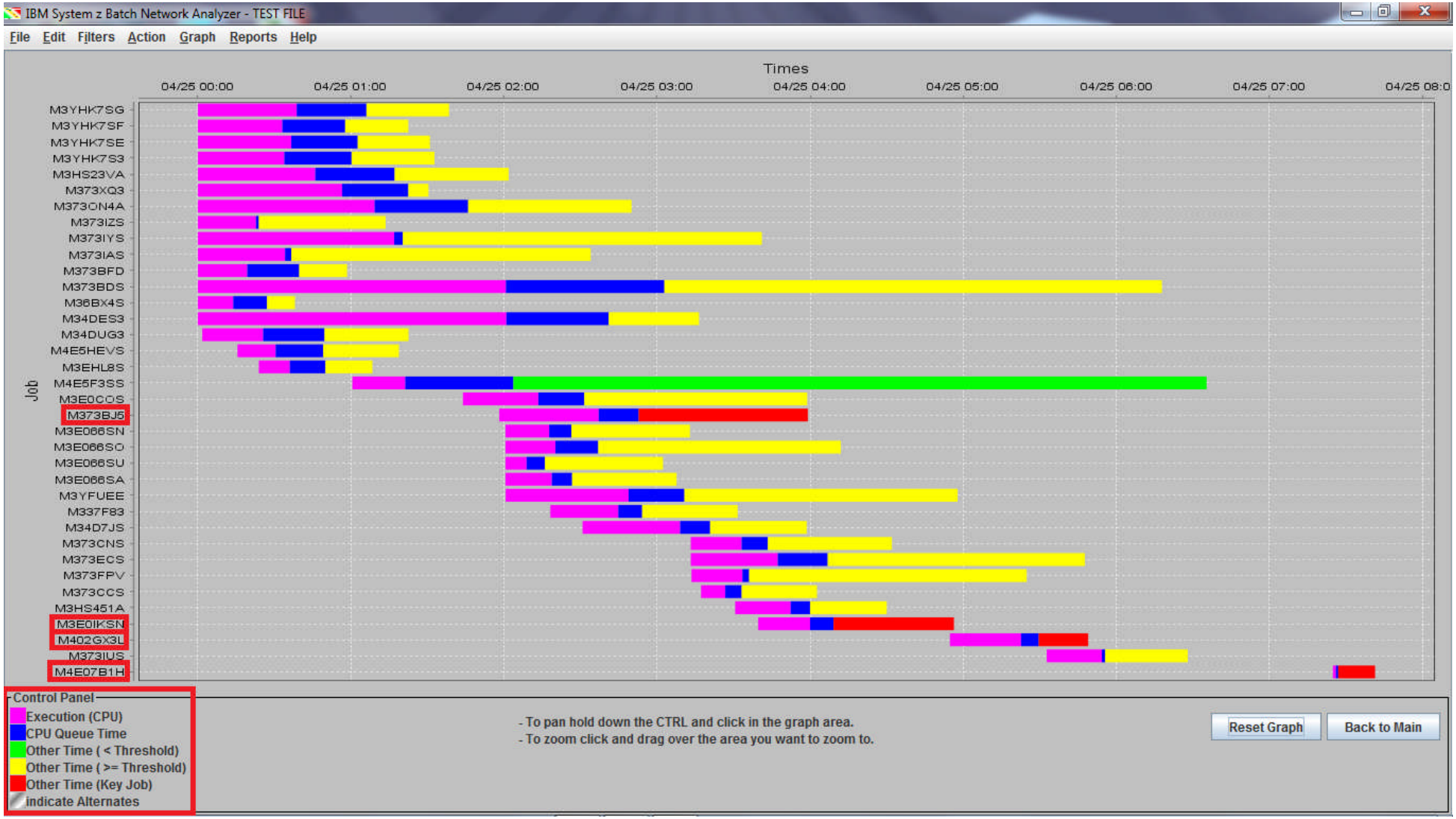
Model:	2817-711
Partition Name:	ONLM
SYSID:	SYS1
Partition Logical Utilization:	93.7%
CPC Utilization:	93.7%

Show Step Details
Exclude Data
Toggle Key Batch
Job Dataset Report

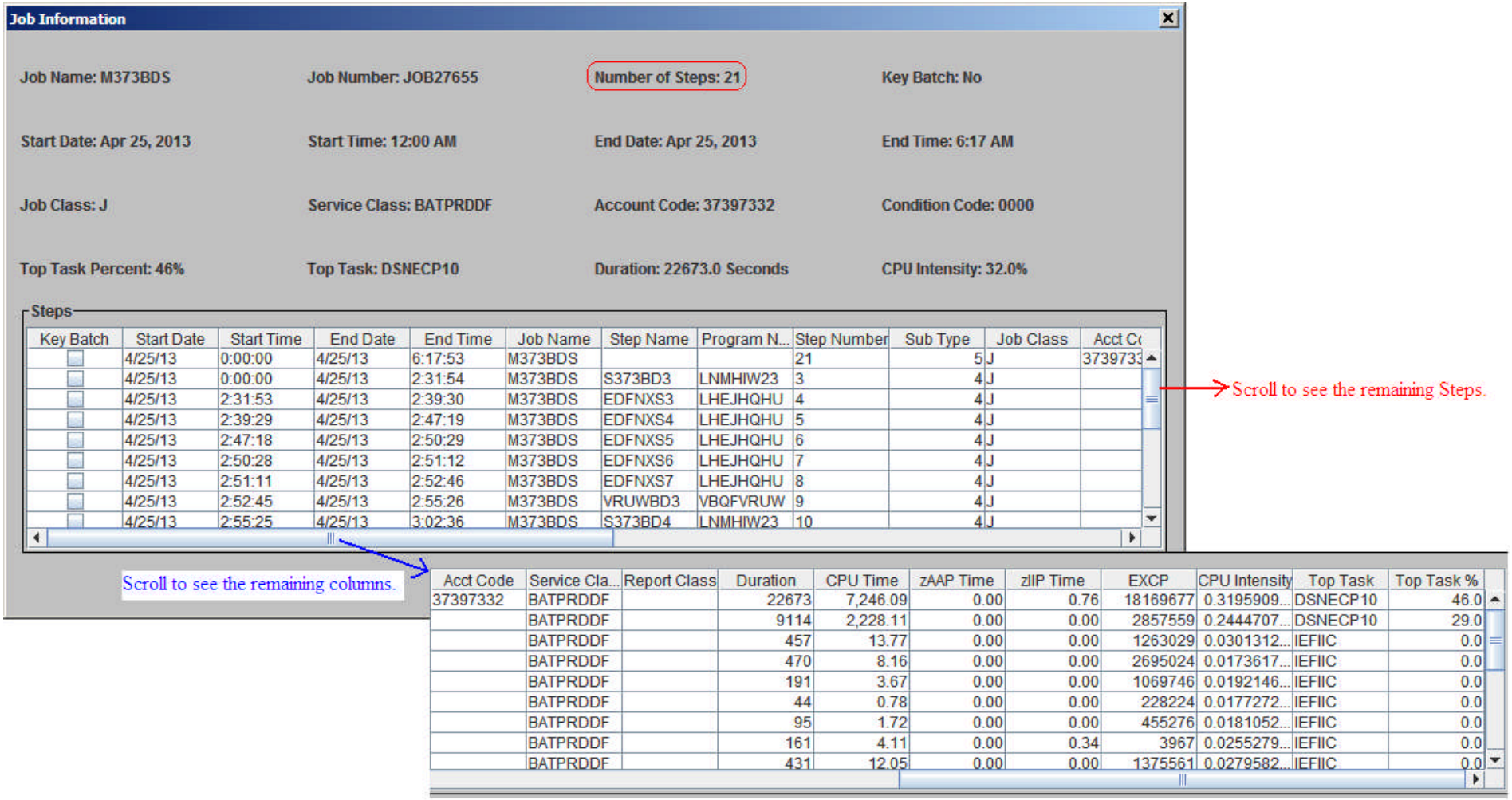
Key Batch	Job Name	Steps	Job Class	Acct Code	Service Class	Elapsed Time	CPU Time	zAAP Time	zIIP Time	CPU Intensity	EXCPs	Top Program	Top Pgm %	Condition Code
	M373BDS	21	J	37397332	BATPRDDF	6.3h	2.0h	0.0s	0.8s	32.0%	18,169,677	DSNECP10	46.0%	0000
	M4E5F3SS			4E595732	BATPRDDF	5.6h	20.7m	0.0s	0.2s	6.2%	19,960,843	DSNECP10	17.0%	0000
	M373IYS			37397332	BATCHHI	3.7h	1.3h	0.0s	0.0s	34.8%	144,846	DSNECP10	34.0%	0000
	M34DES3			34D94432	BATPRDDF	3.3h	2.0h	0.0s	0.0s	61.6%	31,510	DSNECP10	92.0%	0000
	M3YFUEE			3YF3YF32	BATPRDDF	3.0h	48.2m	0.0s	0.0s	27.2%	441	DSNECP10	21.0%	0000
	M373ON4A			37397332	BATPRDDF	2.8h	1.2h	0.0s	0.0s	40.8%	56,388	DSNECP10	63.0%	0000
	M373ECS			37597532	BATPRDDF	2.6h	34.1m	0.0s	0.0s	22.1%	316	DSNECP10	25.0%	0000
	M373IAS	3	J	37397332	BATCHHI	2.6h	34.2m	0.0s	0.0s	22.2%	67,910	DSNECP10	26.0%	0000
	M3E0COS	3	J	3E09E032	BATPRDDF	2.2h	29.6m	0.0s	0.0s	21.9%	4,404	DSNECP10	26.0%	0000
	M3E066SO	2	J	3E09E032	BATPRDDF	2.2h	19.6m	0.0s	0.0s	14.9%	344	DSNECP10	15.0%	0004
	M373FPV	9	J	37397332	BATCHHI	2.2h	20.0m	0.0s	0.0s	15.2%	1,776,060	DSNECP10	17.0%	0000
	M3HS23VA	3	J	3HS3HS32	BATPRDDF	2.0h	46.0m	0.0s	0.0s	37.8%	21,905	DSNECP10	49.0%	0000
☑	M373BJ5	11	J	37397332	BATPRDDF	2.0h	39.0m	0.0s	0.4s	32.2%	14,821,030	SYNCSORT	9.0%	0000
	M3YHK7SG	26	J	3YH3YH32	BATPRDDF	1.6h	38.8m	0.0s	0.0s	39.4%	596,359	DSNECP10	62.0%	0000
	M3YHK7S3	26	J	3YH3YH32	BATPRDDF	1.5h	33.9m	0.0s	0.0s	36.6%	512,864	DSNECP10	62.0%	0000
	M3YHK7SE	26	J	3YH3YH32	BATPRDDF	1.5h	36.6m	0.0s	0.0s	40.3%	874,506	DSNECP10	64.0%	0000
	M373XQ3	5	J	37397332	BATPRDDF	1.5h	56.6m	0.0s	0.0s	62.5%	6,101	DSNECP10	87.0%	0000
	M34D7JS	3	J	34D94432	BATPRDDF	1.5h	38.2m	0.0s	0.0s	43.5%	3,735,605	DSNECP10	21.0%	0000
	M3YHK7SF	26	J	3YH3YH32	BATPRDDF	1.4h	33.1m	0.0s	0.0s	40.1%	731,964	DSNECP10	63.0%	0000
	M34DUG3	15	J	34D94432	BATPRDDF	1.3h	23.9m	0.0s	0.0s	29.5%	21,548	DSNECP10	29.0%	0000
	M373CNS	5	J	37397332	BATPRDDF	1.3h	19.9m	0.0s	0.0s	25.3%	392,740	DSNECP10	19.0%	0000
☑	M3E0IKSN	4	J	3E09E032	BATPRDDF	1.3h	20.3m	0.0s	0.0s	26.5%	1,976,574	DSNECP10	8.0%	0000
	M373IZS	3	J	37397332	BATCHHI	1.2h	22.8m	0.0s	0.0s	31.0%	43,231	DSNECP10	22.0%	0000
	M337F83	5	J	33793732	BATPRDDF	1.2h	26.6m	0.0s	0.0s	36.3%	2,434,989	DSNECP10	26.0%	0000
	M3E066SN	2	J	3E09E032	BATPRDDF	1.2h	17.2m	0.0s	0.0s	23.7%	320	DSNECP10	13.0%	0004
	M3E066SA	2	J	3E09E032	BATPRDDF	1.1h	18.2m	0.0s	0.0s	27.1%	340	DSNECP10	22.0%	0004
	M4E5HEVS	7	J	4E595732	BATPRDDF	1.1h	15.0m	0.0s	0.0s	23.7%	6,954	DSNECP10	18.0%	0000
	M3E066SU	2	J	3E09E032	BATPRDDF	1.0h	498.0s	0.0s	0.0s	13.4%	342	DSNECP10	12.0%	0004
	M3HS451A	9	J	3HS3HS32	BATPRDDF	59.4m	21.8m	0.0s	0.0s	36.6%	121,786	DSNECP10	23.0%	0000
	M373BFD	7	J	37397332	BATPRDDF	58.5m	19.4m	0.0s	0.0s	33.1%	865,814	DSNECP10	48.0%	0000
	M373IUS	14	J	37397332	BATCHHI	55.3m	21.6m	0.0s	0.2s	39.1%	3,407,043	DSNECP10	24.0%	0000
☑	M402GX3L	17	J	40242032	BATPRDDF	54.2m	27.9m	0.0s	0.0s	51.5%	2,949,226	ENGEXE	4.0%	0000
	M373CCS	15	J	37397332	BATPRDDF	45.5m	571.8s	0.0s	0.0s	21.0%	510,039	DSNECP10	13.0%	0000
	M3EHL8S	2	J	3EH94932	BATPRDDF	44.5m	12.2m	0.0s	0.0s	27.3%	36,613	DSNECP10	15.0%	0000
	M36BX4S	3	J	36B96B32	BATPRDDF	38.1m	13.9m	0.0s	0.0s	36.5%	172,542	DSNECP10	10.0%	0000

36 Jobs

zBNA – Display Graph for Filtered Jobs



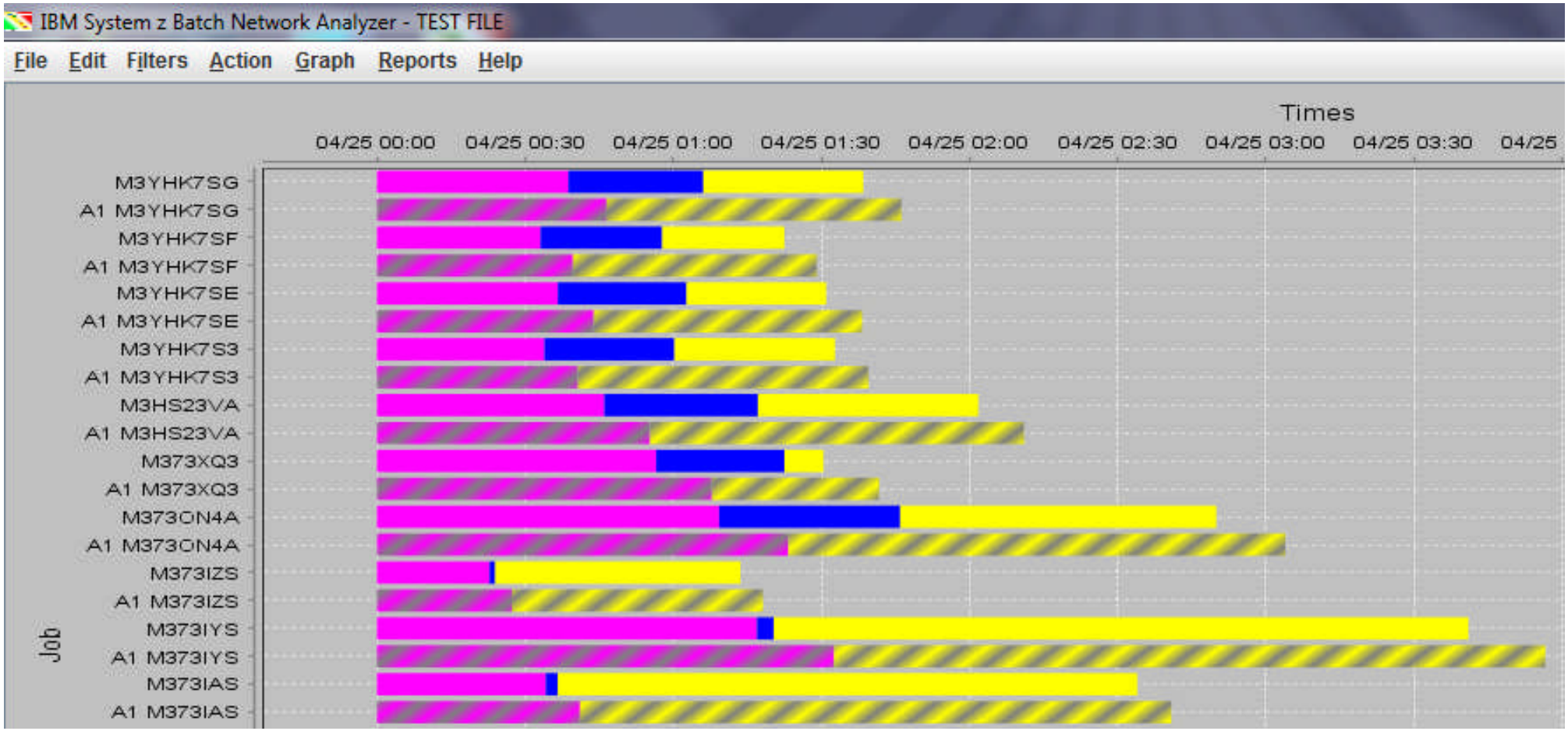
zBNA – Step Details for Job M373BDS



Key Batch	Start Date	Start Time	End Date	End Time	Job Name	Step Name	Program N...	Step Number	Sub Type	Job Class	Acct C
	4/25/13	0:00:00	4/25/13	6:17:53	M373BDS			21	5	J	3739733
	4/25/13	0:00:00	4/25/13	2:31:54	M373BDS	S373BD3	LNMHIW23	3	4	J	
	4/25/13	2:31:53	4/25/13	2:39:30	M373BDS	EDFNXS3	LHEJHQHU	4	4	J	
	4/25/13	2:39:29	4/25/13	2:47:19	M373BDS	EDFNXS4	LHEJHQHU	5	4	J	
	4/25/13	2:47:18	4/25/13	2:50:29	M373BDS	EDFNXS5	LHEJHQHU	6	4	J	
	4/25/13	2:50:28	4/25/13	2:51:12	M373BDS	EDFNXS6	LHEJHQHU	7	4	J	
	4/25/13	2:51:11	4/25/13	2:52:46	M373BDS	EDFNXS7	LHEJHQHU	8	4	J	
	4/25/13	2:52:45	4/25/13	2:55:26	M373BDS	VRUWBD3	VBQFVRUW	9	4	J	
	4/25/13	2:55:25	4/25/13	3:02:36	M373BDS	S373BD4	LNMHIW23	10	4	J	

Acct Code	Service Cla...	Report Class	Duration	CPU Time	zAAP Time	zIIP Time	EXCP	CPU Intensity	Top Task	Top Task %
37397332	BATPRDDF		22673	7,246.09	0.00	0.76	18169677	0.3195909...	DSNECP10	46.0
	BATPRDDF		9114	2,228.11	0.00	0.00	2857559	0.2444707...	DSNECP10	29.0
	BATPRDDF		457	13.77	0.00	0.00	1263029	0.0301312...	IEFIIC	0.0
	BATPRDDF		470	8.16	0.00	0.00	2695024	0.0173617...	IEFIIC	0.0
	BATPRDDF		191	3.67	0.00	0.00	1069746	0.0192146...	IEFIIC	0.0
	BATPRDDF		44	0.78	0.00	0.00	228224	0.0177272...	IEFIIC	0.0
	BATPRDDF		95	1.72	0.00	0.00	455276	0.0181052...	IEFIIC	0.0
	BATPRDDF		161	4.11	0.00	0.34	3967	0.0255279...	IEFIIC	0.0
	BATPRDDF		431	12.05	0.00	0.00	1375561	0.0279582...	IEFIIC	0.0

zBNA Alternate Processor Analysis – z196-711 to zEC12-607



zBNA - Some Recent Updates Include:

See C:\CPSTOOLS\zBNA "zBNAnews.pdf" for a complete description

- v1.2.0 – 9/17/13
  - Update with DASD Data Set Information
    - Process SMF 42 records
      - Information on response times, blocking, I/O rates, read:write ratios, more
    - What DASD data sets are used in a job
    - What are the set of jobs that use a DASD data set - LOADS

- v1.3.0 – 12/31/13
  - zEDC BSAM/QSAM Compression Candidates

- v1.4.0 – 1/31/14
  - zBNA requires the new 64-bit IBM CPS Java Runtime Environment
  - Will only install on a Windows 7 64-bit operating system
  - Need to uninstall all of your CPS Java6 material. Admin Authority will no longer be required to install/uninstall IBM CPS Java, zBNA or any other CPS tool

zBNA – Some Recent Updates include:

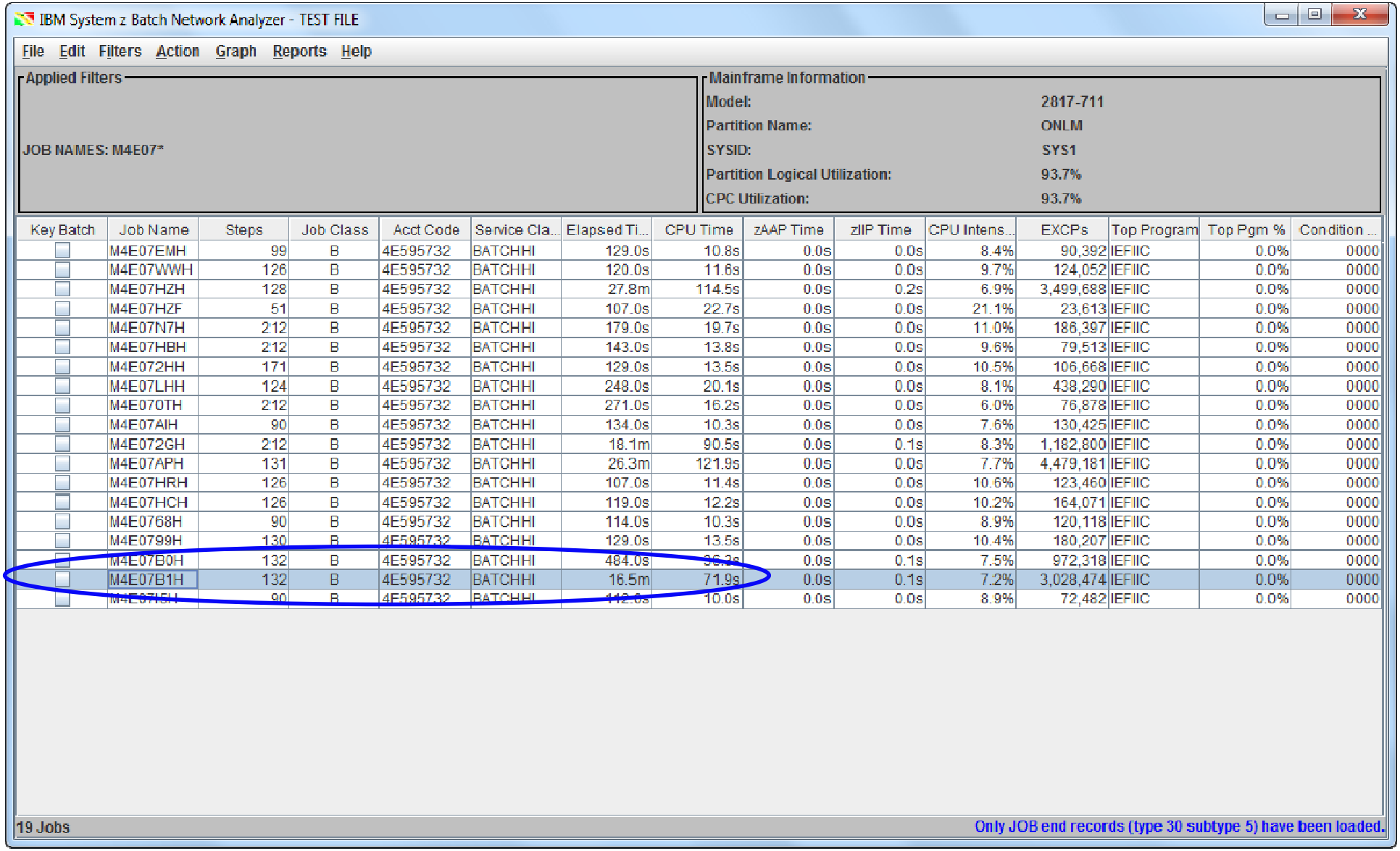
See C:\CPSTOOLS\zBNA "zBNAnews.pdf" for a complete description

- v1.4.1 – 2/11/14
  - "**Find**" and "**Find Next**" are available on Edit menu and zBNA panels with tables
- v1.4.2 – 3/17/14
  - **Report** and **Action** menu changes
- v1.4.3 and v1.4.4 – 5/1/14
  - Added **Block Size** column to table on Job Dataset Report and Life of a Dataset panel
  - Added **IIP CP Time** column to table on Job Information panel for each Step
- v1.4.5 – 5/30/14
  - Misc: Job Class > 1 character, CSV options overwrite, append and cancel, Clear Data function removed but planned to be available 3QT 2014
- v1.4.6 – planned 8/31/14
  - Terse support for the zBNA DAT file (SMF 14s, 15s, 30s, and 42s) – EDF remains as is)
    - Terse CP3K Extract DAT file on MVS, then upload to workstation along with EDF file
- v1.5.0 – planned 3QT 2014
  - Alternate Support for Compression

Note: These statements represent the current intention of IBM. IBM reserves the right to change or alter the IBM System z Batch Network Analyzer plans in the future or to exclude certain releases beyond those stated. IBM development plans are subject to change or withdrawal without further notice. Any reliance on this statement of direction is at the relying party's sole risk and does not create any liability or obligation for IBM.

SMF 42.6 DASD Data Set Information

Filter" BATCHHI Service Class, Jobs M4E07*, >10 sec CPU and >100 sec Elapsed - Select Job M4E07B1H then (right click) Job Data Set Report



Key Batch	Job Name	Steps	Job Class	Acct Code	Service Cla...	Elapsed Ti...	CPU Time	zAAP Time	zIIP Time	CPU Intens...	EXCPs	Top Program	Top Pgm %	Condition ...
	M4E07EMH	99	B	4E595732	BATCHHI	129.0s	10.8s	0.0s	0.0s	8.4%	90,392	IEFIIC	0.0%	0000
	M4E07WWH	126	B	4E595732	BATCHHI	120.0s	11.6s	0.0s	0.0s	9.7%	124,052	IEFIIC	0.0%	0000
	M4E07HZH	128	B	4E595732	BATCHHI	27.8m	114.5s	0.0s	0.2s	6.9%	3,499,688	IEFIIC	0.0%	0000
	M4E07HZF	51	B	4E595732	BATCHHI	107.0s	22.7s	0.0s	0.0s	21.1%	23,613	IEFIIC	0.0%	0000
	M4E07N7H	212	B	4E595732	BATCHHI	179.0s	19.7s	0.0s	0.0s	11.0%	186,397	IEFIIC	0.0%	0000
	M4E07HBH	212	B	4E595732	BATCHHI	143.0s	13.8s	0.0s	0.0s	9.6%	79,513	IEFIIC	0.0%	0000
	M4E072HH	171	B	4E595732	BATCHHI	129.0s	13.5s	0.0s	0.0s	10.5%	106,668	IEFIIC	0.0%	0000
	M4E07LHH	124	B	4E595732	BATCHHI	248.0s	20.1s	0.0s	0.0s	8.1%	438,290	IEFIIC	0.0%	0000
	M4E070TH	212	B	4E595732	BATCHHI	271.0s	16.2s	0.0s	0.0s	6.0%	76,878	IEFIIC	0.0%	0000
	M4E07AIH	90	B	4E595732	BATCHHI	134.0s	10.3s	0.0s	0.0s	7.6%	130,425	IEFIIC	0.0%	0000
	M4E072GH	212	B	4E595732	BATCHHI	18.1m	90.5s	0.0s	0.1s	8.3%	1,182,800	IEFIIC	0.0%	0000
	M4E07APH	131	B	4E595732	BATCHHI	26.3m	121.9s	0.0s	0.0s	7.7%	4,479,181	IEFIIC	0.0%	0000
	M4E07HRH	126	B	4E595732	BATCHHI	107.0s	11.4s	0.0s	0.0s	10.6%	123,460	IEFIIC	0.0%	0000
	M4E07HCH	126	B	4E595732	BATCHHI	119.0s	12.2s	0.0s	0.0s	10.2%	164,071	IEFIIC	0.0%	0000
	M4E0768H	90	B	4E595732	BATCHHI	114.0s	10.3s	0.0s	0.0s	8.9%	120,118	IEFIIC	0.0%	0000
	M4E0799H	130	B	4E595732	BATCHHI	129.0s	13.5s	0.0s	0.0s	10.4%	180,207	IEFIIC	0.0%	0000
	M4E07B0H	132	B	4E595732	BATCHHI	484.0s	36.3s	0.0s	0.1s	7.5%	972,318	IEFIIC	0.0%	0000
	M4E07B1H	132	B	4E595732	BATCHHI	16.5m	71.9s	0.0s	0.1s	7.2%	3,028,474	IEFIIC	0.0%	0000
	M4E07I5H	90	B	4E595732	BATCHHI	112.0s	10.0s	0.0s	0.0s	8.9%	72,482	IEFIIC	0.0%	0000

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

Job Dataset Report

File Edit Action

Job Details:

Job Name: M4E07B1H | Key Batch: No | Elapsed Time: 991.79 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	Discon Time
S4E5N227	92	I4E5SEY.M4E57B1S.SOQDVSG.LQGHA	188.0s	1879622	0.1	0.0	0.0	0.0	
S4E5H22E	76	I4E5SE.M4E57B1S.PHD.HAWUDFW.J2439Y22	42.1s	619	68.0	0.0	0.1	34.6	
S4E0T8A4	66	Y325.L576.WPV	25.0s	249682	0.1	0.0	0.0	0.0	
S4E03FQG	44	I4E0SEY.M4E07B1S.HAW2KLS.GDWD	22.5s	7746	2.9	0.0	0.0	2.8	
S4E5N27G	91	I4E5SE.VRUWILOH.M4E57B1S.J2421Y22	19.8s	738	26.8	0.0	0.0	20.7	
S4E5H22E	76	I4E5SE.SE5H2233.M4E57B1S	19.5s	698	28.0	0.0	0.0	21.5	
S4E03FQ7	36	VBV35337.W294677.UD222.M4E07B1H.U2910380	15.7s	83	189.0	0.0	1.4	159.3	
S4E5N26F	82	I4E5SE.SE5N226F.M4E57B1S	15.6s	10401	1.5	0.0	0.0	1.4	
S4E5N24E	75	I4E5SE.SE5N2233.M4E57B1S	13.2s	145	90.7	0.0	0.0	84.2	
S4E5N27E	89	I4E5SE.HAWUDFW.M4E57B1S.ILOH	12.8s	3276	3.9	0.0	0.0	2.5	
S4E5N227	92	I4E5SE.VRUWILOH.M4E57B1S.J2421Y22	8.4s	5249	1.6	0.0	0.0	1.5	
S4E03FQJ	47	I4E0SEY.M4E07B1S.HAW2KLS.LQGHA	8.4s	83547	0.1	0.0	0.0	0.0	
S4E5N225	78	I4E5SE.SE5N2253.M4E57B1S	8.1s	145	56.0	0.0	0.1	45.0	
S4E5N227	92	I4E5SEY.M4E57B1S.SOQDVSG.GDWD	8.1s	81184	0.1	0.0	0.0	0.0	

OK

Job M4E07B1H "Life of a Data Set" I4E5SEY.M4E57B1S.SOQDVSG.LQGHA Report

zBNA: Life of a Dataset

File Edit Action

Data Set Details:

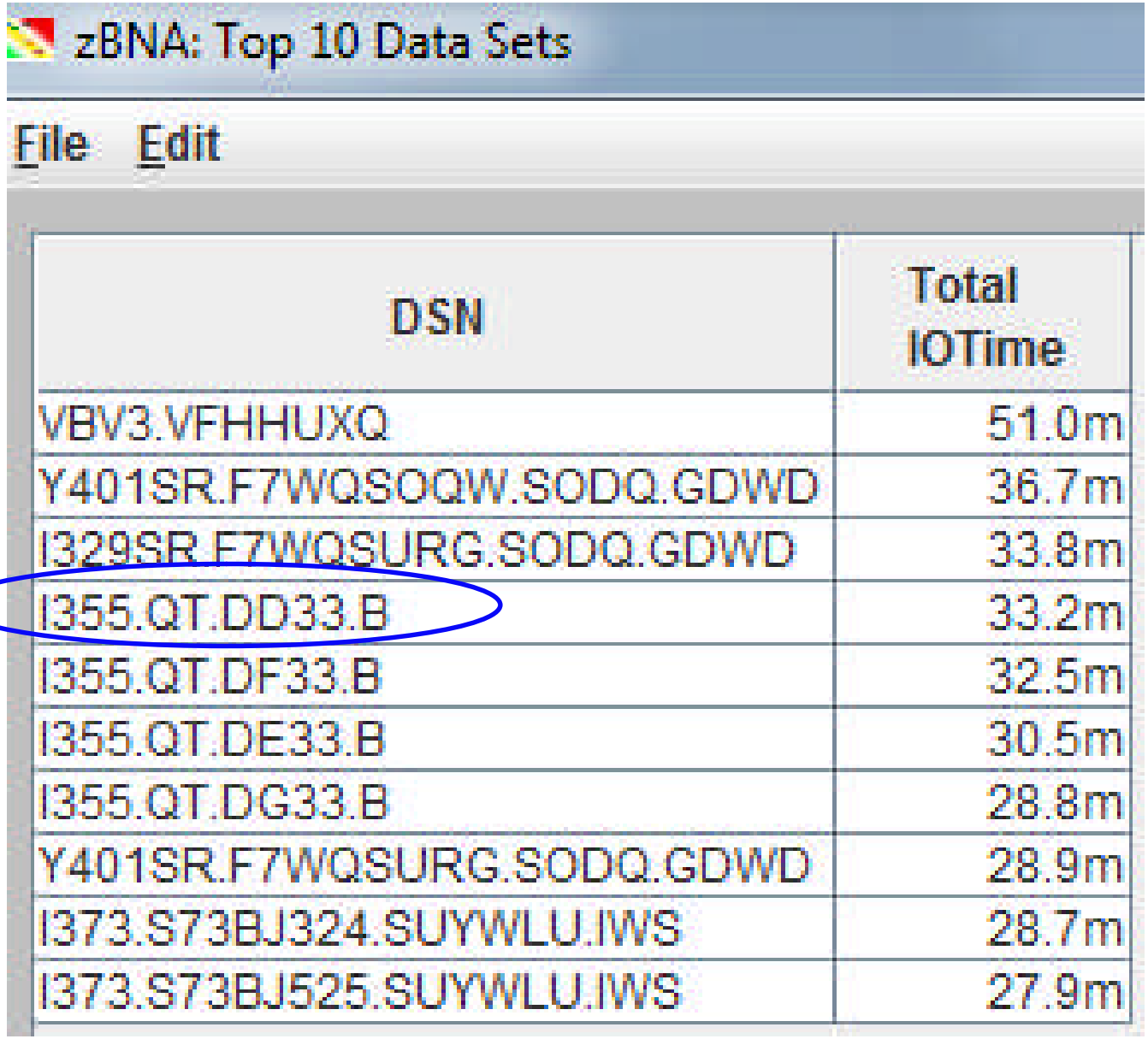
Data Set: I4E5SEY.M4E57B1S.SOQDVSG.LQGHA Number of Job Steps: 2

Job	Step	Step Number	Job Number	Step End	Total IOTime	IO 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


zBNA: Top 10 Data Sets

File Edit

DSN	Total IOTime
VBV3.VFHHUXQ	51.0m
Y401SR.F7WQSOQW.SODQ.GDWD	36.7m
I329SR.F7WQSURG.SODQ.GDWD	33.8m
I355.QT.DD33.B	33.2m
I355.QT.DF33.B	32.5m
I355.QT.DE33.B	30.5m
I355.QT.DG33.B	28.8m
Y401SR.F7WQSURG.SODQ.GDWD	28.9m
I373.S73BJ324.SUYWLU.IWS	28.7m
I373.S73BJ525.SUYWLU.IWS	27.9m

"Life of a Data Set" (LOADS) Report – I355.QT.DD33.B - Sorted in Step End Ascending

zBNA: Life of a Dataset

File Edit Action

Data Set Details:

Data Set: I355.QT.DD33.B Number of Job Steps: 395

Job	Step	Step Number	Job Number	Step End	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time
M4E5H7S	S4EH7S5	5	JOB29802	04/25/2013 00:16:01	1.3s	199	6.7	0.0	0.1	0.1	6.
M4E5UHS3	VWHS7	11	JOB29797	04/25/2013 00:16:17	0.1s	11	5.1	0.0	0.1	0.3	4.
M4E077VH	S4E5N27D	46	JOB29932	04/25/2013 00:16:37	0.0s	4	2.4	0.0	0.1	0.1	2.
M4E0N7GH	S4E5N27D	55	JOB29876	04/25/2013 00:16:40	0.0s	2	3.7	0.0	0.0	0.2	3.
M4E0N7GF	VWHS2302	25	JOB30315	04/25/2013 00:21:17	0.0s	1	0.3	0.0	0.1	0.1	0.
M4E0YEDF	VWHS2302	25	JOB30739	04/25/2013 00:31:42	4.6s	860	5.4	0.0	0.1	0.2	4.
M35703S	S357024	3	JOB31246	04/25/2013 00:34:25	0.0s	126	0.3	0.0	0.0	0.1	0.
M35702S	S357024	3	JOB31261	04/25/2013 00:34:59	0.7s	2,440	0.3	0.0	0.1	0.1	0.
M4E0XCOH	S4E5N27D	80	JOB31288	04/25/2013 00:35:30	0.0s	2	7.4	0.0	0.1	0.1	7.
M35703S	S357020	12	JOB31246	04/25/2013 00:36:19	0.0s	124	0.3	0.0	0.1	0.1	0.
M35703S	S357028	13	JOB31246	04/25/2013 00:36:24	0.0s	126	0.3	0.0	0.1	0.1	0.
M4E0XCOF	VWHS2302	25	JOB31578	04/25/2013 00:37:30	0.0s	1	0.3	0.0	0.1	0.1	0.
M35700S	S357093	5	JOB31515	04/25/2013 00:41:00	0.3s	76	4.4	0.0	0.1	0.2	3.
M35702S	S357020	12	JOB31261	04/25/2013 00:53:33	12.3s	2,414	5.1	0.0	0.1	0.2	4.
M35702S	S357028	13	JOB31261	04/25/2013 00:55:14	1.7s	2,467	0.7	0.0	0.1	0.2	0.
M35709G	S357093	13	JOB32268	04/25/2013 01:01:50	1.4s	219	6.2	0.0	0.1	0.8	5.
M35709H	S357093	13	JOB32263	04/25/2013 01:02:00	1.2s	263	4.7	0.0	0.1	0.9	3.
M35709E	S357093	13	JOB32266	04/25/2013 01:02:07	1.8s	322	5.4	0.0	0.1	0.8	4.
M35709F	S357093	13	JOB32267	04/25/2013 01:02:56	2.1s	343	6.2	0.0	0.1	1.6	4.
M35709D	S357093	13	JOB32265	04/25/2013 01:04:24	2.1s	329	6.5	0.0	0.1	1.4	4.

OK

"Life of a Data Set" (LOADS) Report – I355.QT.DD33.B – Sorted in Total I/O Time Descending

zBNA: Life of a Dataset

File Edit Action

Data Set Details:

Data Set: I355.QT.DD33.B Number of Job Steps: 395

Job	Step	Step Number	Job Number	Step End	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time
M354KQR	VWHS23	2	JOB02903	04/25/2013 03:43:08	24.8m	281,099	5.3	0.0	0.0	0.3	4.5
M354GJS	S354GO3	3	JOB03191	04/25/2013 03:22:10	460.0s	82,127	5.6	0.0	0.0	0.5	4.7
M35702S	S357020	12	JOB31261	04/25/2013 00:53:33	12.3s	2,414	5.1	0.0	0.1	0.2	4.4
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	S4E5634	3	JOB16213	04/25/2013 06:09:27	2.7s	558	4.9	0.0	0.1	0.2	4.4
M35709D	S357093	13	JOB32265	04/25/2013 01:04:24	2.1s	329	6.5	0.0	0.1	1.4	4.8
M35709F	S357093	13	JOB32267	04/25/2013 01:02:56	2.1s	343	6.2	0.0	0.1	1.6	4.2
M35709E	S357093	13	JOB32266	04/25/2013 01:02:07	1.8s	322	5.4	0.0	0.1	0.8	4.4
M35702S	S357028	13	JOB31261	04/25/2013 00:55:14	1.7s	2,467	0.7	0.0	0.1	0.2	0.2
M35709G	S357093	13	JOB32268	04/25/2013 01:01:50	1.4s	219	6.2	0.0	0.1	0.8	5.1
M4E5H7S	S4EH7S5	5	JOB29802	04/25/2013 00:16:01	1.3s	199	6.7	0.0	0.1	0.1	6.1
M35709H	S357093	13	JOB32263	04/25/2013 01:02:00	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
M35702S	S357024	3	JOB31261	04/25/2013 00:34:59	0.7s	2,440	0.3	0.0	0.1	0.1	0.0
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 01:23:44	0.7s	157	4.3	0.0	0.1	0.1	3.9

OK

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

What's New?

BSAM/QSAM IBM zEnterprise Data Compression (zEDC)

IBM zEnterprise Data Compression (zEDC)

New data compression offering that can reduce resource usage

What is it?

- ✓ *zEDC Express is an IO adapter that does high performance industry standard compression*
- ✓ *Used by z/OS Operating System components, IBM Middleware and ISV products*
- ✓ *Applications can use zEDC via industry standard APIs (zlib and Java)*
- ✓ *Each zEDC Express sharable across 15 LPARs, up to 8 devices per CEC.*
- ✓ *Raw throughput up to* **1 GB/s** *per zEDC Express Hardware Adapter* vs typical 50 MB a second in SW

What Changes?

It is time to revisit your decisions about compression.

- **Disk Savings:** Many people are already getting value from CMPSC compression and software compression today
- **Performance:** High throughput alternative to existing System z compression for large or active files.
- **Industry Standard:** Low cost compressed data exchange across all platforms
- **Pervasive:** Standard APIs allow quick adoption by middleware products running on System z

What is the Value?

New sources of customer value

- **QSAM/BSAM** can save up to 4x disk space and in some cases shorten elapsed time, reducing batch windows.
- **Business Partner Data Exchange** can have higher throughput with lower CPU cost
- **Managed File Transfer** saves up to 4x link bandwidth, and up to 80% elapsed time
- **ISV Products** deliver expanded customer value
- **Java for z/OS V7R1** accelerates common compression classes used by applications and middleware
- **Improved availability** with SMF

QSAM/BSAM Data Set Compression with zEDC - PTF for APAR OA42195

Reduce the cost of keeping your sequential data online

zEDC compresses data up to 4X, saving up to 75% of your sequential data disk space

Capture new business opportunities due to lower cost of keeping data online

Better I/O elapsed time for sequential access

Potentially run batch workloads faster than either uncompressed or BSAM/QSAM current compression

Sharply lower CPU cost over existing compression

Enables more pervasive use of compression

Up to 80% reduced CPU cost compared to tailored and generic compression options

Simple Enablement

Use a policy to enable zEDC compressed data sets

Example Use Cases

SMF Archived Data can be stored compressed to increase the amount of data kept online up to 4X

zSecure output size of Access Monitor and UNLOAD files reduced up to 10X and CKFREEZE files reduced by up to 4X

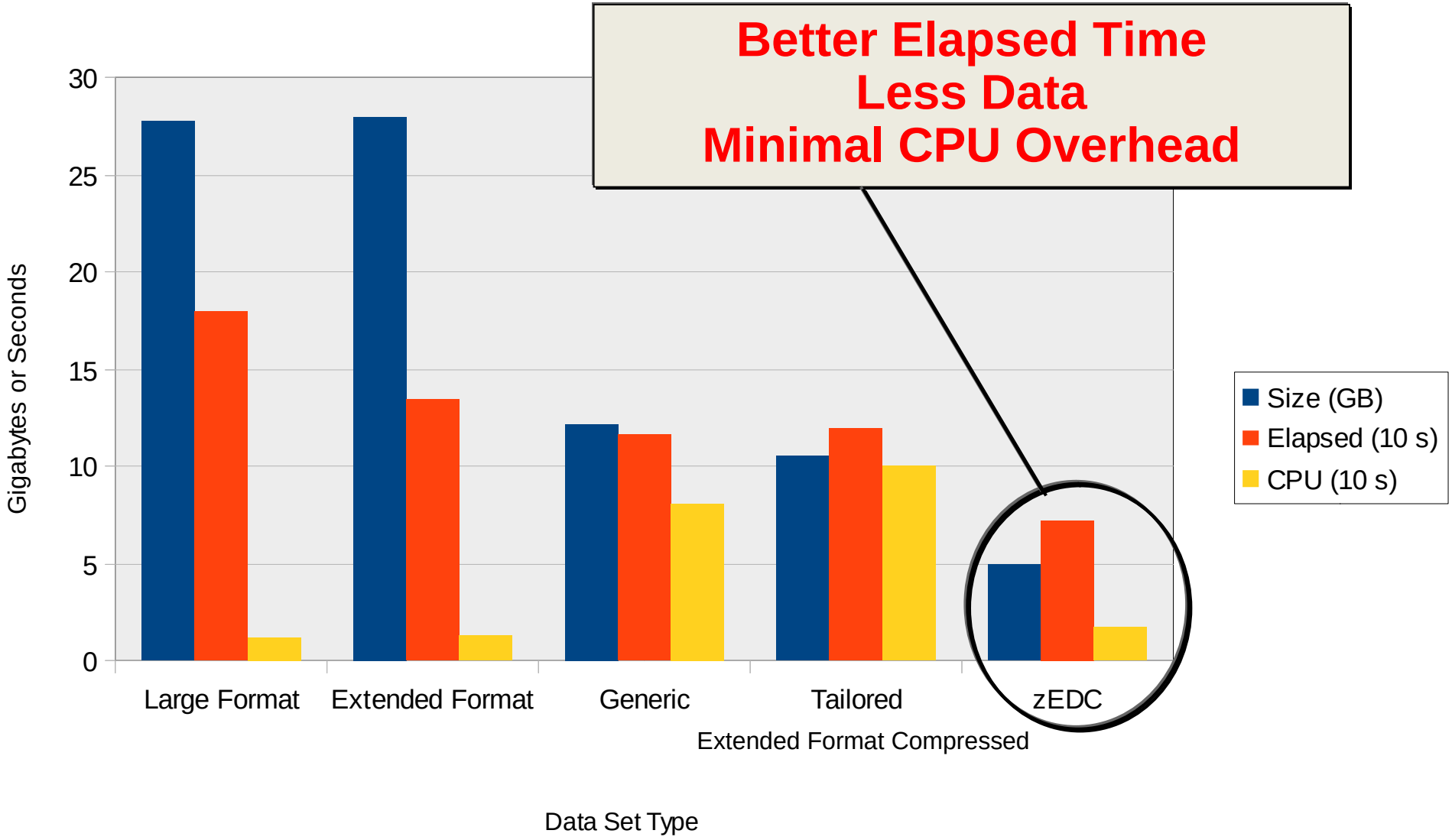
Up to 5X more ***XML*** data can be stored in sequential files

The ***IBM Employee Directory*** was stored in up to 3X less space

z/OS SVC and Stand Alone DUMPs can be stored in up to 5X less space

Disclaimer: Based on projections and/or measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels.

QSAM/BSAM zEDC – Value!

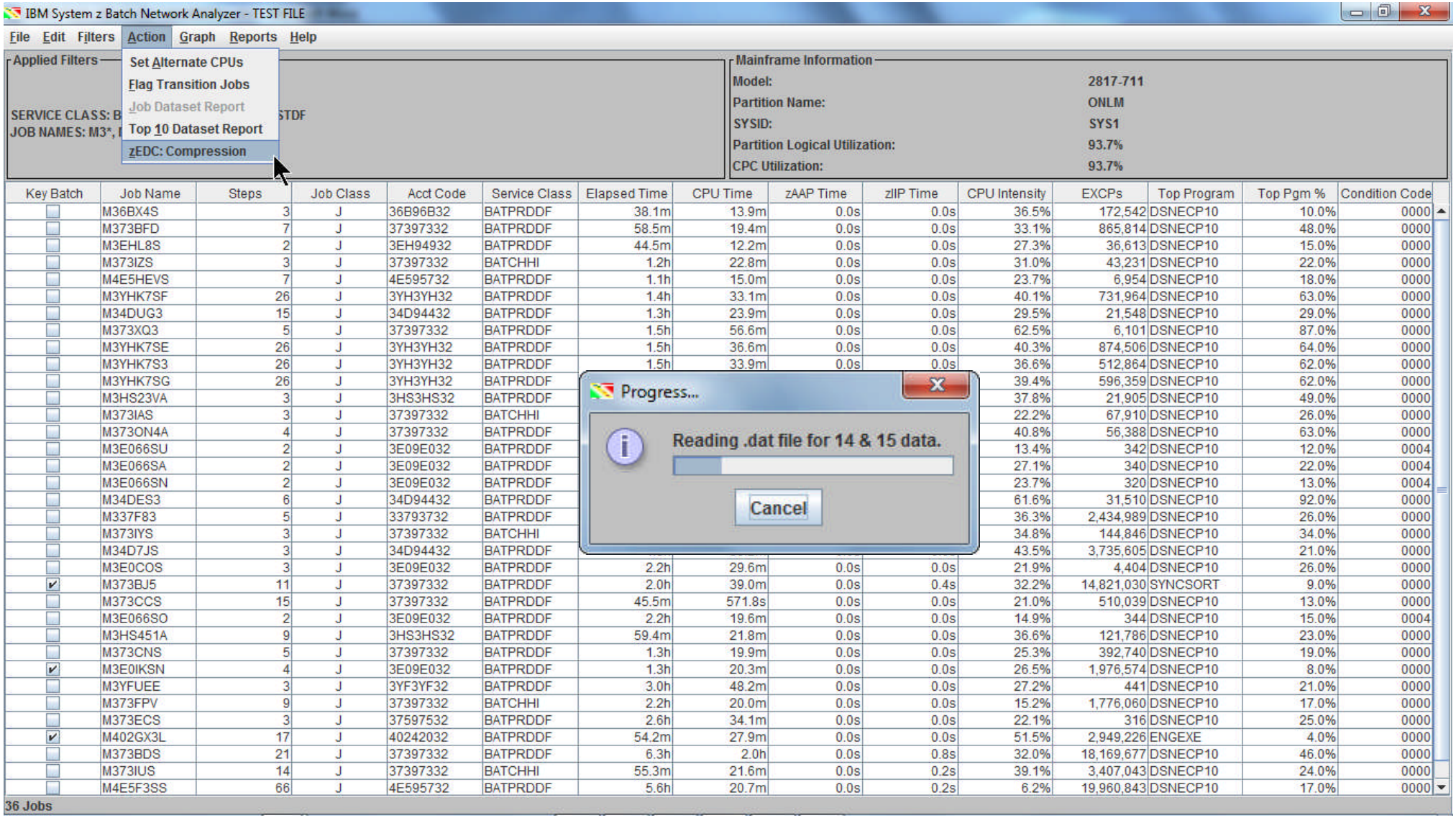


Disclaimer: Based on projections and/or measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels.

Initial zEDC Compression Reports

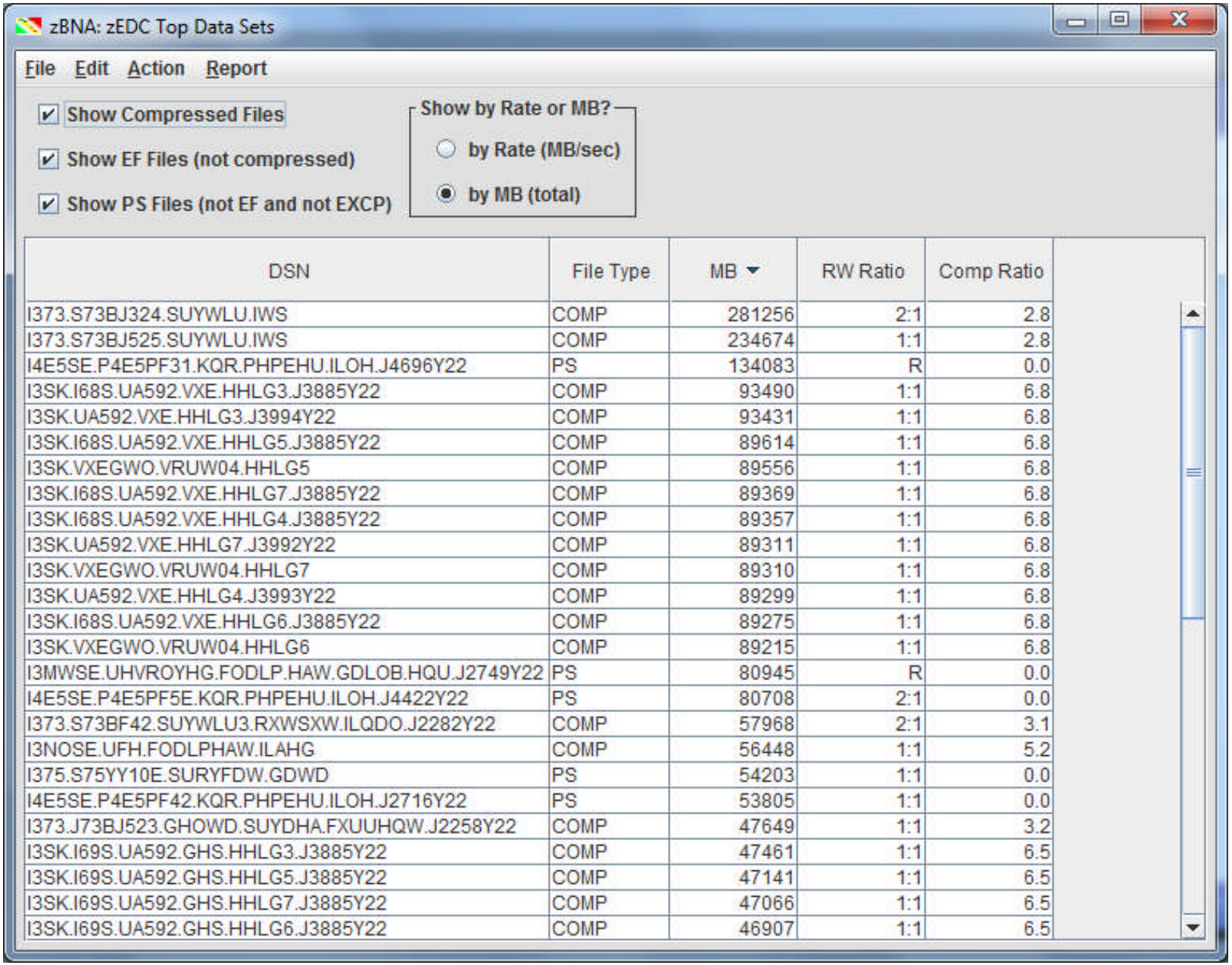
- **zEDC Compression Eligible Criteria for DFSMS BSAM/QSAM Data Sets**
  - Non-VSAM
  - Extended Format or Not Extended Format
  - EXCP = NO
  - Cannot be Open for Update
  - Cannot be Open with EDI processing
  - Data Set Size (Initial Allocation) >5 MB (or >8 MB if no secondary allocation)
  - Not Compressed (although could convert from Generic/Tailored to zEDC compression)
- **Reports**
  - Top zEDC Compression Candidate BSAM/QSAM 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 for BSAM/QSAM compression

zEDC Analysis



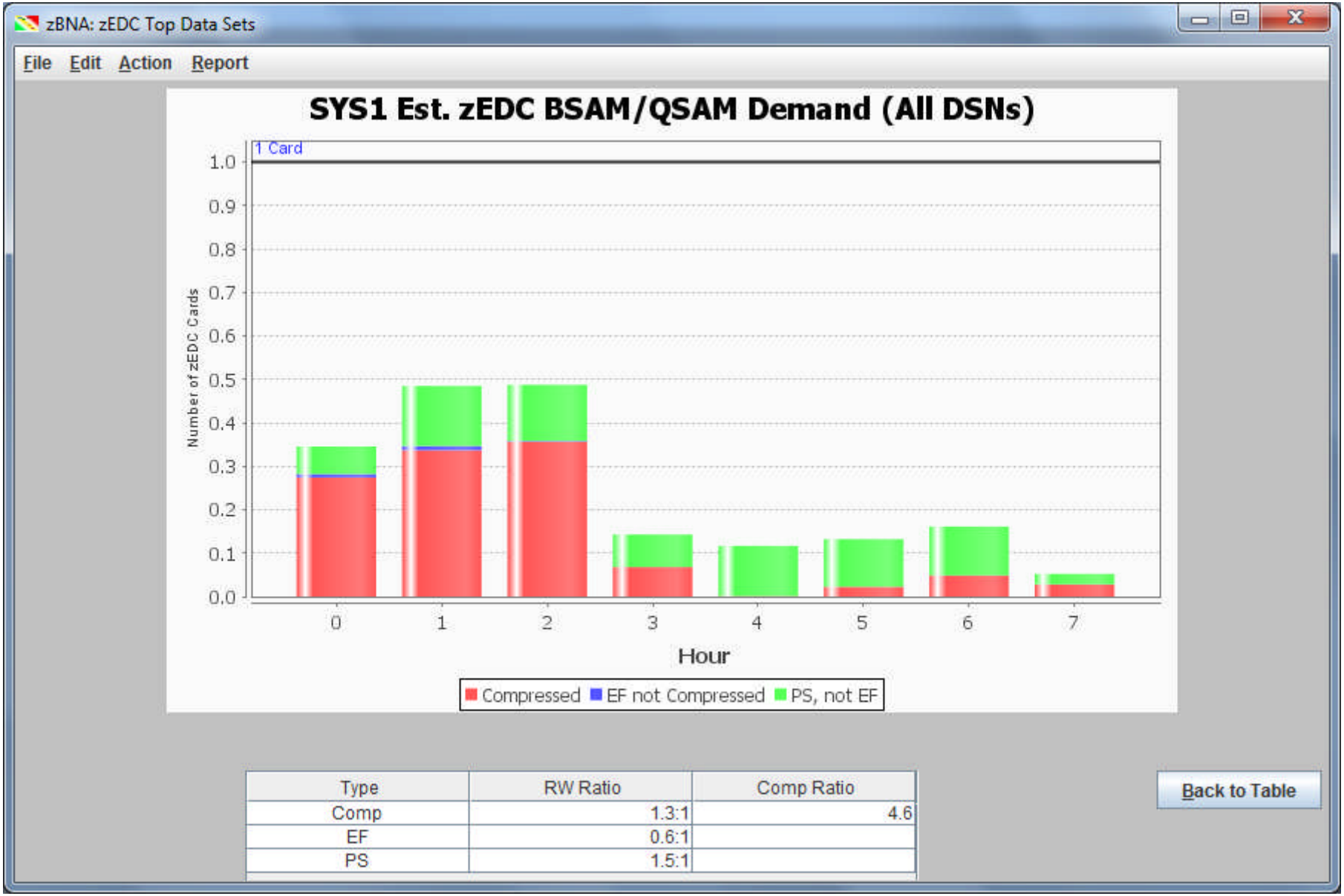
Key Batch	Job Name	Steps	Job Class	Acct Code	Service Class	Elapsed Time	CPU Time	zAAP Time	zIIP Time	CPU Intensity	EXCPs	Top Program	Top Pgm %	Condition Code
☐	M36BX4S	3	J	36B96B32	BATPRDDF	38.1m	13.9m	0.0s	0.0s	36.5%	172,542	DSNECP10	10.0%	0000
☐	M373BFD	7	J	37397332	BATPRDDF	58.5m	19.4m	0.0s	0.0s	33.1%	865,814	DSNECP10	48.0%	0000
☐	M3EHL8S	2	J	3EH94932	BATPRDDF	44.5m	12.2m	0.0s	0.0s	27.3%	36,613	DSNECP10	15.0%	0000
☐	M373IZS	3	J	37397332	BATCHHI	1.2h	22.8m	0.0s	0.0s	31.0%	43,231	DSNECP10	22.0%	0000
☐	M4E5HEVS	7	J	4E595732	BATPRDDF	1.1h	15.0m	0.0s	0.0s	23.7%	6,954	DSNECP10	18.0%	0000
☐	M3YHK7SF	26	J	3YH3YH32	BATPRDDF	1.4h	33.1m	0.0s	0.0s	40.1%	731,964	DSNECP10	63.0%	0000
☐	M34DUG3	15	J	34D94432	BATPRDDF	1.3h	23.9m	0.0s	0.0s	29.5%	21,548	DSNECP10	29.0%	0000
☐	M373XQ3	5	J	37397332	BATPRDDF	1.5h	56.6m	0.0s	0.0s	62.5%	6,101	DSNECP10	87.0%	0000
☐	M3YHK7SE	26	J	3YH3YH32	BATPRDDF	1.5h	36.6m	0.0s	0.0s	40.3%	874,506	DSNECP10	64.0%	0000
☐	M3YHK7S3	26	J	3YH3YH32	BATPRDDF	1.5h	33.9m	0.0s	0.0s	36.6%	512,864	DSNECP10	62.0%	0000
☐	M3YHK7SG	26	J	3YH3YH32	BATPRDDF					39.4%	596,359	DSNECP10	62.0%	0000
☐	M3HS23VA	3	J	3HS3HS32	BATPRDDF					37.8%	21,905	DSNECP10	49.0%	0000
☐	M373IAS	3	J	37397332	BATCHHI					22.2%	67,910	DSNECP10	26.0%	0000
☐	M373ON4A	4	J	37397332	BATPRDDF					40.8%	56,388	DSNECP10	63.0%	0000
☐	M3E066SU	2	J	3E09E032	BATPRDDF					13.4%	342	DSNECP10	12.0%	0004
☐	M3E066SA	2	J	3E09E032	BATPRDDF					27.1%	340	DSNECP10	22.0%	0004
☐	M3E066SN	2	J	3E09E032	BATPRDDF					23.7%	320	DSNECP10	13.0%	0004
☐	M34DES3	6	J	34D94432	BATPRDDF					61.6%	31,510	DSNECP10	92.0%	0000
☐	M337F83	5	J	33793732	BATPRDDF					36.3%	2,434,989	DSNECP10	26.0%	0000
☐	M373IYS	3	J	37397332	BATCHHI					34.8%	144,846	DSNECP10	34.0%	0000
☐	M34D7JS	3	J	34D94432	BATPRDDF					43.5%	3,735,605	DSNECP10	21.0%	0000
☐	M3E0COS	3	J	3E09E032	BATPRDDF	2.2h	29.6m	0.0s	0.0s	21.9%	4,404	DSNECP10	26.0%	0000
☑	M373BJ5	11	J	37397332	BATPRDDF	2.0h	39.0m	0.0s	0.4s	32.2%	14,821,030	SYNCSORT	9.0%	0000
☐	M373CCS	15	J	37397332	BATPRDDF	45.5m	571.8s	0.0s	0.0s	21.0%	510,039	DSNECP10	13.0%	0000
☐	M3E066SO	2	J	3E09E032	BATPRDDF	2.2h	19.6m	0.0s	0.0s	14.9%	344	DSNECP10	15.0%	0004
☐	M3HS451A	9	J	3HS3HS32	BATPRDDF	59.4m	21.8m	0.0s	0.0s	36.6%	121,786	DSNECP10	23.0%	0000
☐	M373CNS	5	J	37397332	BATPRDDF	1.3h	19.9m	0.0s	0.0s	25.3%	392,740	DSNECP10	19.0%	0000
☑	M3E0IKSN	4	J	3E09E032	BATPRDDF	1.3h	20.3m	0.0s	0.0s	26.5%	1,976,574	DSNECP10	8.0%	0000
☐	M3YFUEE	3	J	3YF3YF32	BATPRDDF	3.0h	48.2m	0.0s	0.0s	27.2%	441	DSNECP10	21.0%	0000
☐	M373FPV	9	J	37397332	BATCHHI	2.2h	20.0m	0.0s	0.0s	15.2%	1,776,060	DSNECP10	17.0%	0000
☐	M373ECS	3	J	37597532	BATPRDDF	2.6h	34.1m	0.0s	0.0s	22.1%	316	DSNECP10	25.0%	0000
☑	M402GX3L	17	J	40242032	BATPRDDF	54.2m	27.9m	0.0s	0.0s	51.5%	2,949,226	ENGEXE	4.0%	0000
☐	M373BDS	21	J	37397332	BATPRDDF	6.3h	2.0h	0.0s	0.8s	32.0%	18,169,677	DSNECP10	46.0%	0000
☐	M373IUS	14	J	37397332	BATCHHI	55.3m	21.6m	0.0s	0.2s	39.1%	3,407,043	DSNECP10	24.0%	0000
☐	M4E5F3SS	66	J	4E595732	BATPRDDF	5.6h	20.7m	0.0s	0.2s	6.2%	19,960,843	DSNECP10	17.0%	0000

zEDC Top Data Sets



DSN	File Type	MB	RW Ratio	Comp Ratio
I373.S73BJ324.SUYWLU.IWS	COMP	281256	2:1	2.8
I373.S73BJ525.SUYWLU.IWS	COMP	234674	1:1	2.8
I4E5SE.P4E5PF31.KQR.PHPEHU.ILOH.J4696Y22	PS	134083	R	0.0
I3SK.I68S.UA592.VXE.HHLG3.J3885Y22	COMP	93490	1:1	6.8
I3SK.UA592.VXE.HHLG3.J3994Y22	COMP	93431	1:1	6.8
I3SK.I68S.UA592.VXE.HHLG5.J3885Y22	COMP	89614	1:1	6.8
I3SK.VXEGWO.VRUW04.HHLG5	COMP	89556	1:1	6.8
I3SK.I68S.UA592.VXE.HHLG7.J3885Y22	COMP	89369	1:1	6.8
I3SK.I68S.UA592.VXE.HHLG4.J3885Y22	COMP	89357	1:1	6.8
I3SK.UA592.VXE.HHLG7.J3992Y22	COMP	89311	1:1	6.8
I3SK.VXEGWO.VRUW04.HHLG7	COMP	89310	1:1	6.8
I3SK.UA592.VXE.HHLG4.J3993Y22	COMP	89299	1:1	6.8
I3SK.I68S.UA592.VXE.HHLG6.J3885Y22	COMP	89275	1:1	6.8
I3SK.VXEGWO.VRUW04.HHLG6	COMP	89215	1:1	6.8
I3MWSE.UHVROYHG.FODLP.HAW.GDLOB.HQU.J2749Y22	PS	80945	R	0.0
I4E5SE.P4E5PF5E.KQR.PHPEHU.ILOH.J4422Y22	PS	80708	2:1	0.0
I373.S73BF42.SUYWLU3.RXWSXW.ILQDO.J2282Y22	COMP	57968	2:1	3.1
I3NOSE.UFH.FODLPHAW.ILAHG	COMP	56448	1:1	5.2
I375.S75YY10E.SURYFDW.GDWD	PS	54203	1:1	0.0
I4E5SE.P4E5PF42.KQR.PHPEHU.ILOH.J2716Y22	PS	53805	1:1	0.0
I373.J73BJ523.GHOWD.SUYDHA.FXUUHQW.J2258Y22	COMP	47649	1:1	3.2
I3SK.I69S.UA592.GHS.HHLG3.J3885Y22	COMP	47461	1:1	6.5
I3SK.I69S.UA592.GHS.HHLG5.J3885Y22	COMP	47141	1:1	6.5
I3SK.I69S.UA592.GHS.HHLG7.J3885Y22	COMP	47066	1:1	6.5
I3SK.I69S.UA592.GHS.HHLG6.J3885Y22	COMP	46907	1:1	6.5

Estimated zEDC Cards Report – SYS1 All Data Sets



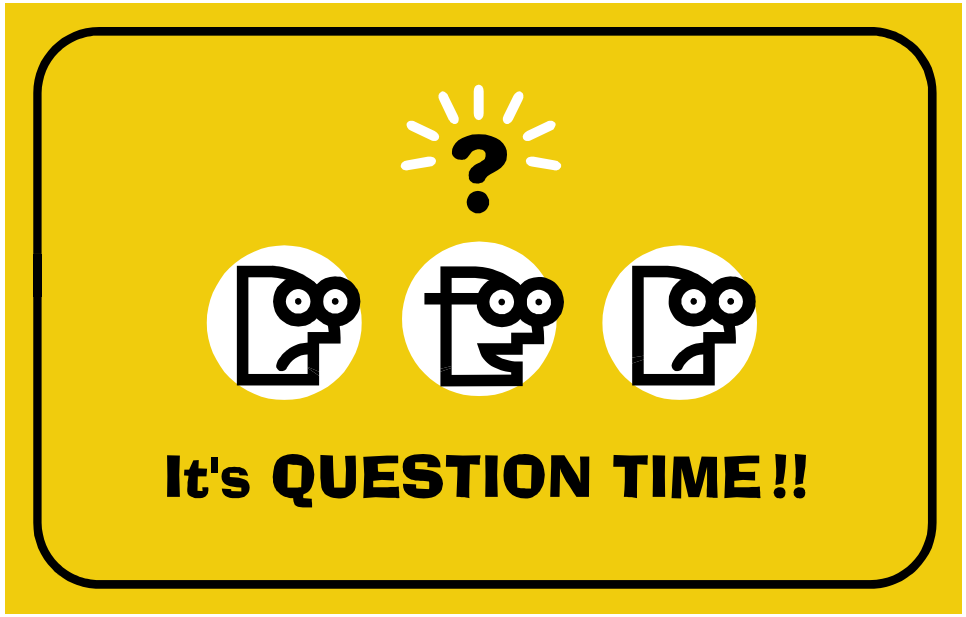
What's New – Future?

- **Looking at adding Job Scheduler information to zBNA**
  - Would this be of value to you?
  - What Job Schedulers are you running?
- **What other function would be of value to you?**

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
- zBNA can help identify technology options to reduce the Batch Window
- Use the tool and let us know how you like it
  - Available from
    - www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS5132
  - Education Tab has:
    - User's Guide
    - Recorded Demo from June 2013
    - Lab exercise
    - Sample files

Updated for zBNA 1.4.2



zBNA Hands-On Lab Thursday 4:15 PM
Room 301- Session 15671

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