z Systems Batch Network Analyzer (zBNA) Tool - Because Batch is Back!

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zBNA Topics

- Capacity Planning Information
- Introduction
  - What and Why
  - SMF 30 field for Max Task CPU%
  - Sample flow and reports
- What's New
  - SMF 42.6s
  - Compression and zEDC
    - BSAM and QSAM Candidates
    - zBNA Sample Reports
    - Alternate Compression
- Technical Support and Additional Education

z Systems 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

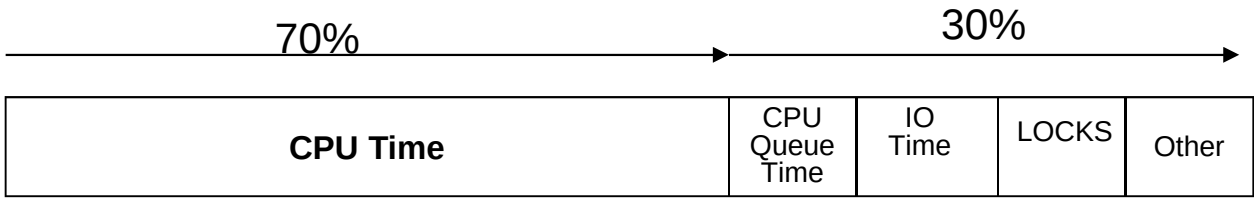
Impact of these trends will most likely be seen first in the Batch Window

Fewer, Faster CPs vs More, Slower CPs

- **Fewer, Faster CPs**
  - **High priority workloads see great benefits**
  - **Have the ability to monopolize a CP**
  - **A high priority workload with lots of ready thread can dominate the logical CPs in a partition**
  - **On a migration a previously limited workload can now use more capacity**
    - **High Priority work performs better**
    - **Control with WLM resource groups**
  - **LPAR Weight Issues – more LPARs with logicals with smaller per CP share**
- **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**
  - **Can build LPARs with greater CP share**

Workload Considerations

Online Transaction

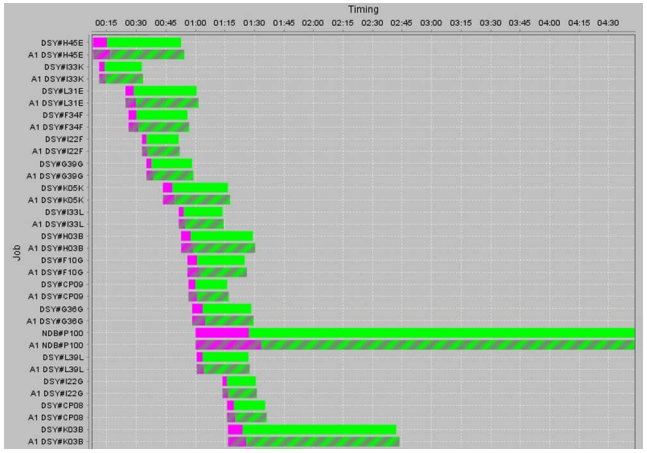


Processor	CPU Time	Other Time	Total
z196-708	.028	.012	.040
zEC12-707	.023	.012	.035
zEC12-611	.036	.012	.048

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 z Systems Batch Network Analyzer (zBNA)

- IBM z Systems Batch Network Analyzer
  - A no charge, “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 on Techdocs
  - https://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS5132



Enhanced SMF 30 Reporting

- APAR OA39629
- 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)

Need SMF 30 Interval recording to get values in subtype 4s and 5s and thus zBNA reporting

- 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, and 113
  - 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 **Limit the time range to 24 hours for 1 System !**
  - 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?

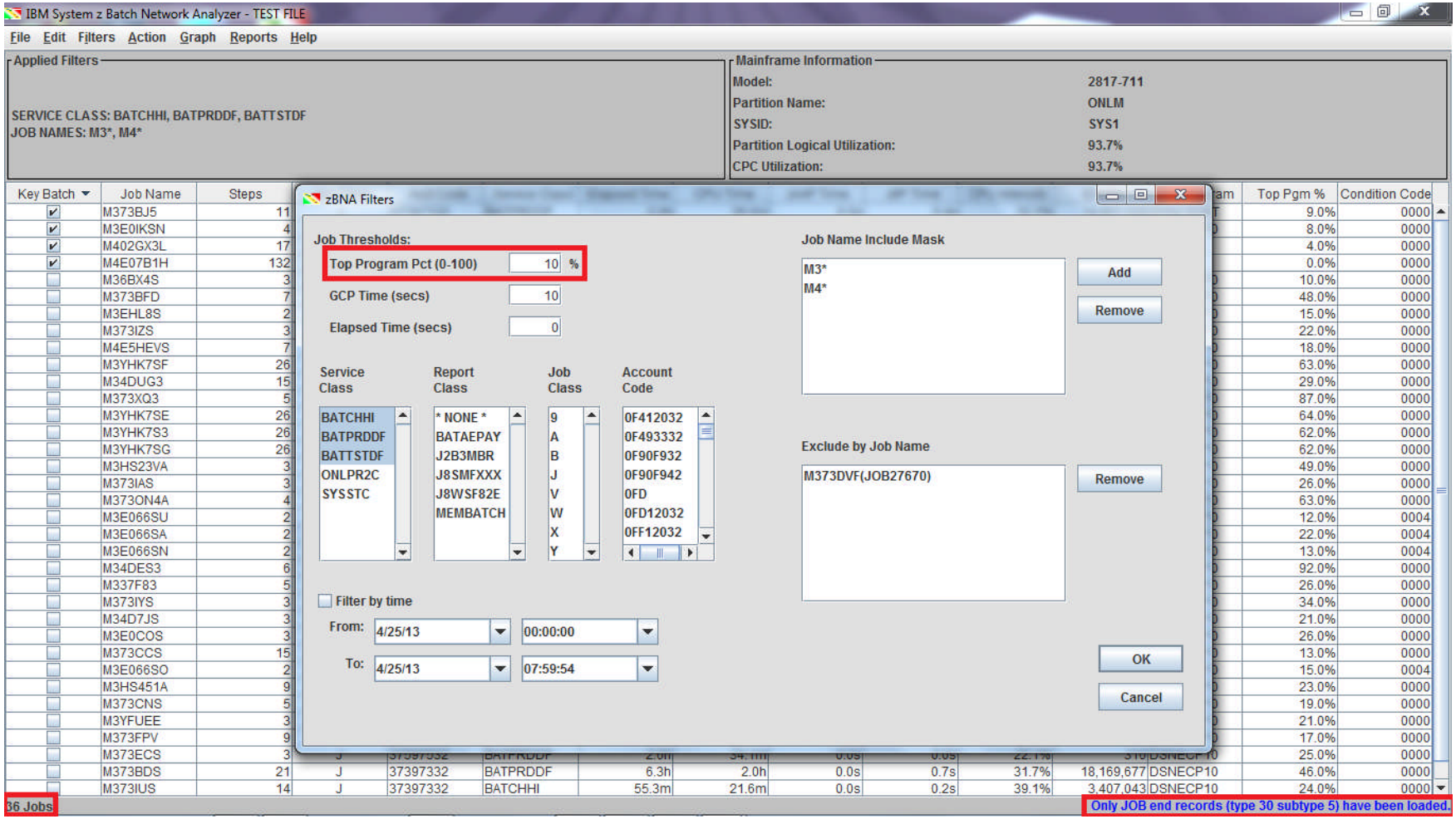
- Identify Batch Resource Usage
  - Filter jobs by attributes like CPU time / intensity, job class, service class, etc.
  - Review the resource consumption of batch jobs
  - Drill down to the individual Steps to see resource usage and DASD Data Sets used
  - Identify job time sequences based on a graphical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

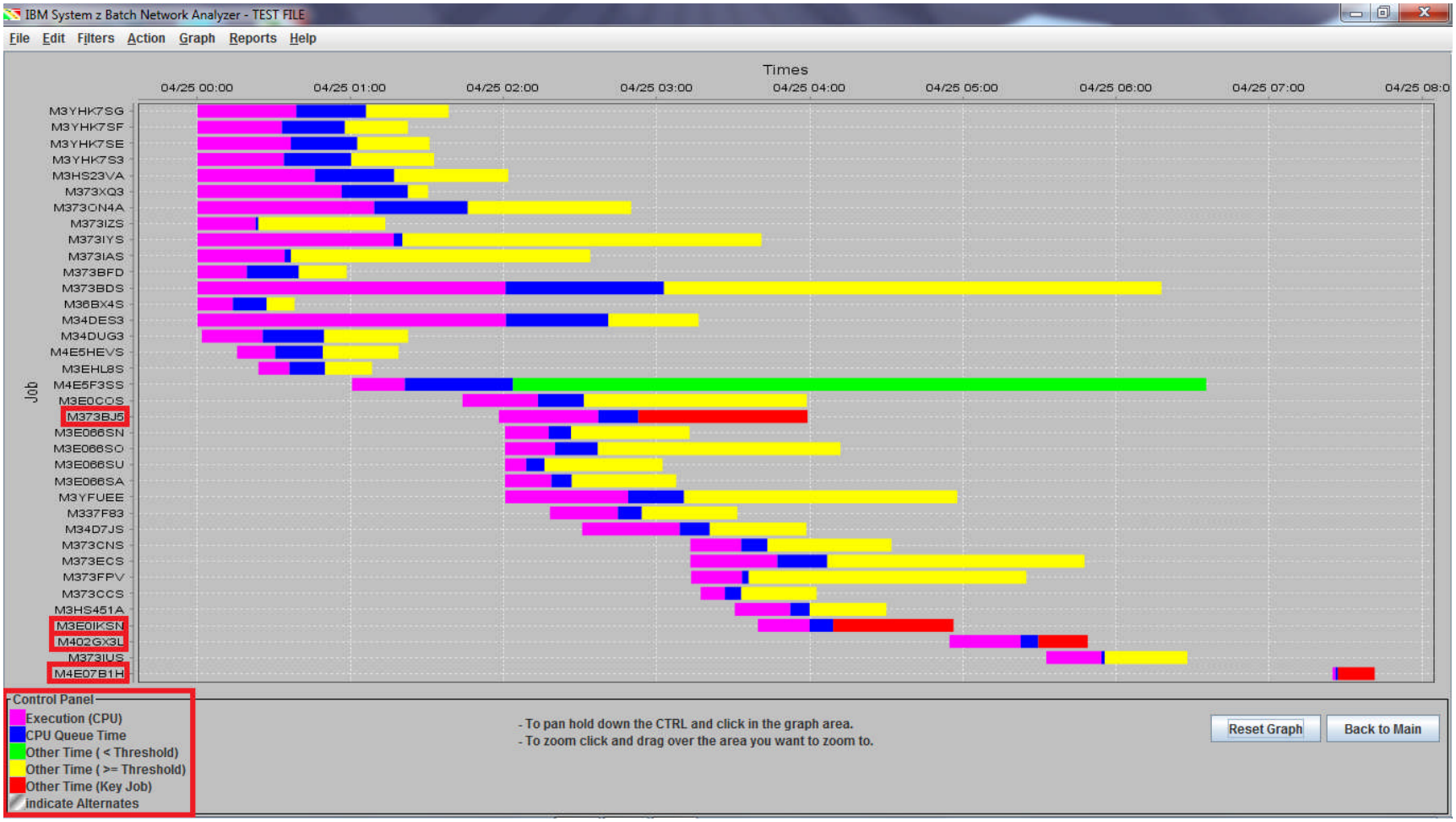
Typical zBNA Flow

- 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
- zEDC BSAM / QSAM Analysis
- Save the zBNA File

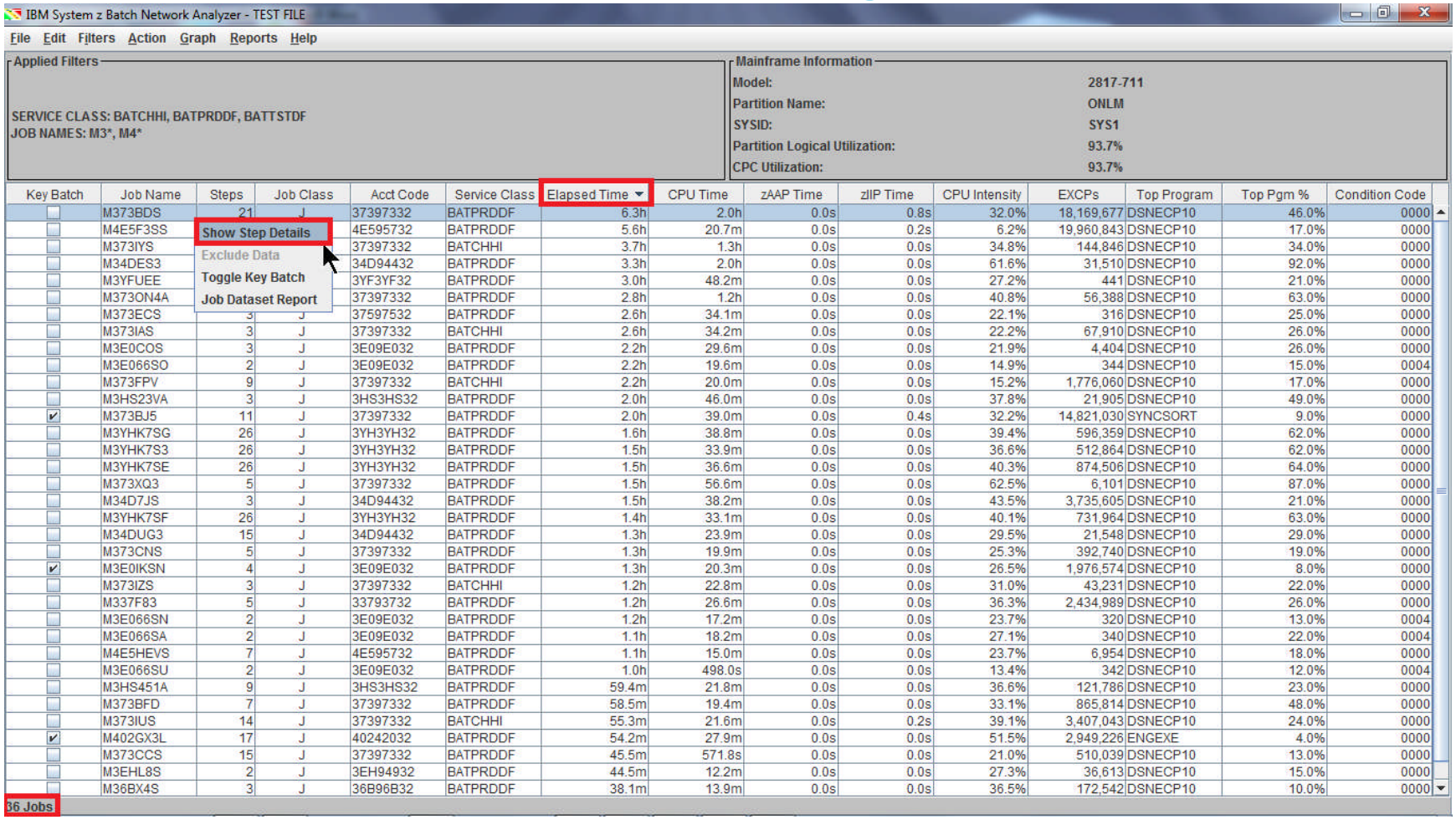
zBNA Filtering Capability



zBNA – Display Graph for Filtered Jobs



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

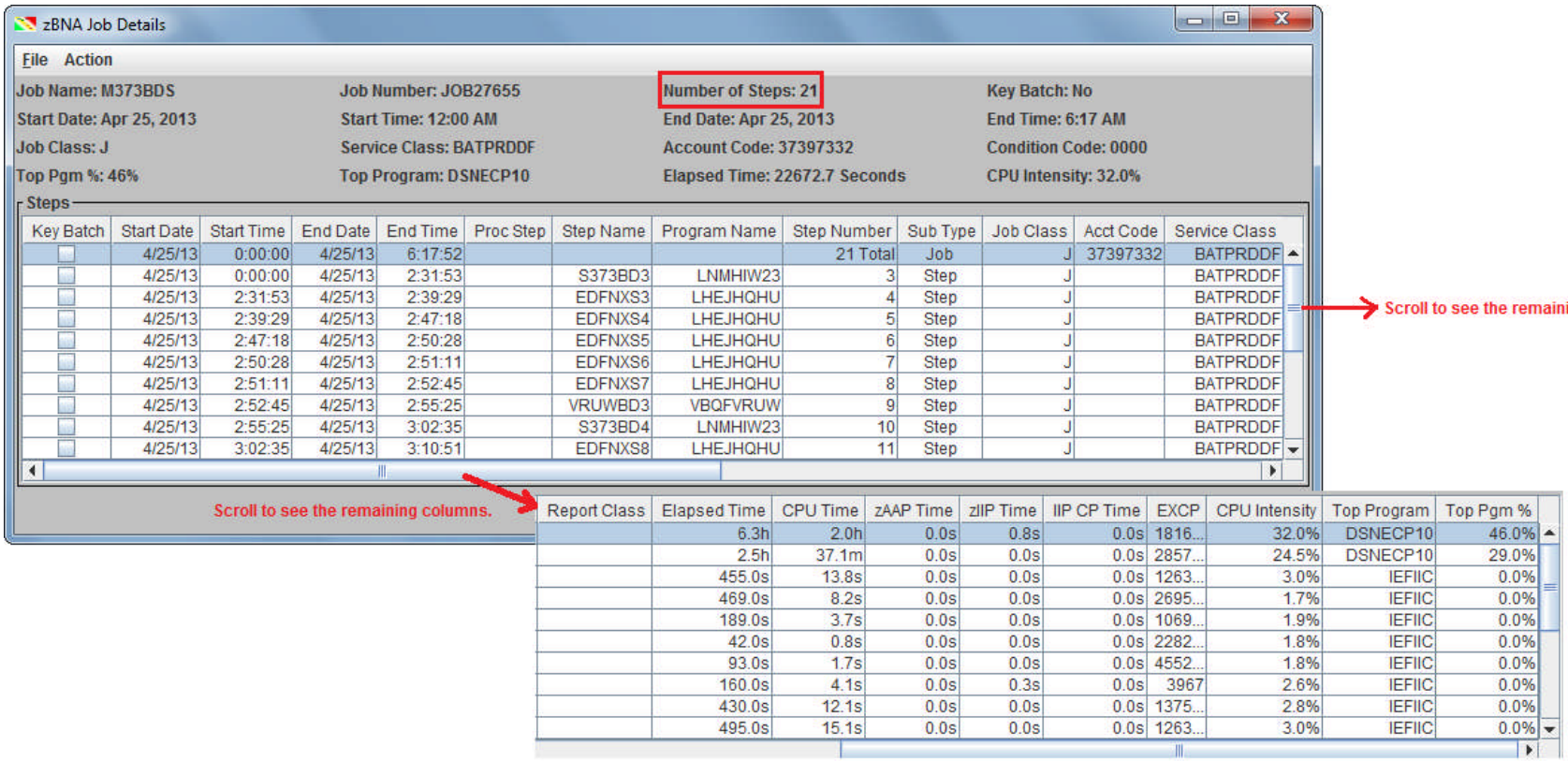
Model:	2817-711
Partition Name:	ONLM
SYSID:	SYS1
Partition Logical Utilization:	93.7%
CPC Utilization:	93.7%

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

Show Step Details
Exclude Data
Toggle Key Batch
Job Dataset Report

36 Jobs

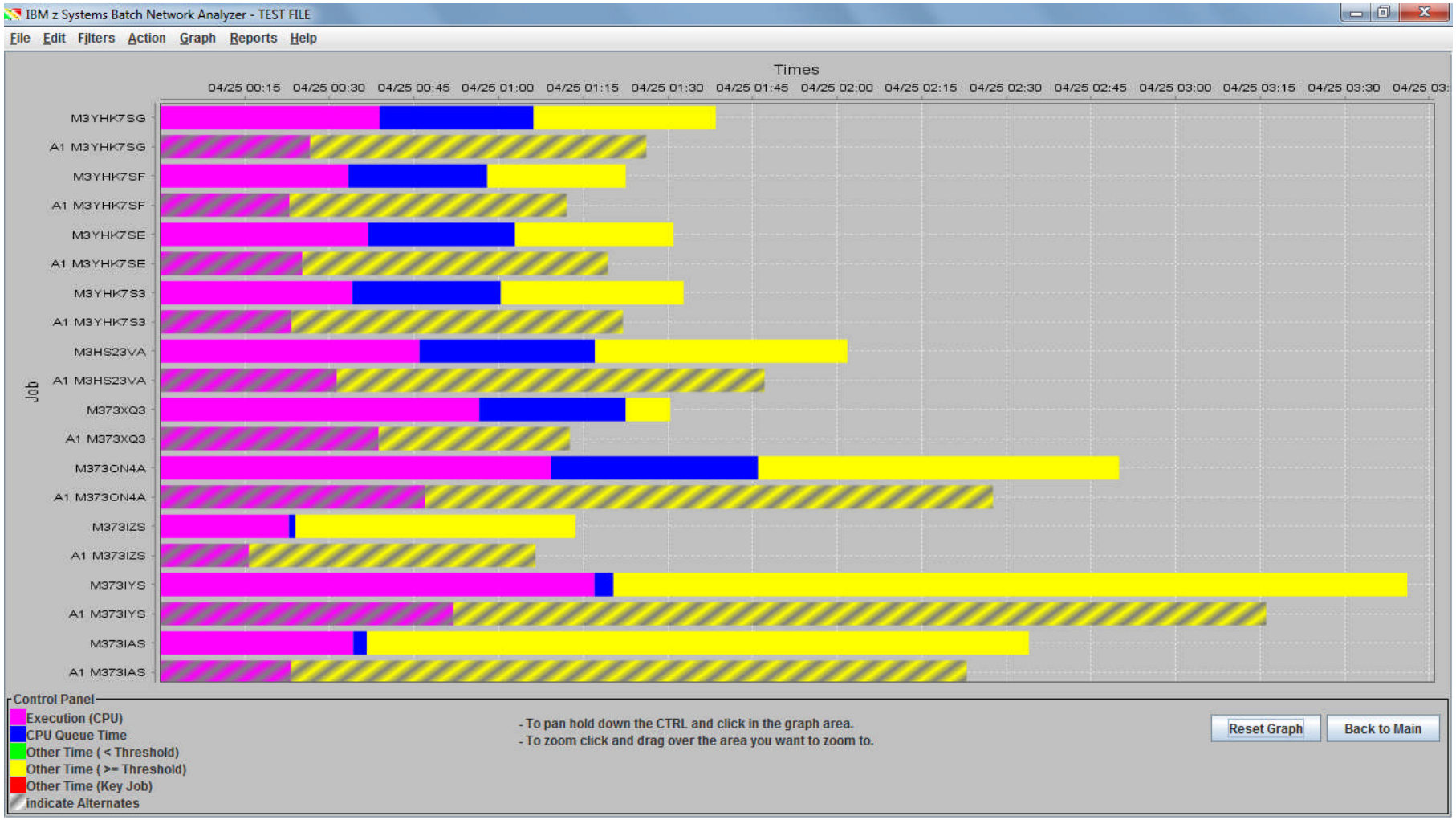
zBNA – Step Details for Job M373BDS



Key Batch	Start Date	Start Time	End Date	End Time	Proc Step	Step Name	Program Name	Step Number	Sub Type	Job Class	Acct Code	Service Class
	4/25/13	0:00:00	4/25/13	6:17:52				21 Total	Job	J	37397332	BATPRDDF
	4/25/13	0:00:00	4/25/13	2:31:53		S373BD3	LNMHIW23	3	Step	J		BATPRDDF
	4/25/13	2:31:53	4/25/13	2:39:29		EDFNXS3	LHEJHQHU	4	Step	J		BATPRDDF
	4/25/13	2:39:29	4/25/13	2:47:18		EDFNXS4	LHEJHQHU	5	Step	J		BATPRDDF
	4/25/13	2:47:18	4/25/13	2:50:28		EDFNXS5	LHEJHQHU	6	Step	J		BATPRDDF
	4/25/13	2:50:28	4/25/13	2:51:11		EDFNXS6	LHEJHQHU	7	Step	J		BATPRDDF
	4/25/13	2:51:11	4/25/13	2:52:45		EDFNXS7	LHEJHQHU	8	Step	J		BATPRDDF
	4/25/13	2:52:45	4/25/13	2:55:25		VRUWBD3	VBQFVRUW	9	Step	J		BATPRDDF
	4/25/13	2:55:25	4/25/13	3:02:35		S373BD4	LNMHIW23	10	Step	J		BATPRDDF
	4/25/13	3:02:35	4/25/13	3:10:51		EDFNXS8	LHEJHQHU	11	Step	J		BATPRDDF

Report Class	Elapsed Time	CPU Time	zAAP Time	zIIP Time	IIP CP Time	EXCP	CPU Intensity	Top Program	Top Pgm %
	6.3h	2.0h	0.0s	0.8s	0.0s	1816...	32.0%	DSNECP10	46.0%
	2.5h	37.1m	0.0s	0.0s	0.0s	2857...	24.5%	DSNECP10	29.0%
	455.0s	13.8s	0.0s	0.0s	0.0s	1263...	3.0%	IEFIIC	0.0%
	469.0s	8.2s	0.0s	0.0s	0.0s	2695...	1.7%	IEFIIC	0.0%
	189.0s	3.7s	0.0s	0.0s	0.0s	1069...	1.9%	IEFIIC	0.0%
	42.0s	0.8s	0.0s	0.0s	0.0s	2282...	1.8%	IEFIIC	0.0%
	93.0s	1.7s	0.0s	0.0s	0.0s	4552...	1.8%	IEFIIC	0.0%
	160.0s	4.1s	0.0s	0.3s	0.0s	3967	2.6%	IEFIIC	0.0%
	430.0s	12.1s	0.0s	0.0s	0.0s	1375...	2.8%	IEFIIC	0.0%
	495.0s	15.1s	0.0s	0.0s	0.0s	1263...	3.0%	IEFIIC	0.0%

zBNA Alternate Processor Analysis – z196-711 to z13-708



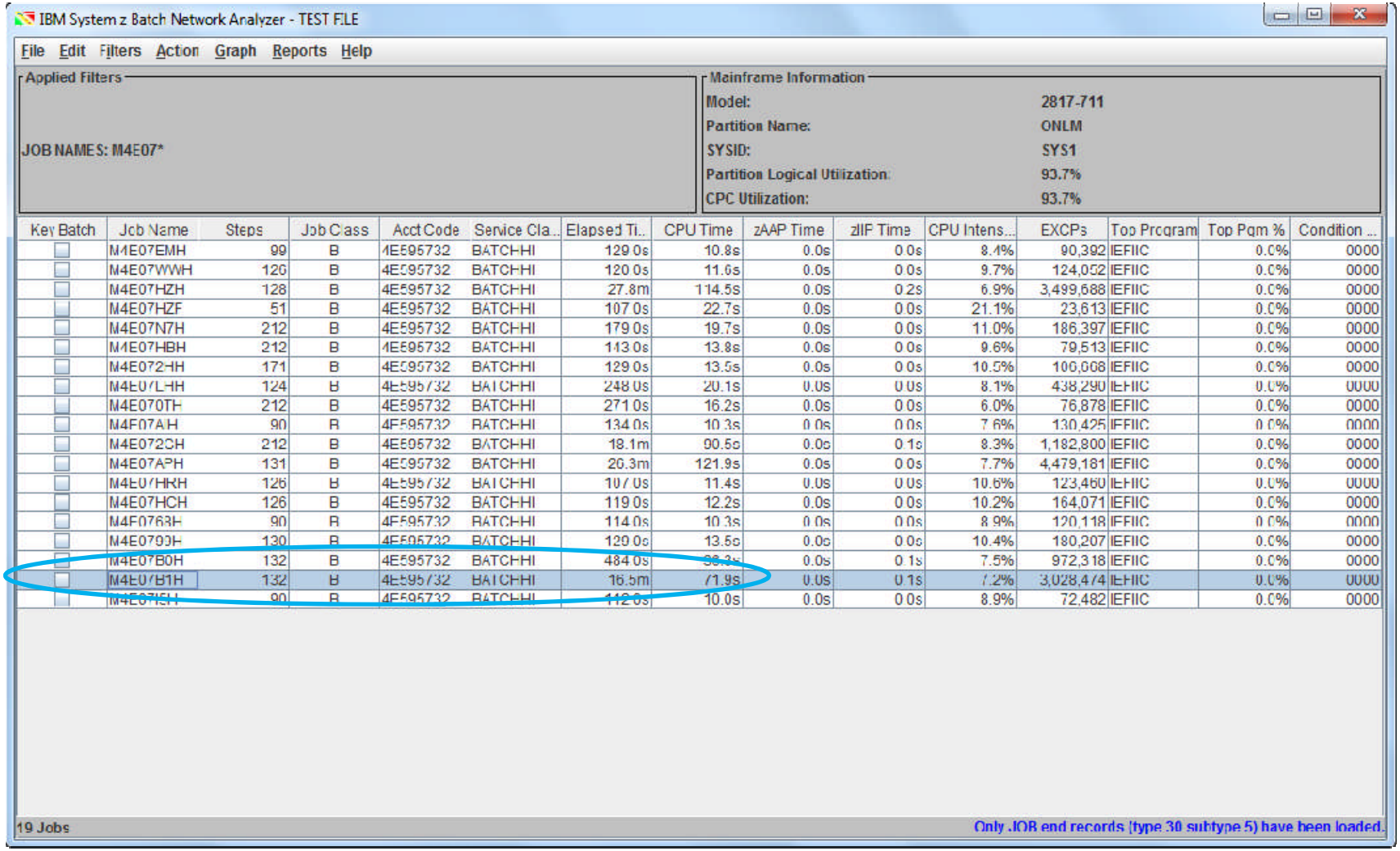
zBNA – Some Recent Updates include:

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

- v1.6.3 – 3/31/15
  - Alternate CPU zIIP SMT
- v1.6.2 – 3/6/15
  - Alternate Support for zEDC Compression to include estimated DASD space savings
- v1.6.1 – 1/31/15
  - Miscellaneous enhancements and fixes
- v1.6.0 – 1/14/15
  - z13 Support
- v1.5.1 – 12/12/14
  - New Gigabytes by hour graph
  - Allow inclusion/exclusion by data sets to drive zEDC graphs
- v1.5.0 – 10/22/14
  - Alternate Support for zEDC Compression: I/O, I/O time and CPU delta in table and graphs

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



IBM System z Batch Network Analyzer - TEST FILE

File Edit Filters Action Graph Reports Help

Applied Filters

JOB NAMES: M4E07*

Mainframe Information

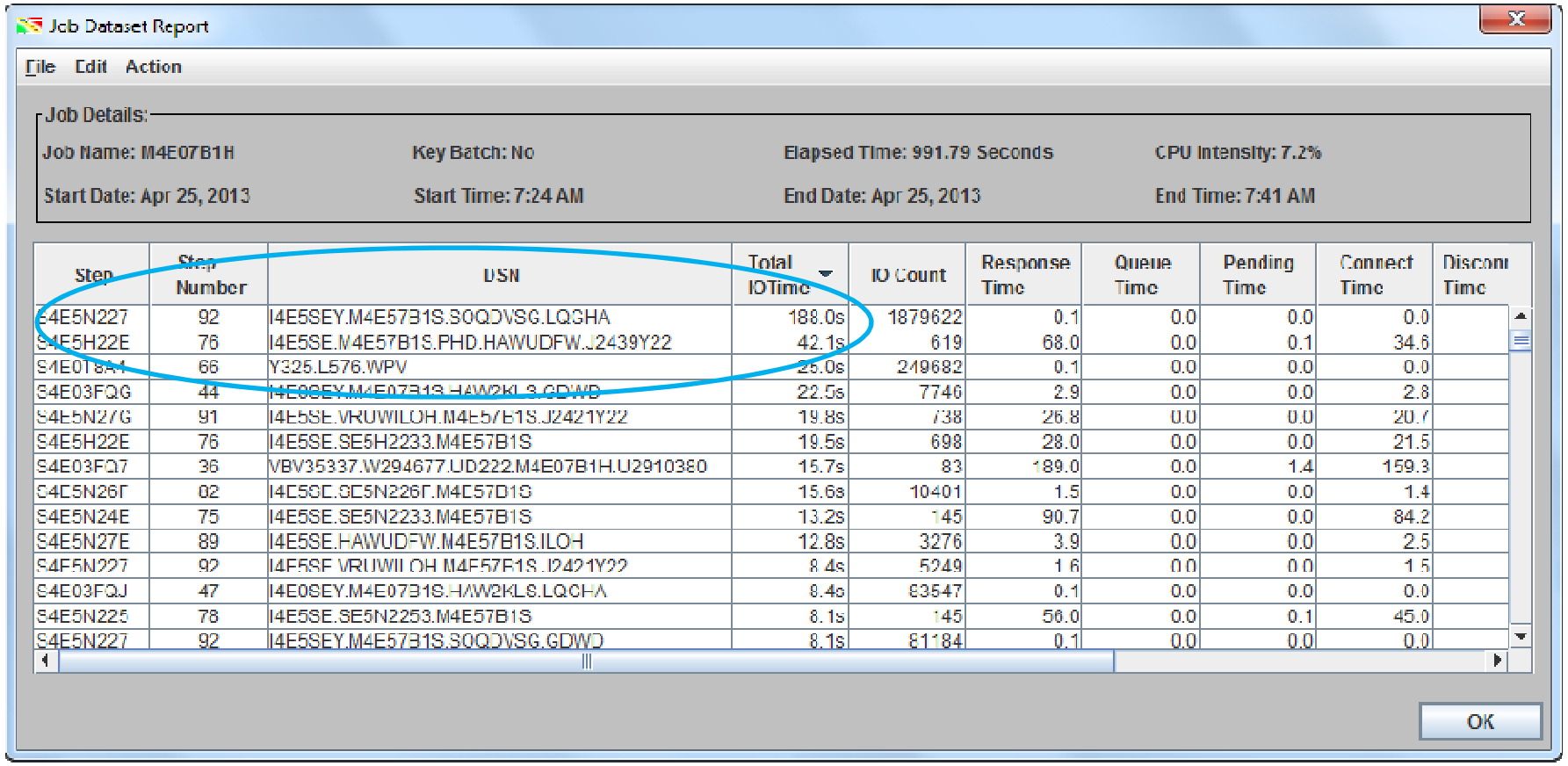
Model:	2817-711
Partition Name:	ONLM
SYSID:	SYS1
Partition Logical Utilization:	93.7%
CPC Utilization:	93.7%

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	113.0s	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%	106,008	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
	M4E072OH	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	20.3m	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
	M4E076RH	90	B	4E595732	BATCHHI	114.0s	10.3s	0.0s	0.0s	8.9%	120,118	IEFIIC	0.0%	0000
	M4E070JH	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
	M4E07IEH	90	B	4E595732	BATCHHI	112.0s	10.0s	0.0s	0.0s	8.9%	72,482	IEFIIC	0.0%	0000

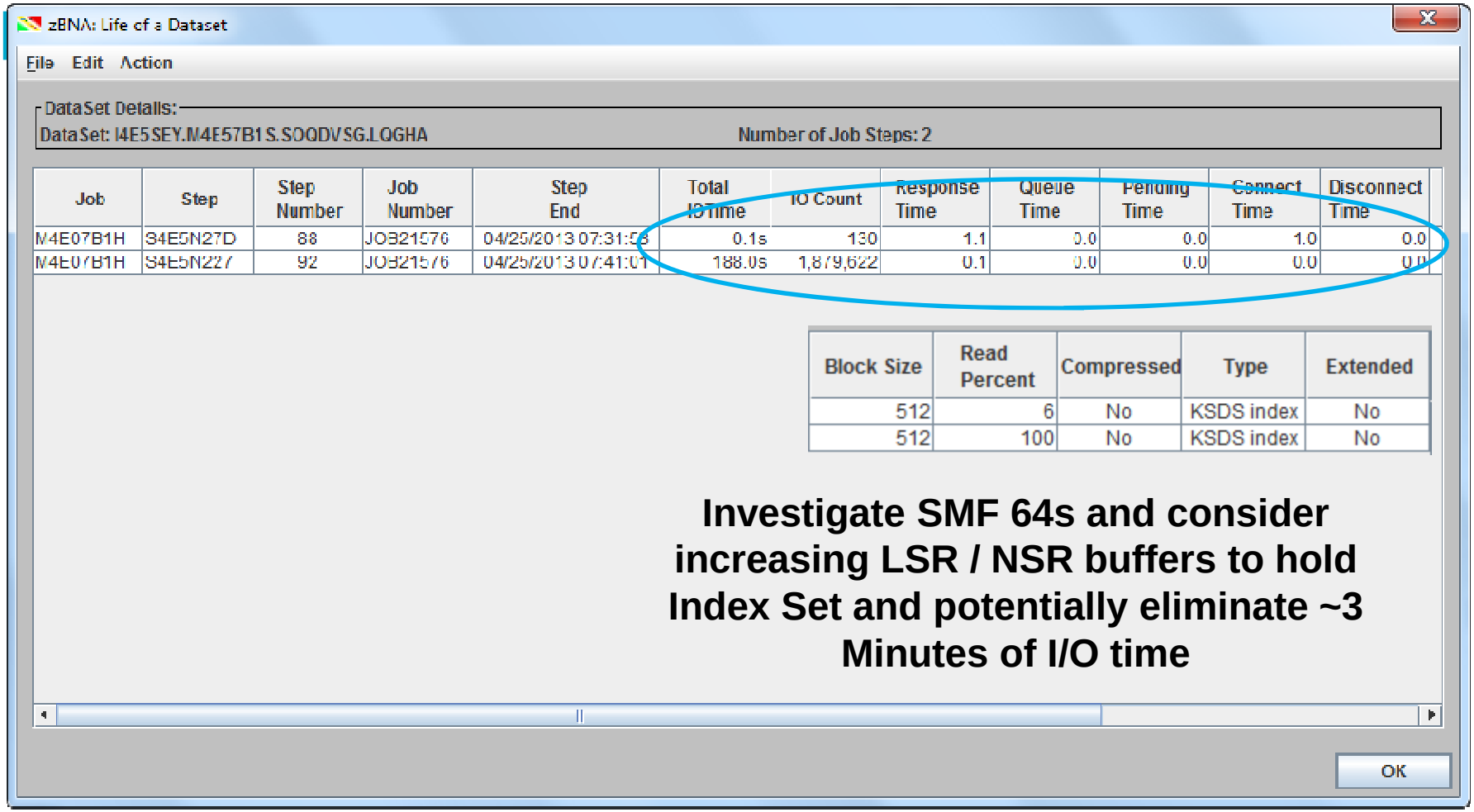
19 Jobs

Only JOB end records (type 30 subtype 5) have been loaded.

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



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



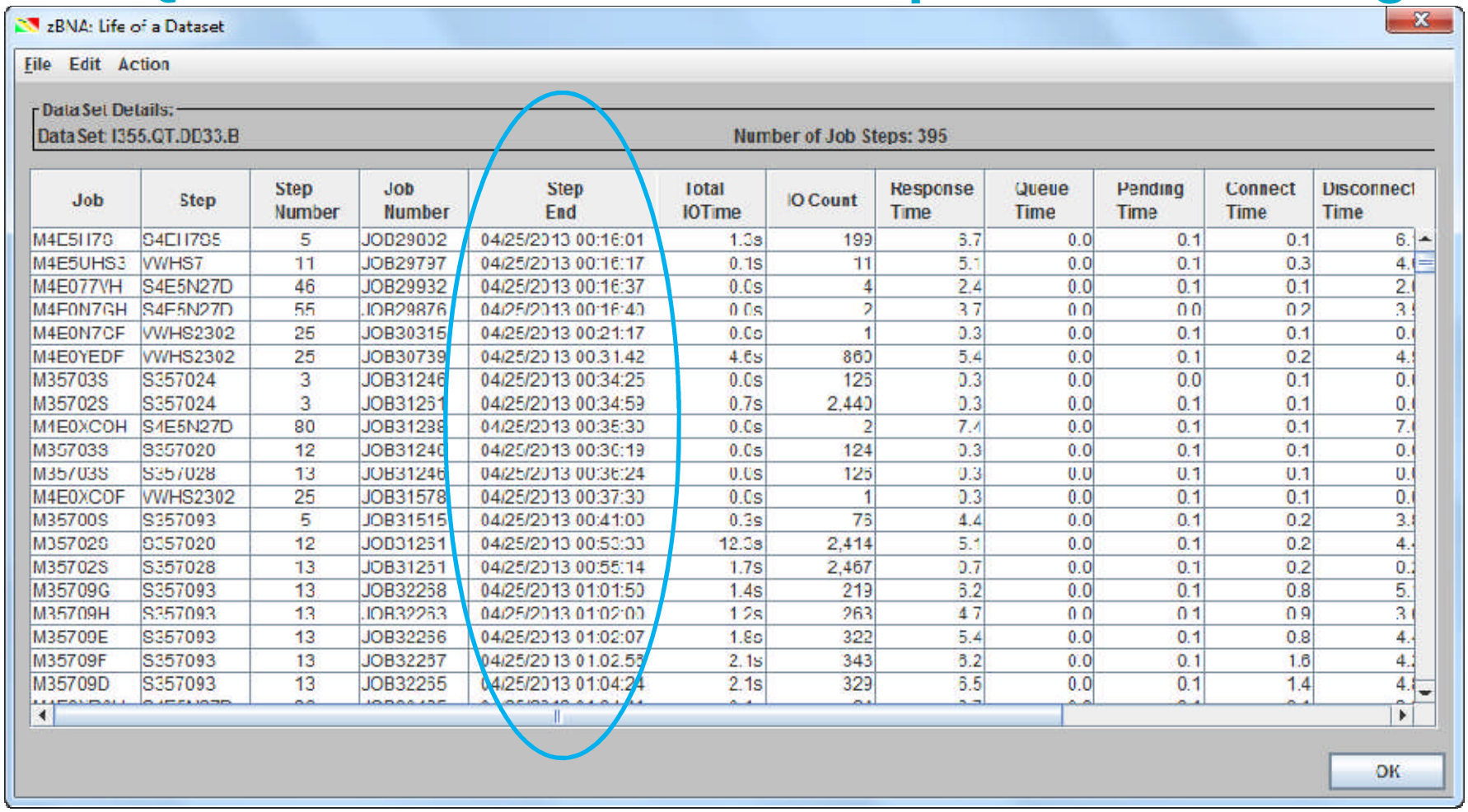
“Top 10” Data Sets Report

zBNA: Top 10 Data Sets

File Edit

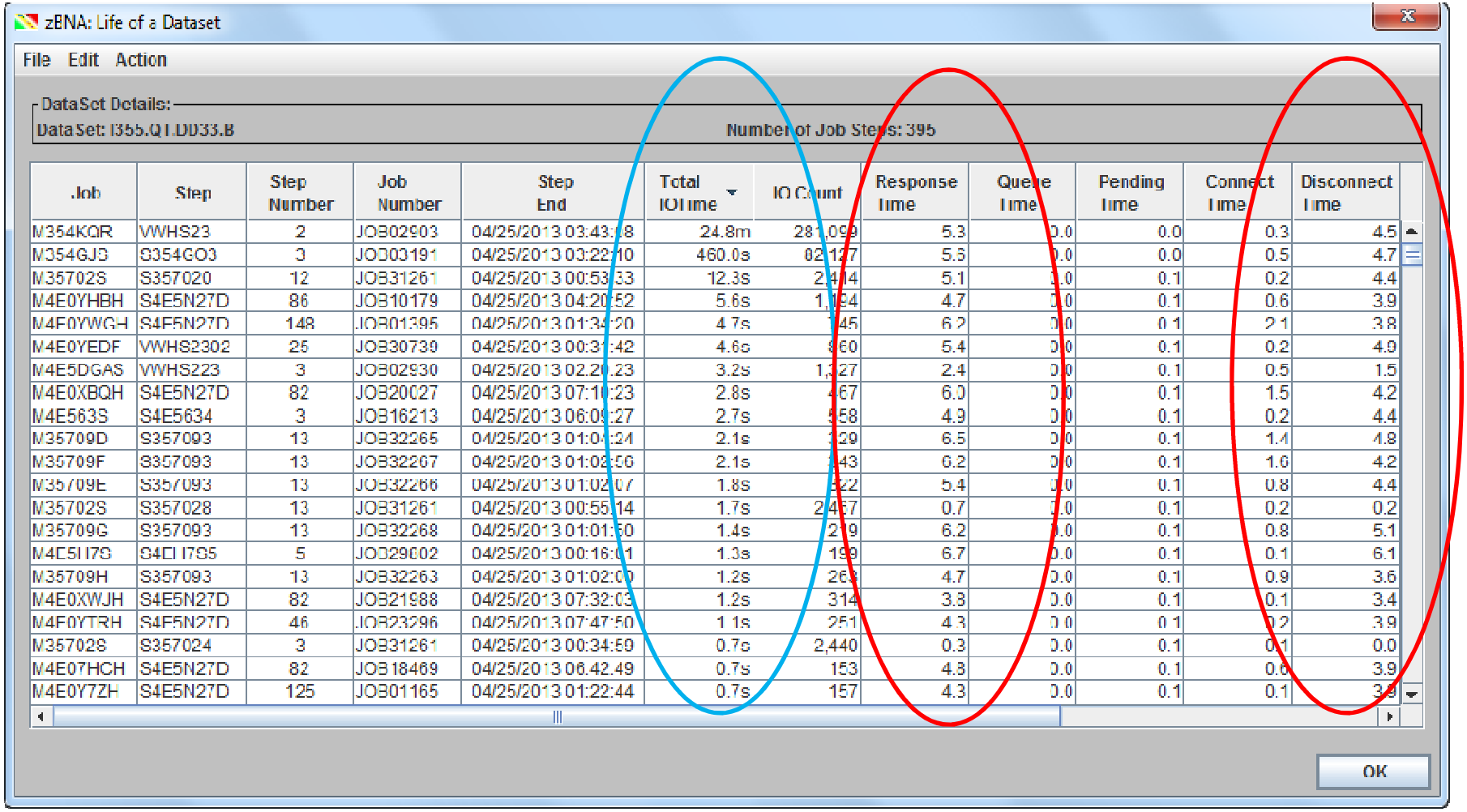
DSN	Total IOTime
VBV3.VFHHUXQ	51.0m
Y401SR.F7WQSOQW.SODQ.GDWD	36.7m
I329SR.F7WQSURG.SODQ.GDWD	33.8m
I355.QT.DD33.B	33.2m
I355.QT.DF33.B	32.5m
I355.QT.DE33.B	30.5m
I355.QT.DG33.B	28.8m
Y401SR.F7WQSURG.SODQ.GDWD	28.9m
I373.S73BJ324.SUYWLU.IWS	28.7m
I373.S73BJ525.SUYWLU.IWS	27.9m

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



Job	Step	Step Number	Job Number	Step End	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time
M4E5II7G	S4EII7S5	5	JOD29002	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.
M4F0N7GH	S4F5N27D	55	JOB29876	04/25/2013 00:16:40	0.0s	2	3.7	0.0	0.0	0.2	3.
M4E0N7CF	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	125	0.3	0.0	0.0	0.1	0.
M35702S	S357024	3	JOB31251	04/25/2013 00:34:59	0.7s	2,440	0.3	0.0	0.1	0.1	0.
M4E0XC0H	S4E5N27D	80	JOB31238	04/25/2013 00:35:30	0.0s	2	7.4	0.0	0.1	0.1	7.
M35703S	S357020	12	JOB31240	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	125	0.3	0.0	0.1	0.1	0.
M4E0XC0F	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	75	4.4	0.0	0.1	0.2	3.
M35702S	S357020	12	JOB31251	04/25/2013 00:53:30	12.3s	2,414	5.1	0.0	0.1	0.2	4.
M35702S	S357028	13	JOB31251	04/25/2013 00:55:14	1.7s	2,467	0.7	0.0	0.1	0.2	0.
M35709G	S357093	13	JOB32238	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	JOB32256	04/25/2013 01:02:07	1.8s	322	5.4	0.0	0.1	0.8	4.
M35709F	S357093	13	JOB32257	04/25/2013 01:02:53	2.1s	343	6.2	0.0	0.1	1.6	4.
M35709D	S357093	13	JOB32255	04/25/2013 01:04:24	2.1s	329	6.5	0.0	0.1	1.4	4.

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



Job	Step	Step Number	Job Number	Step End	Total IO Time	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time
M354KQR	VWHS23	2	JOB02903	04/25/2013 03:43:18	24.8m	281,099	5.3	0.0	0.0	0.3	4.5
M354GJC	S354CO3	3	JOB03191	04/25/2013 03:22:10	460.0s	82,127	5.5	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 01:03:56	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	279	6.2	0.0	0.1	0.8	5.1
M4E5II7G	S4EII7S5	5	JOB29602	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	268	4.7	0.0	0.1	0.9	3.6
M4E0XWJH	S4E5N27D	82	JOB21988	04/25/2013 07:32:03	1.2s	314	3.3	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	4.3	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

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 z Systems 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 z Systems

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

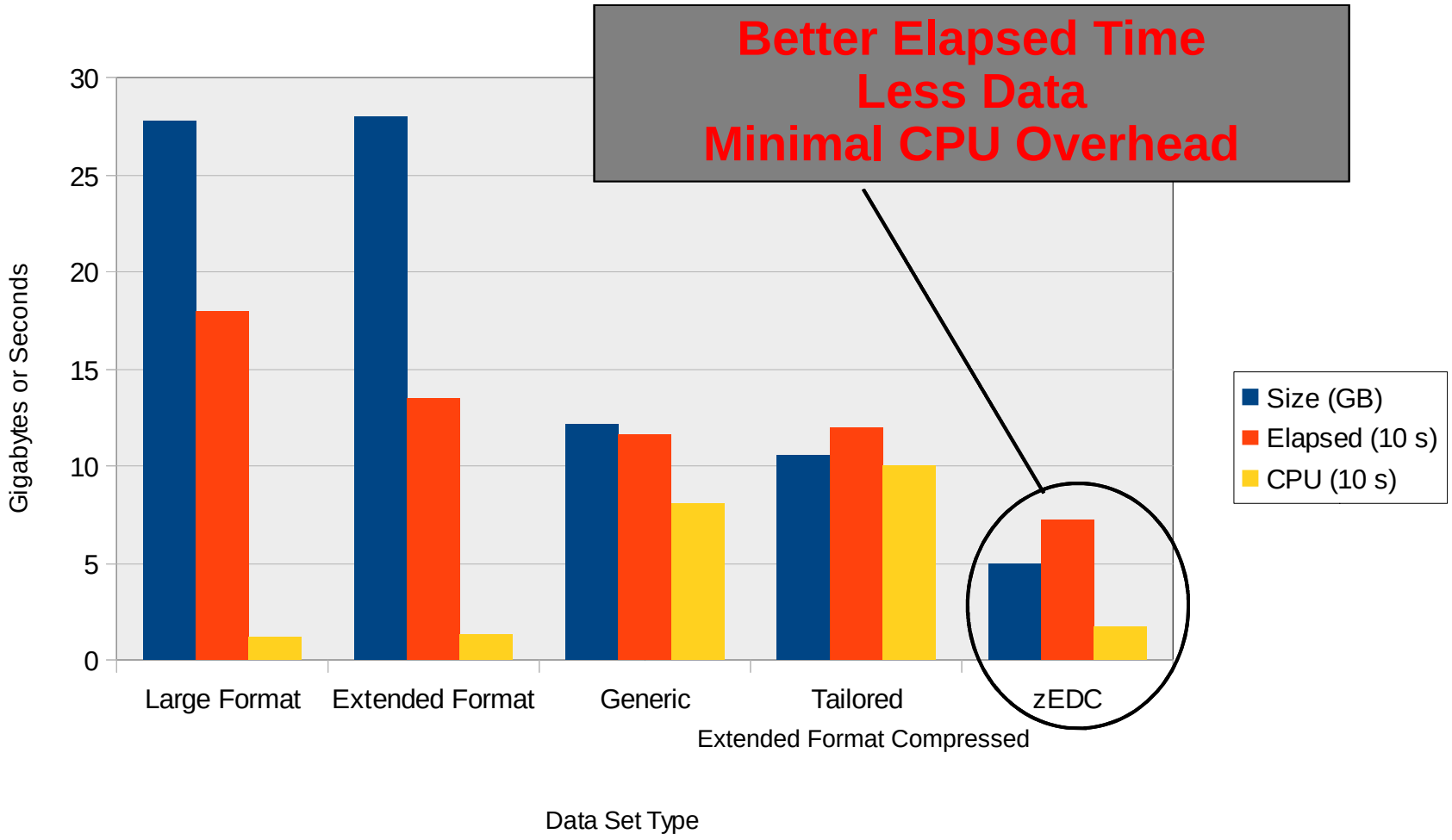
Up to 5X more ***XML*** data can be stored in sequential files

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!

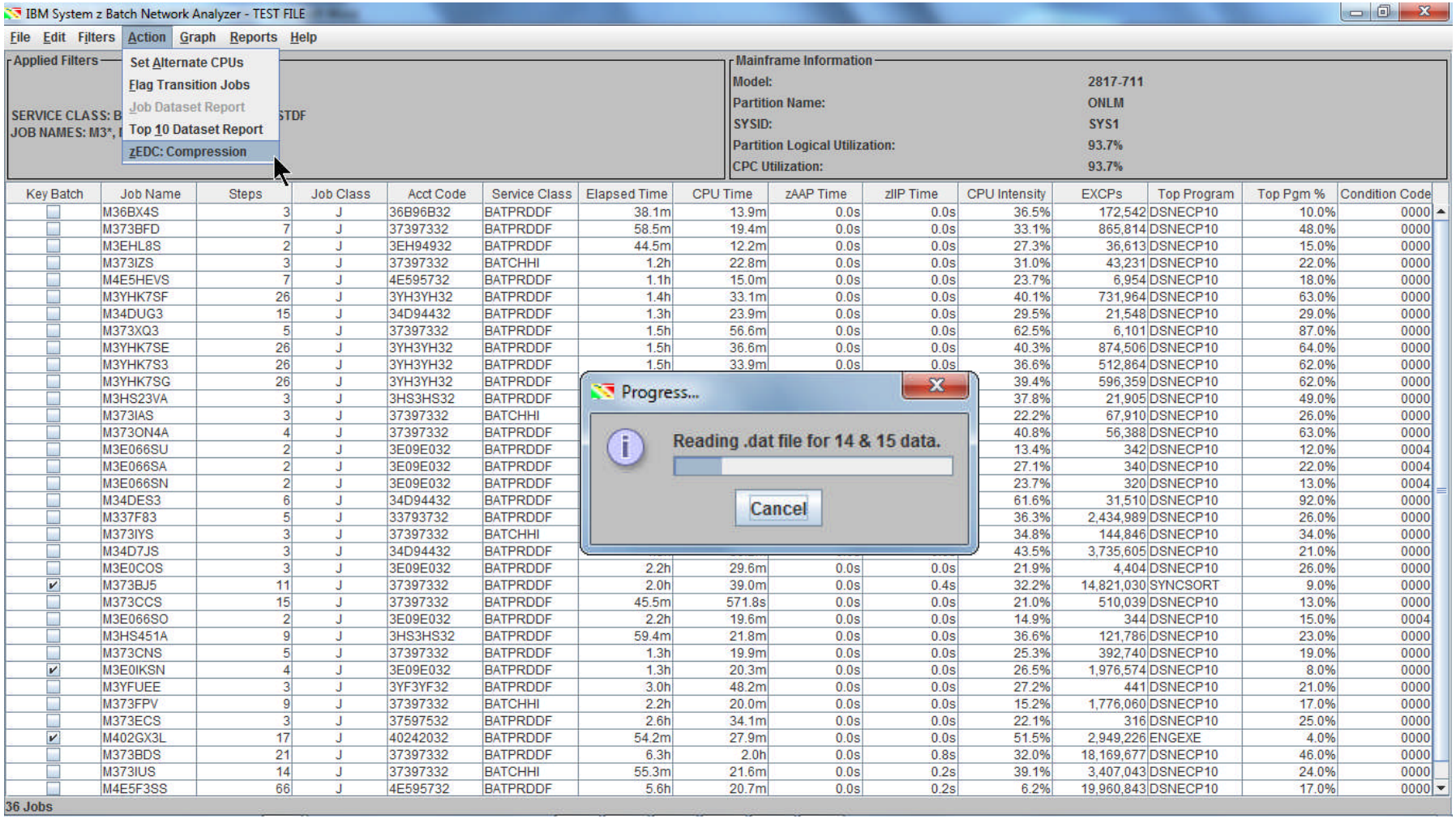


Disclaimer: Based on projections and/or measurements completed in a controlled environment. Results may vary by customer based on individual workload, configuration and software levels.

Initial zEDC Compression Reports

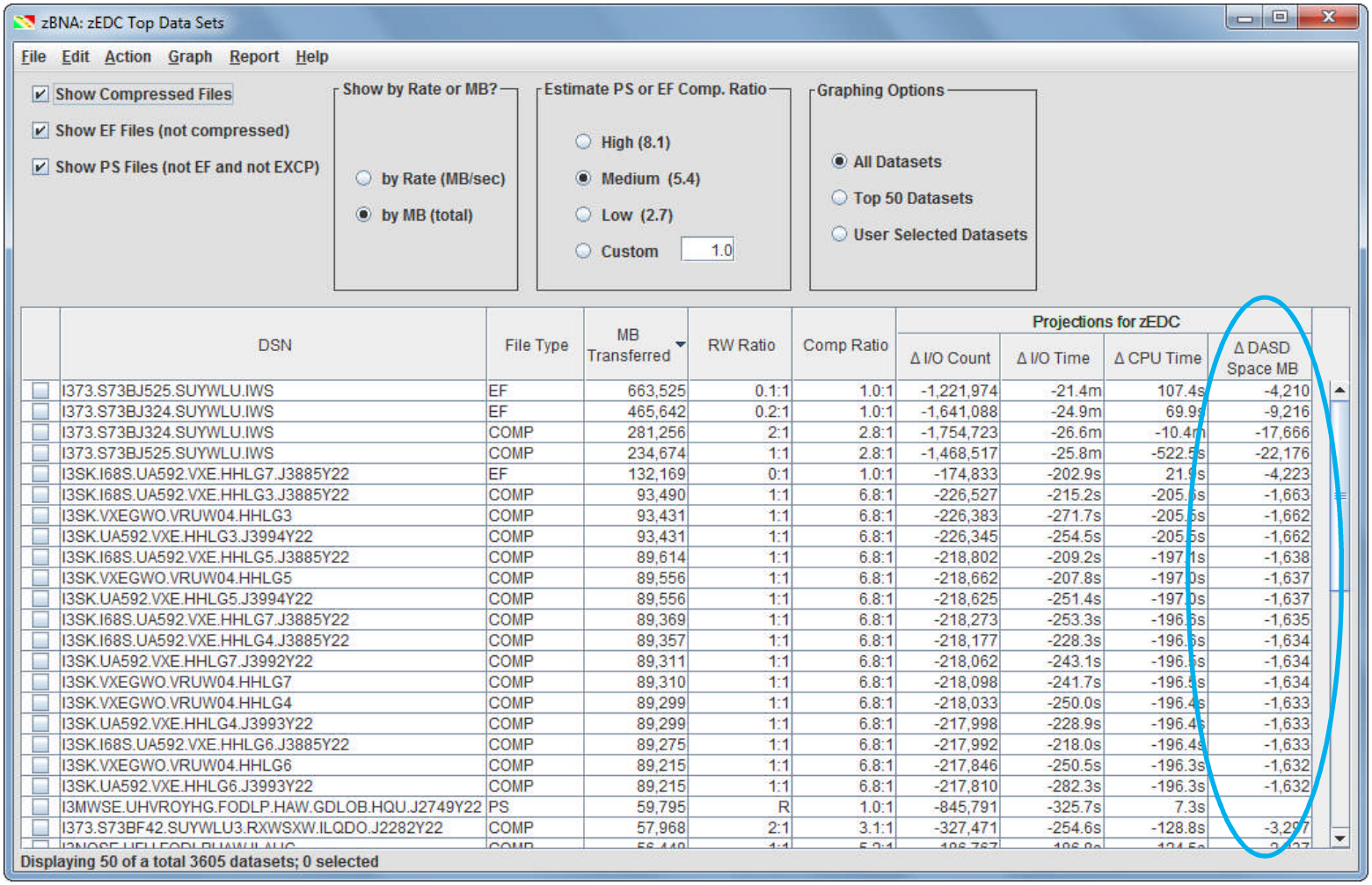
- **zEDC Compression Eligible Criteria for DFSMS BSAM/QSAM Data Sets**
  - Non-VSAM
  - Extended Format or Not Extended Format
  - EXCP = NO
  - Cannot be Open for Update
  - Cannot be Open with EDI processing
  - Data Set Size (Initial Allocation) >5 MB (or >8 MB if no secondary allocation)
  - Not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



zBNA: zEDC Top Data Sets

File Edit Action Graph Report Help

Show Compressed Files
Show EF Files (not compressed)
Show PS Files (not EF and not EXCP)

Show by Rate or MB?: by Rate (MB/sec); by MB (total)

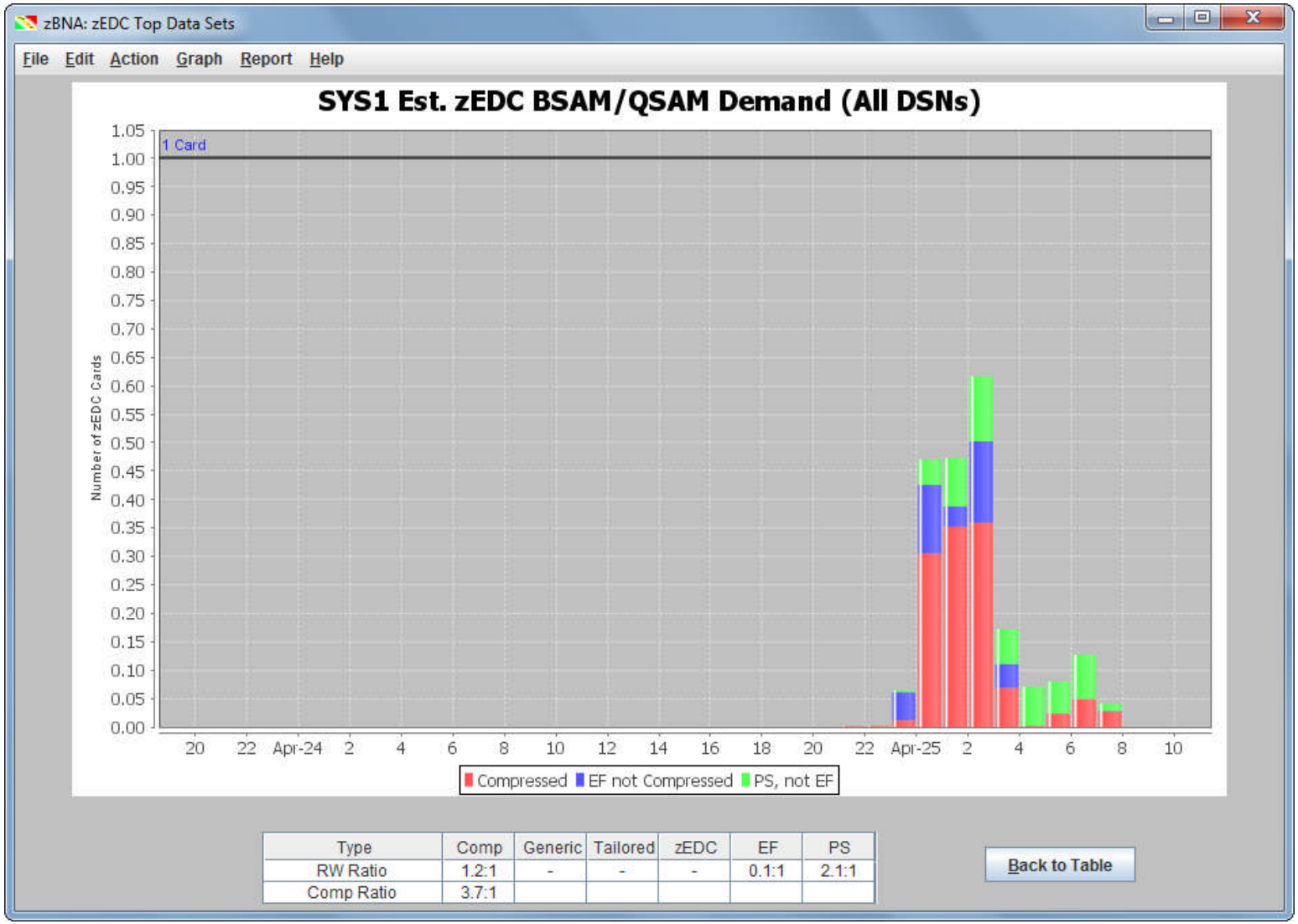
Estimate PS or EF Comp. Ratio: High (8.1); Medium (5.4); Low (2.7); Custom 1.0

Graphing Options: All Datasets; Top 50 Datasets; User Selected Datasets

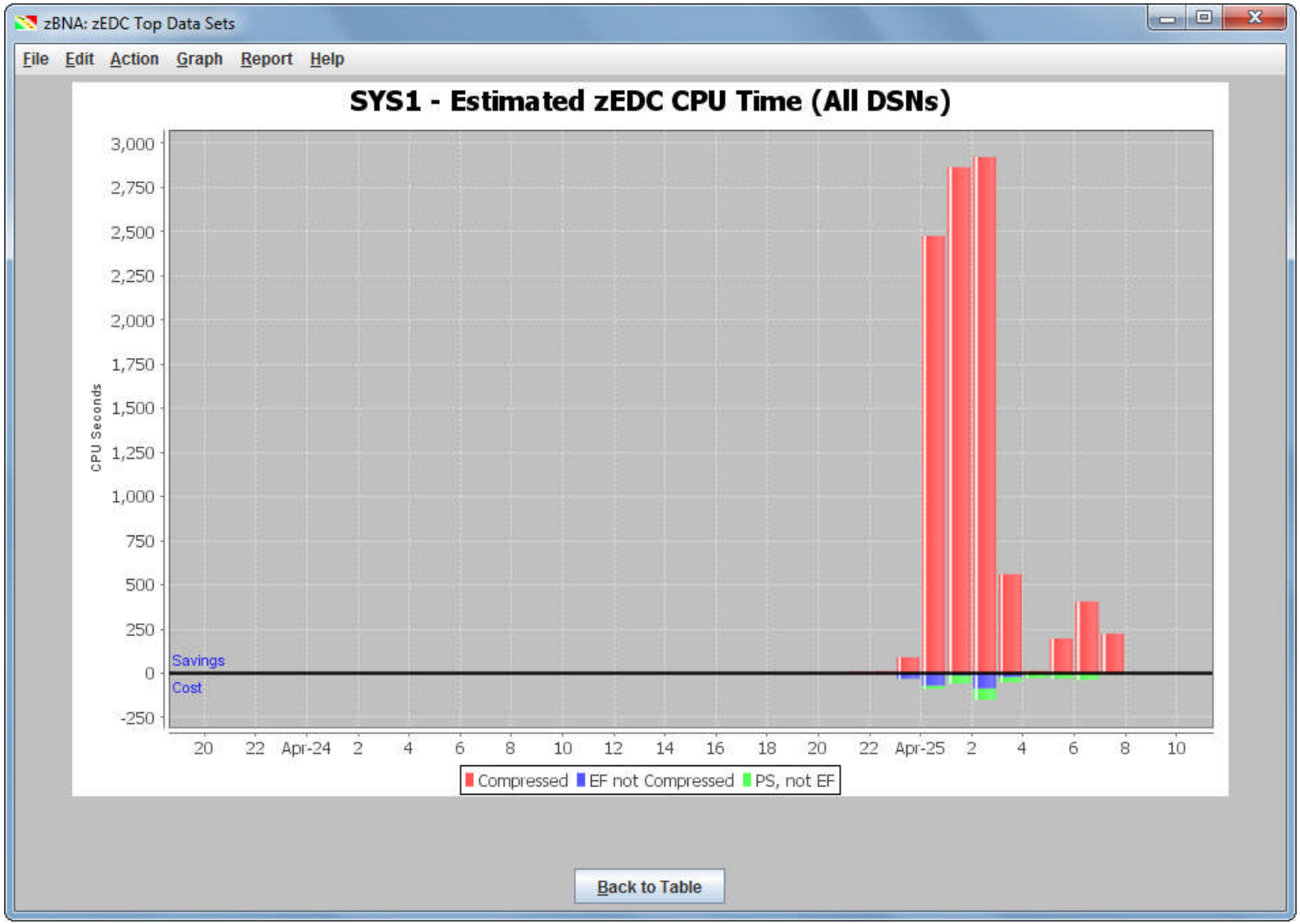
DSN	File Type	MB Transferred	RW Ratio	Comp Ratio	Projections for zEDC: Δ I/O Count	Δ I/O Time	Δ CPU Time	Δ DASD Space MB
I373.S73BJ525.SUYWLU.IWS	EF	663,525	0.1:1	1.0:1	-1,221,974	-21.4m	107.4s	-4,210
I373.S73BJ324.SUYWLU.IWS	EF	465,642	0.2:1	1.0:1	-1,641,088	-24.9m	69.9s	-9,216
I373.S73BJ324.SUYWLU.IWS	COMP	281,256	2:1	2.8:1	-1,754,723	-26.6m	-10.4m	-17,666
I373.S73BJ525.SUYWLU.IWS	COMP	234,674	1:1	2.8:1	-1,468,517	-25.8m	-522.5s	-22,176
I3SK.I68S.UA592.VXE.HHLG7.J3885Y22	EF	132,169	0:1	1.0:1	-174,833	-202.9s	21.9s	-4,223
I3SK.I68S.UA592.VXE.HHLG3.J3885Y22	COMP	93,490	1:1	6.8:1	-226,527	-215.2s	-205.6s	-1,663
I3SK.VXEGWO.VRUW04.HHLG3	COMP	93,431	1:1	6.8:1	-226,383	-271.7s	-205.6s	-1,662
I3SK.UA592.VXE.HHLG3.J3994Y22	COMP	93,431	1:1	6.8:1	-226,345	-254.5s	-205.6s	-1,662
I3SK.I68S.UA592.VXE.HHLG5.J3885Y22	COMP	89,614	1:1	6.8:1	-218,802	-209.2s	-197.1s	-1,638
I3SK.VXEGWO.VRUW04.HHLG5	COMP	89,556	1:1	6.8:1	-218,662	-207.8s	-197.0s	-1,637
I3SK.UA592.VXE.HHLG5.J3994Y22	COMP	89,556	1:1	6.8:1	-218,625	-251.4s	-197.0s	-1,637
I3SK.I68S.UA592.VXE.HHLG7.J3885Y22	COMP	89,369	1:1	6.8:1	-218,273	-253.3s	-196.6s	-1,635
I3SK.I68S.UA592.VXE.HHLG4.J3885Y22	COMP	89,357	1:1	6.8:1	-218,177	-228.3s	-196.6s	-1,634
I3SK.UA592.VXE.HHLG7.J3992Y22	COMP	89,311	1:1	6.8:1	-218,062	-243.1s	-196.5s	-1,634
I3SK.VXEGWO.VRUW04.HHLG7	COMP	89,310	1:1	6.8:1	-218,098	-241.7s	-196.5s	-1,634
I3SK.VXEGWO.VRUW04.HHLG4	COMP	89,299	1:1	6.8:1	-218,033	-250.0s	-196.4s	-1,633
I3SK.UA592.VXE.HHLG4.J3993Y22	COMP	89,299	1:1	6.8:1	-217,998	-228.9s	-196.4s	-1,633
I3SK.I68S.UA592.VXE.HHLG6.J3885Y22	COMP	89,275	1:1	6.8:1	-217,992	-218.0s	-196.4s	-1,633
I3SK.VXEGWO.VRUW04.HHLG6	COMP	89,215	1:1	6.8:1	-217,846	-250.5s	-196.3s	-1,632
I3SK.UA592.VXE.HHLG6.J3993Y22	COMP	89,215	1:1	6.8:1	-217,810	-282.3s	-196.3s	-1,632
I3MWSE.UHVROYHG.FODLP.HAW.GDLOB.HQU.J2749Y22	PS	59,795	R	1.0:1	-845,791	-325.7s	7.3s	
I373.S73BF42.SUYWLU3.RXWSXW.ILQDO.J2282Y22	COMP	57,968	2:1	3.1:1	-327,471	-254.6s	-128.8s	-3,297

Displaying 50 of a total 3605 datasets; 0 selected

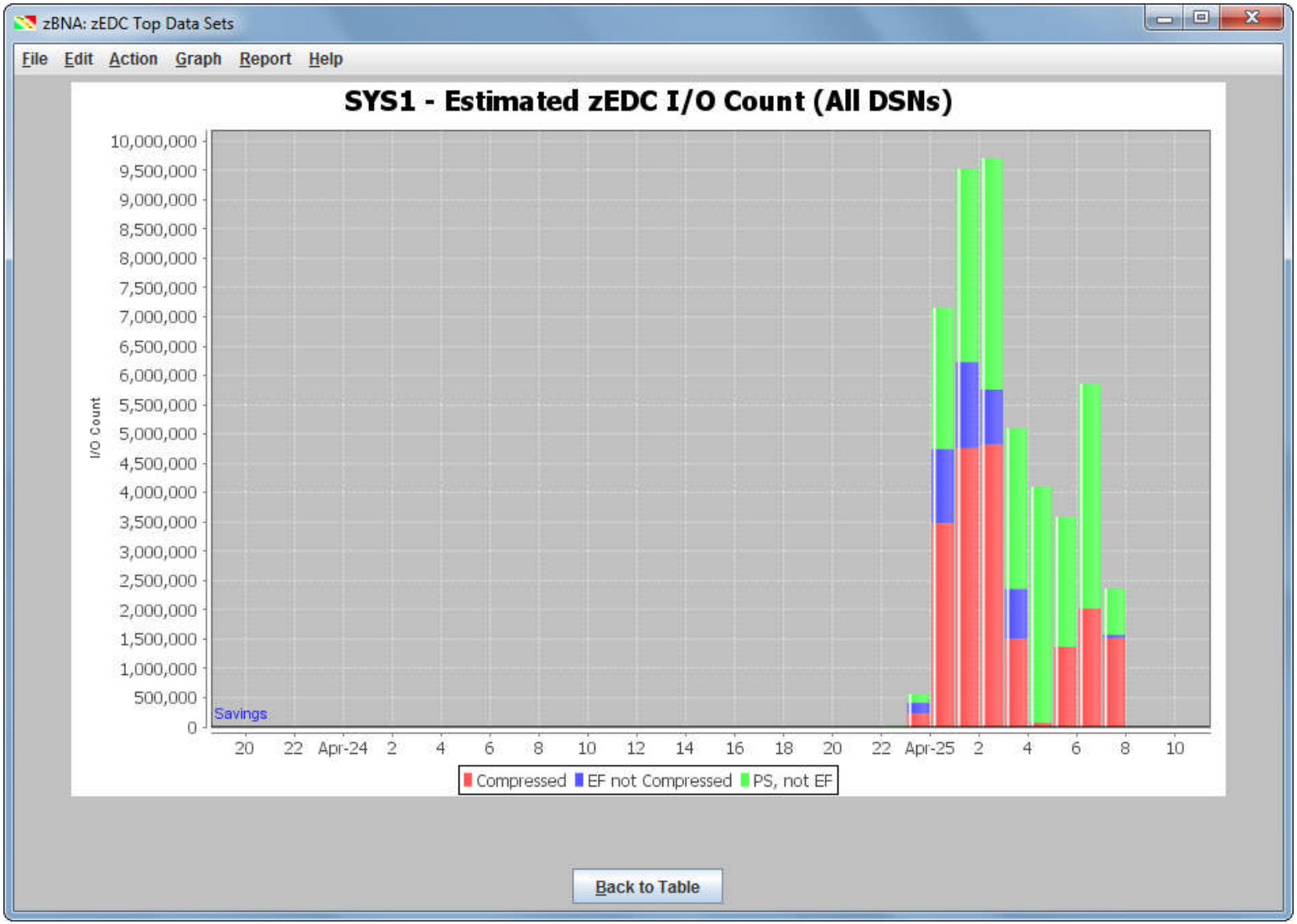
Estimated zEDC Cards Report – SYS1 All Data Sets



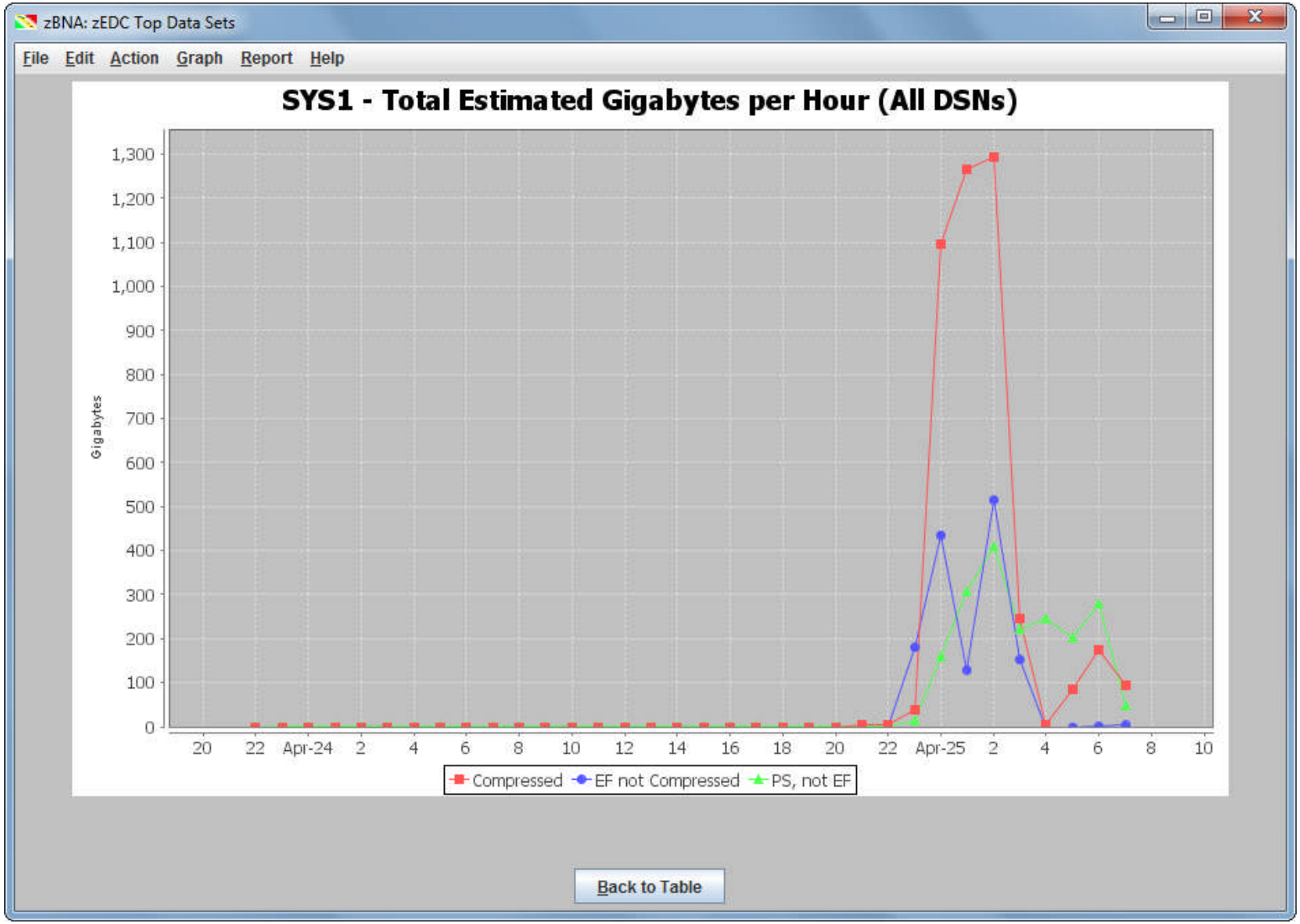
Estimated CPU Savings Report – SYS1 All Data Sets



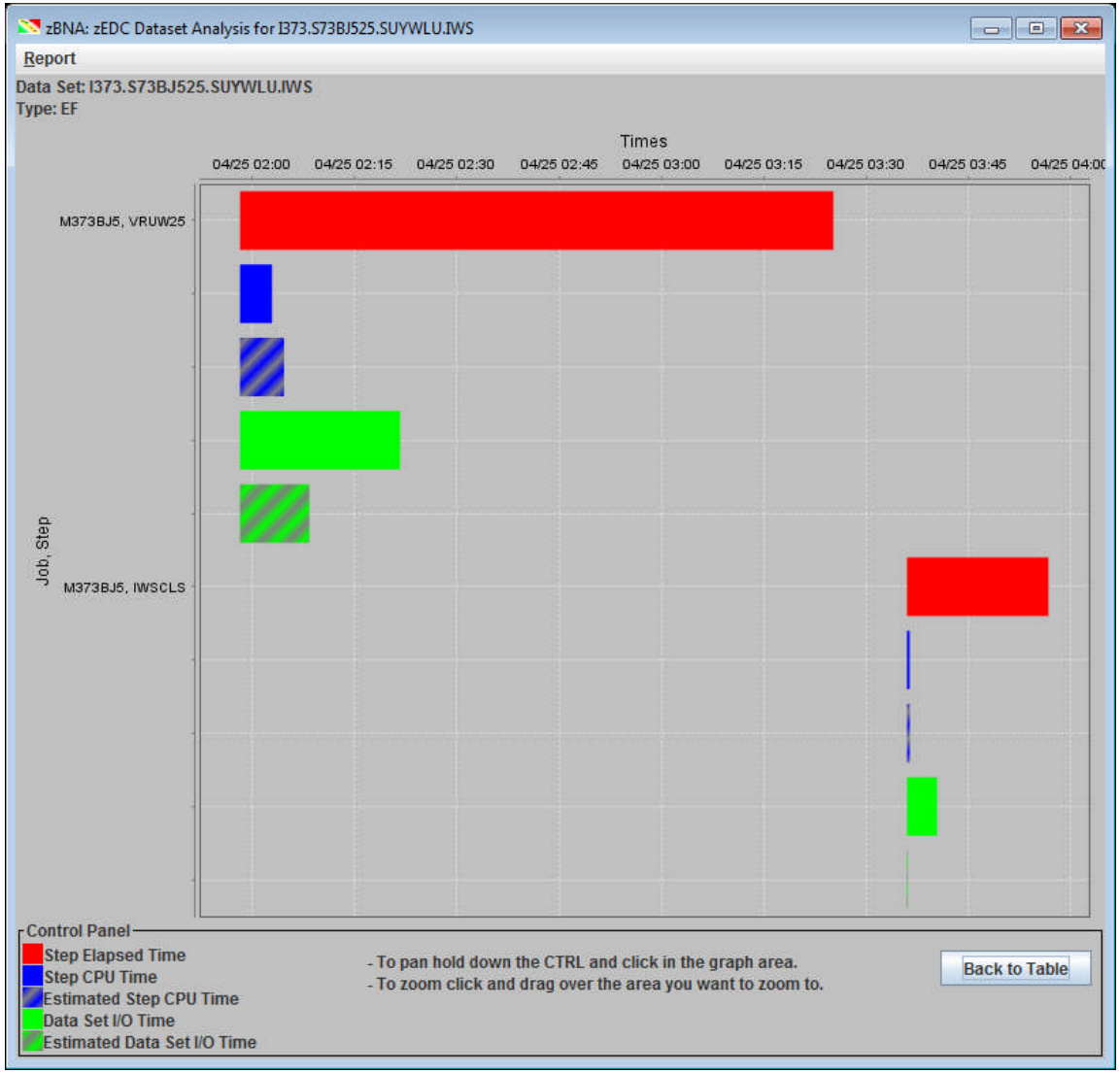
Estimated I/O Savings Report – SYS1 All Data Sets



Estimated Gigabytes/Hour Report – SYS1 All Data Sets

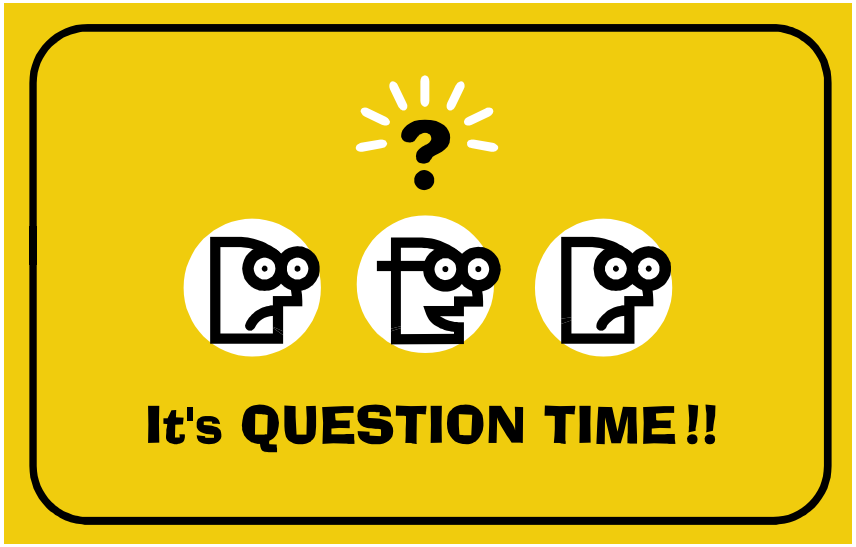


zEDC Data Set Analysis



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 (updated for zBNA 1.6.3)
    - Sample Files
    - Lab exercise written for zBNA 1.6.3
    - Recorded Demo from June 2013



zBNA Hands-on Lab

Thur 3:15 PM – Room Asia 5

Thank You for Attending!

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Back Up

DFSMS - *BSAM/QSAM Exploitation* – PTF for APAR OA42195

- z/OS DFSMS (BSAM/QSAM) introduces a new type of compression (zEDC) for non-VSAM extended format data sets. This was provided via PTF in 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

z Systems Batch Network Analyzer (zBNA) Tool - Hands-on Lab

John Burg

August 13 2015

Session 17551

#SHAREorg

Lab Tasks

The purpose of this zBNA Lab is to provide an exercise in running the zBNA tool; utilizing its functions to successfully complete a simple Batch analysis.

In this exercise you will complete the following tasks:

1) Explore the Main Screen
   Start zBNA and load two data files
2) Filter Data
   - Use the job filtering capabilities (CPU time, Service classes, exclude jobs, key jobs and job masking) to select a subset of candidate Batch jobs
   - Save as zBNA File
   - Filter Top Program Pct
   - Load Step level records, and drill down into the Step details
3) Display a Graph and Create Reports
   Display the job subset created with the filters
4) Display SMF 42(6) DASD Dataset Analysis
   - Job/Dataset Report
   - Top 10 Dataset Report
5) Perform Alternate Processor Analysis
   Assess the impact of an alternate CPU technology with Simultaneous MultiThreading (SMT)
6) Explore zEDC Compression
   Identify data sets that will benefit from moving to zEDC cards
7) Save the final zBNA file