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

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zBNA Topics

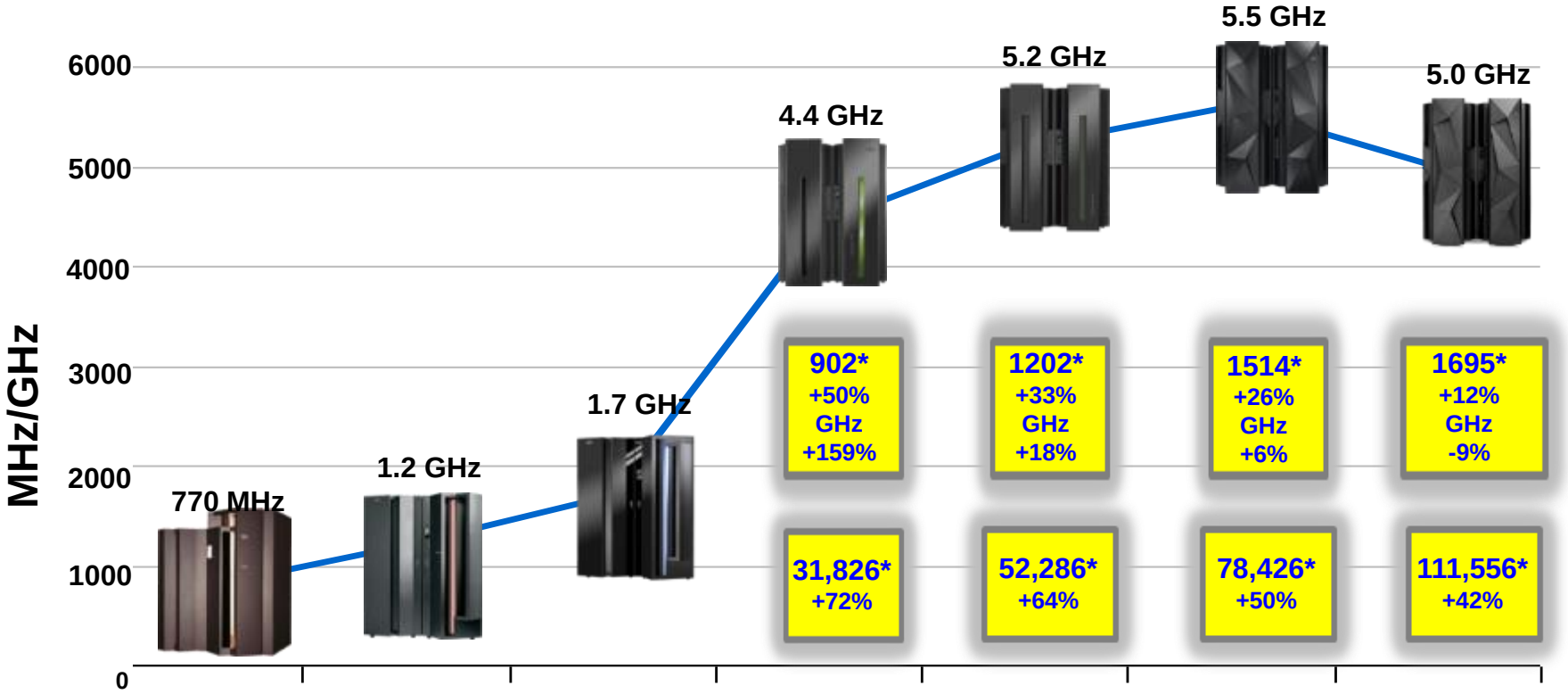
- Capacity Planning Information
- zBNA Introduction
  - What and Why
  - Sample flow and reports
- Additional Function
  - Top Data Sets
  - Compression and zEDC
- Technical Support and Additional Education

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 z Systems 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

z13 Continues the CMOS Mainframe Heritage Begun in 1994



2000 z900	2003 z990	2005 z9 EC	2008 z10 EC	2010 z196	2012 zEC12	2015 z13
189 nm SOI 16 Cores** Full 64-bit z/Architecture	130 nm SOI 32 Cores** Superscalar Modular SMP	90 nm SOI 54 Cores** System level scaling	65 nm SOI 64 Cores** High-freq core 3-level cache	45 nm SOI 80 Cores** OOO core eDRAM cache RAIM memory zBX integration	32 nm SOI 101 Cores** OOO and eDRAM cache improvements PCIe Flash Arch extensions for scaling	22 nm SOI 141 Cores** SMT &SIMD Up to 10TB of Memory

*** MIPS Tables are NOT adequate for making comparisons of z Systems processors. Additional capacity planning required**
**** Number of PU cores for customer use**

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**
  - **<u>Can trade-off slower CP speeds with a reduction in CPU queue delay</u>**
  - **<u>Can build LPARs with greater CP share</u>**

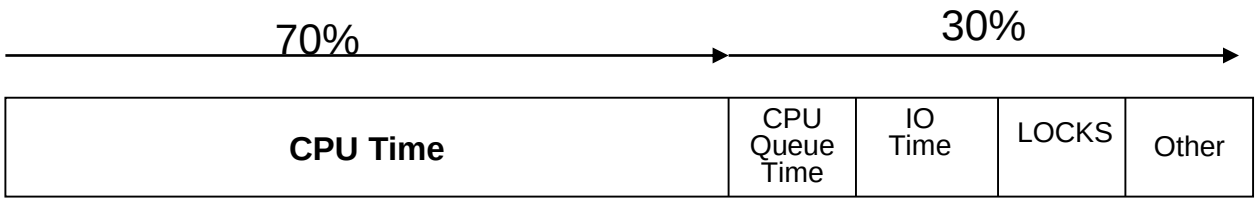
Per CP Share Comparison of Fewer Faster vs More Slower

	MIPS	LPAR 1	LPAR 2	LPAR 3	LPAR 4	LPAR 5	LPAR 6
Weight		30	30	10	10	10	10
2964-704	6041	1.2 CP	1.2 CP	0.4 CP	0.4 CP	0.4 CP	0.4 CP
2964-510	6145	3 CP	3 CP	1 CP	1 CP	1 CP	1 CP

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

Workload Considerations

Online Transaction

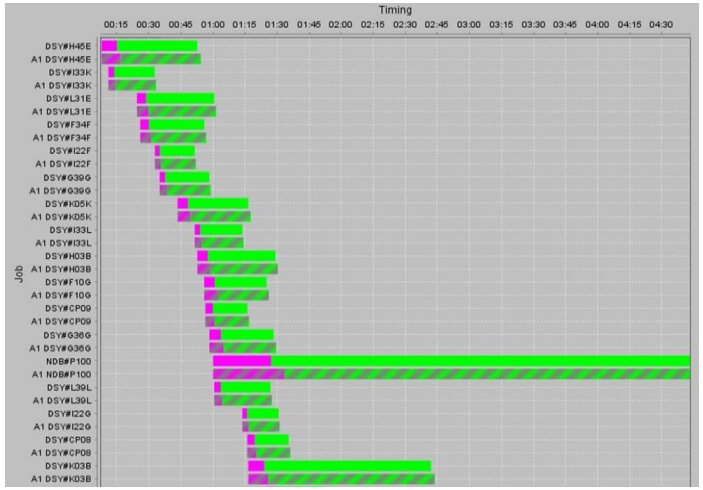


Processor	CPU Time	Other Time	Total
zEC12-708	.028	.012	.040
z13-707	.024	.012	.036
z13-612	.036	.012	.048

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
  - Customers
    - https://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS5132



zBNA – Multiple Data Sources

SMF 70 – CEC + LPAR INFO

SMF 72 – Workload Info (CPU Delay)

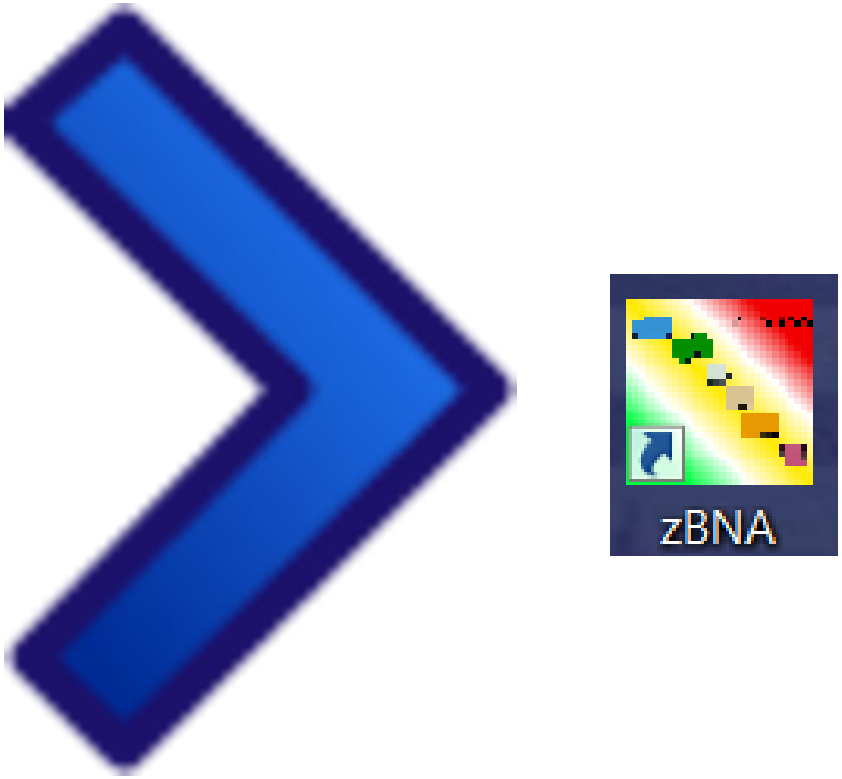
SMF 113 – RNI Workload Info

SMF 30.5 – Job Information

SMF 30.4 – Step Information

SMF 42.6 – Data Set Information

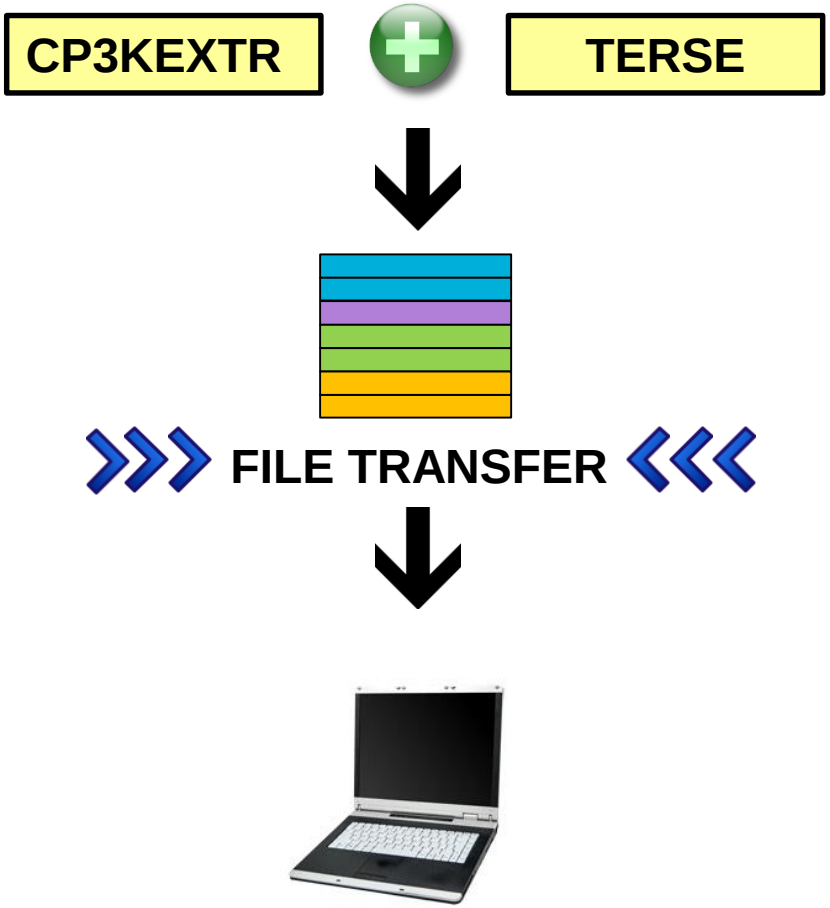
SMF 14/15 – Data Set Open/Close



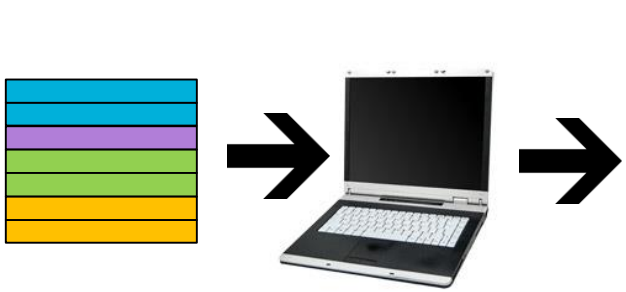
Integrating multiple data sources to provide cutting edge analytics for batch workloads

zBNA – Simple Process

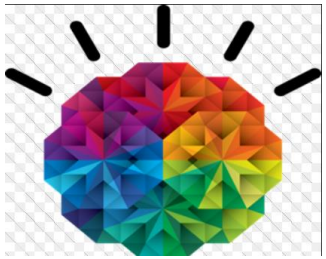
SMF 70 – CEC + LPAR INFO
SMF 72 – Workload Info (CPU Delay)
SMF 113 – RNI Workload Info
SMF 30.5 – Job Information
SMF 30.4 – Step Information
SMF 42.6 – Data Set Information
SMF 14/15 – Data Set Open/Close



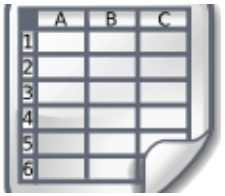
zBNA – A PC Based Tool



Self Discovering Filters
- Service Classes
- Job Classes
- Account Codes
- Time Span of Data



Interactive Analytics



CSV Data

zBNA Report

Save the Study

What can you DO with 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
- Analyze the “Batch Window”
  - Identify candidate jobs for running on different processors
  - Identify jobs with speed of engine concerns (top tasks %)
- Identify DASD data sets used by jobs, and Top DASD data sets overall
- Project Current Batch Environment to a new Processor
  - Perform "what if" analysis and estimate the CPU upgrade effect on batch window
- Evaluate benefits of zEDC Compression
  - Identify BSAM/QSAM Compression candidates
  - Estimate number of zEDC Express cards
  - Estimate potential CPU and IO savings

Do it visually with Gantt charts and easy to read graphs
Do it interactively by changing filters and evaluate different scenarios

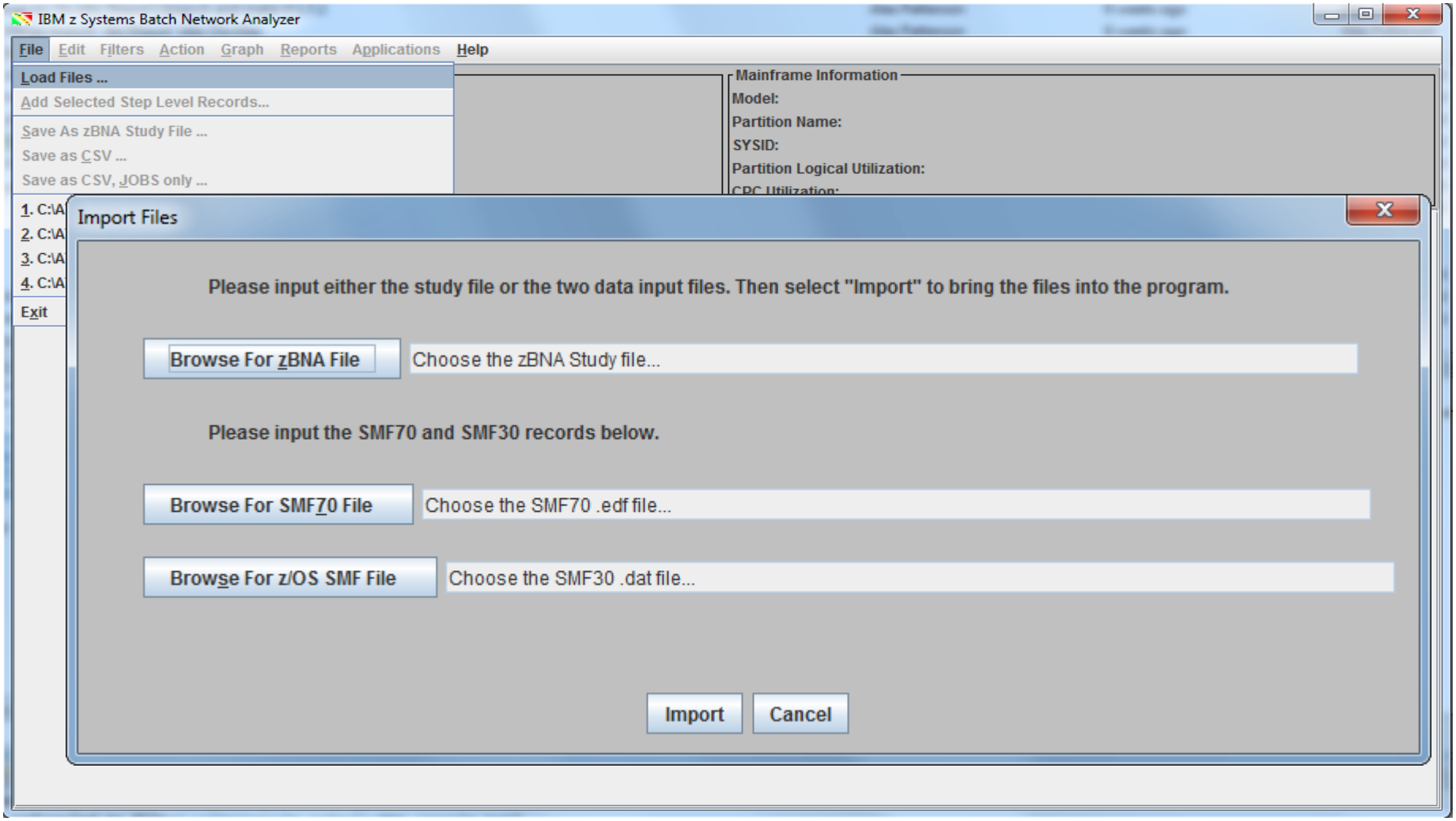
zBNA Scope of Analysis

- Scope of Analysis
  - Single system view
  - Scope is primarily single batch window of user defined length
- Best Practice:

Limit the time range to 24 hours for 1 System!

- Multiple system support is asynchronous
  - Create a CSV for each LPAR and then merge into a spreadsheet

Loading zBNA Files



zBNA Main Panel

IBM z Systems Batch Network Analyzer - TEST FILE

File Edit Filters Action Graph Reports Applications Help

Applied Fi
- Set Table Filters...
- Clear Table Filters

Mainframe Information

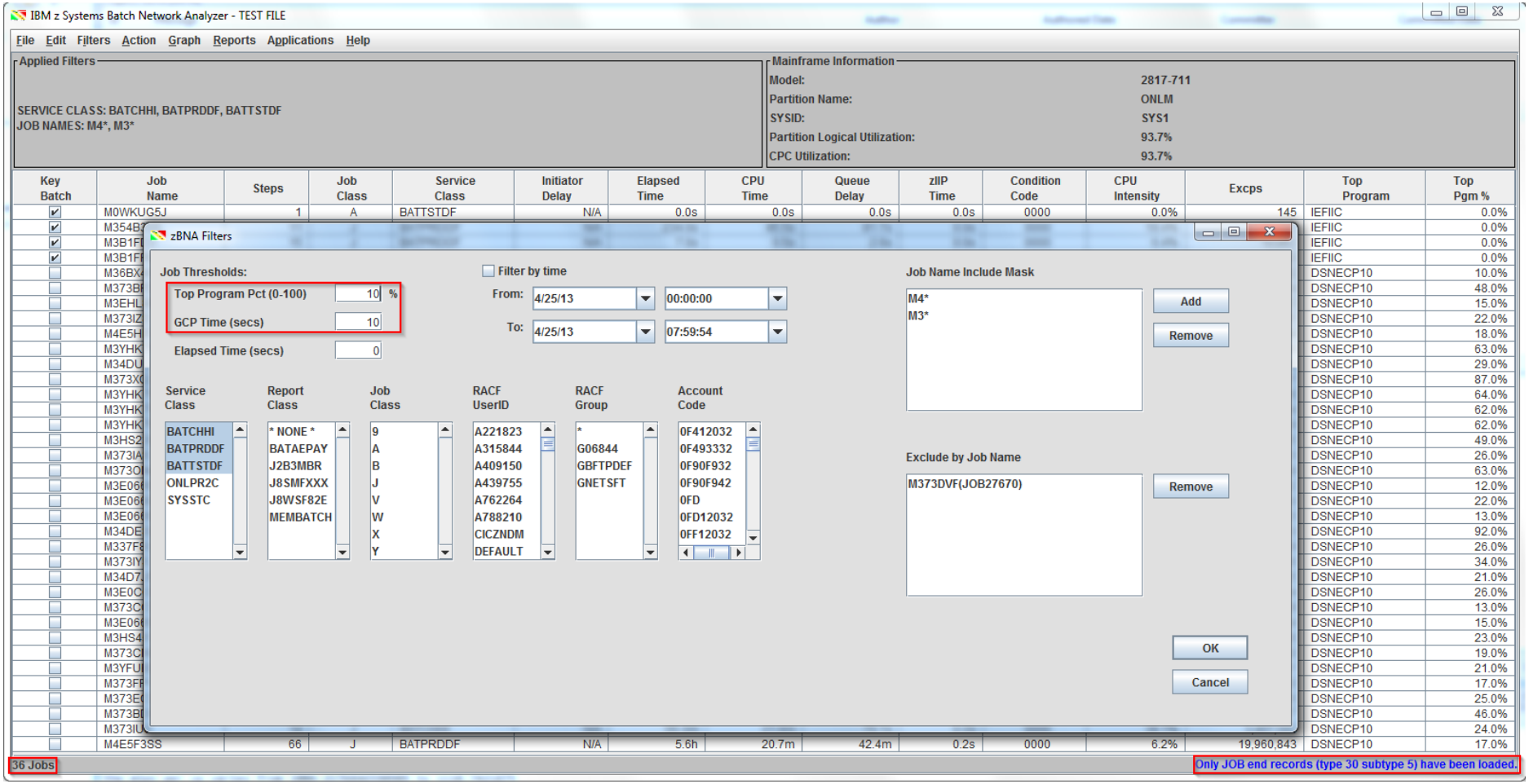
Model:	2817-711
Partition Name:	ONLM
SYSID:	SYS1
Partition Logical Utilization:	93.7%
CPC Utilization:	93.7%

Key Batch	Job Name	Steps	Job Class	Service Class	Initiator Delay	Elapsed Time	CPU Time	Queue Delay	zIIP Time	Condition Code	CPU Intensity	Excps	Top Program	Top Pgm %
	M373Q3S	7	J	BATPRDDF	N/A	12.6m	204.8s	263.8s	0.3s	0000	27.0%	193,926	IEFIIC	0.0%
	M3DQLSD	3	J	BATPRDDF	N/A	30.1m	26.5s	10.5m	0.0s	0000	1.5%	11,995	DSNECP10	3.0%
	M0VPI03V	2	Y	SYSSTC	N/A	0.0s	0.0s	0.0s	0.0s	0004	0.0%	9	IEFIIC	0.0%
	M0D3TSE5	3	J	BATPRDDF	N/A	2.0s	0.1s	0.7s	0.0s	0000	4.9%	824	IEFIIC	0.0%
	M3SK891A	10	J	BATPRDDF	N/A	2.0s	0.1s	1.0s	0.0s	0000	4.1%	800	IEFIIC	0.0%
	M4E5HQ3A	5	J	BATPRDDF	N/A	4.0s	0.4s	1.7s	0.0s	0000	7.6%	3,554	IEFIIC	0.0%
	DH03UXQ3	2	J	BATPRDDF	N/A	0.0s	0.0s	0.2s	0.0s	0000	0.0%	10	IEFIIC	0.0%
	M4E5HYPA	3	J	BATPRDDF	N/A	8.0s	0.2s	3.0s	0.0s	0000	1.9%	809	IEFIIC	0.0%
	M0VPI03V	2	J	SYSSTC	N/A	0.0s	0.0s	0.0s	0.0s	0004	0.0%	9	IEFIIC	0.0%
	DH03UXQ4	2	J	BATPRDDF	N/A	0.0s	0.0s	0.1s	0.0s	0000	0.0%	10	IEFIIC	0.0%
	M3DLWDSA	7	J	BATPRDDF	N/A	1.0s	0.1s	0.6s	0.0s	0000	8.1%	315	IEFIIC	0.0%
	M0FDW57	7	J	BATPRDDF	N/A	29.0s	1.6s	10.2s	0.0s	0000	5.5%	5,882	IEFIIC	0.0%
	M0D3FUL7	5	J	BATPRDDF	N/A	64.0s	2.8s	22.4s	0.0s	0000	4.4%	65,048	IEFIIC	0.0%
	M320MQ4	4	J	BATPRDDF	N/A	19.0s	4.4s	6.8s	0.1s	0000	22.6%	12,363	IEFIIC	0.0%
	M3E0ZAS	4	J	BATPRDDF	N/A	29.9m	34.3s	10.4m	0.0s	0000	1.9%	3,079	IEFIIC	0.0%
	M3577HS3	28	J	BATPRDDF	N/A	28.0s	1.6s	10.1s	0.0s	0000	5.7%	7,217	IEFIIC	0.0%
	M3577LS	4	J	BATPRDDF	N/A	4.0s	0.4s	1.5s	0.0s	0000	9.1%	2,611	IEFIIC	0.0%
	M320XT3	4	J	BATPRDDF	N/A	55.0s	1.2s	19.3s	0.0s	0000	2.1%	2,630	IEFIIC	0.0%
	Q823201A	6	A	BATTSTDF	N/A	0.0s	0.1s	0.0s	0.0s	0000	9.4%	274	IEFIIC	0.0%
	Q823201A	6	A	BATTSTDF	N/A	0.0s	0.1s	0.0s	0.0s	0000	0.0%	272	IEFIIC	0.0%
	M30DMDS	18	J	BATPRDDF	N/A	31.4m	28.1s	10.9m	0.0s	0000	1.5%	3,228,140	IEFIIC	0.0%
	M4FVHEG3	5	J	BATPRDDF	N/A	15.8m	56.8s	329.5s	0.0s	0000	6.0%	162,815	IEFIIC	0.0%
	M0WKUG5J	1	A	BATTSTDF	N/A	0.0s	0.0s	0.0s	0.0s	0000	0.0%	145	IEFIIC	0.0%
	M0WKUG5D	1	A	BATTSTDF	N/A	0.0s	0.1s	0.0s	0.0s	0000	0.0%	171	IEFIIC	0.0%
	Q823201A	6	A	BATTSTDF	N/A	0.0s	0.1s	0.0s	0.0s	0000	11.8%	233	IEFIIC	0.0%
	M4FVHFG	5	J	BATPRDDF	N/A	13.0s	0.3s	4.5s	0.0s	0000	2.7%	1,724	IEFIIC	0.0%
	M4E0YEDF	51	B	BATCHHI	N/A	169.0s	30.6s	2.5s	0.0s	0000	18.1%	62,829	IEFIIC	0.0%
	M354B3S5	11	J	BATPRDDF	N/A	234.0s	45.5s	81.7s	0.0s	0000	19.4%	77,722	IEFIIC	0.0%
	M3B1ER3	15	J	BATPRDDF	N/A	9.0s	0.5s	3.3s	0.0s	0000	[illegible]	[illegible]	IEFIIC	[illegible]

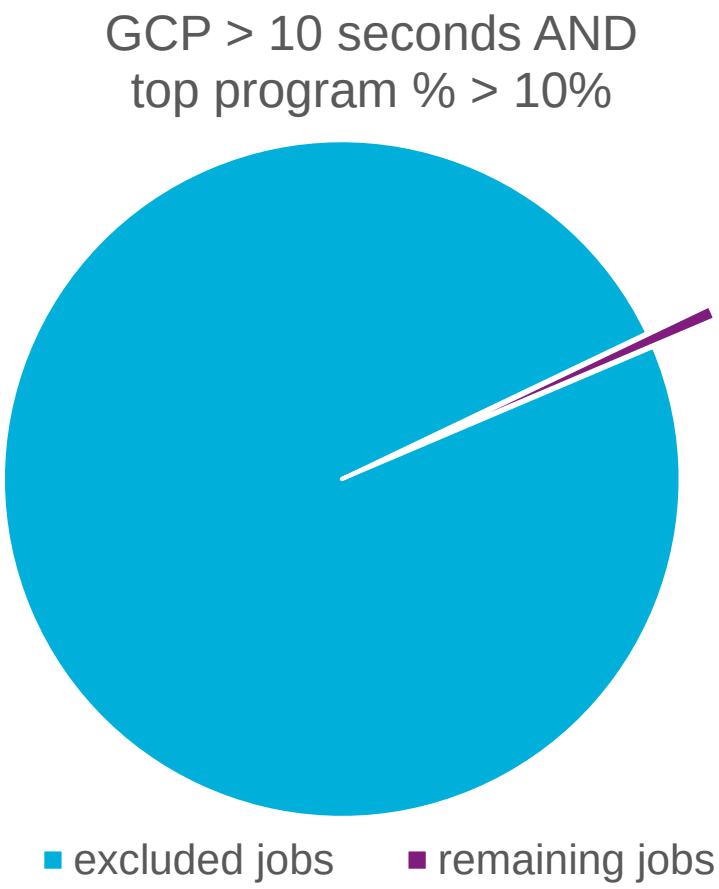
5147 Jobs

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

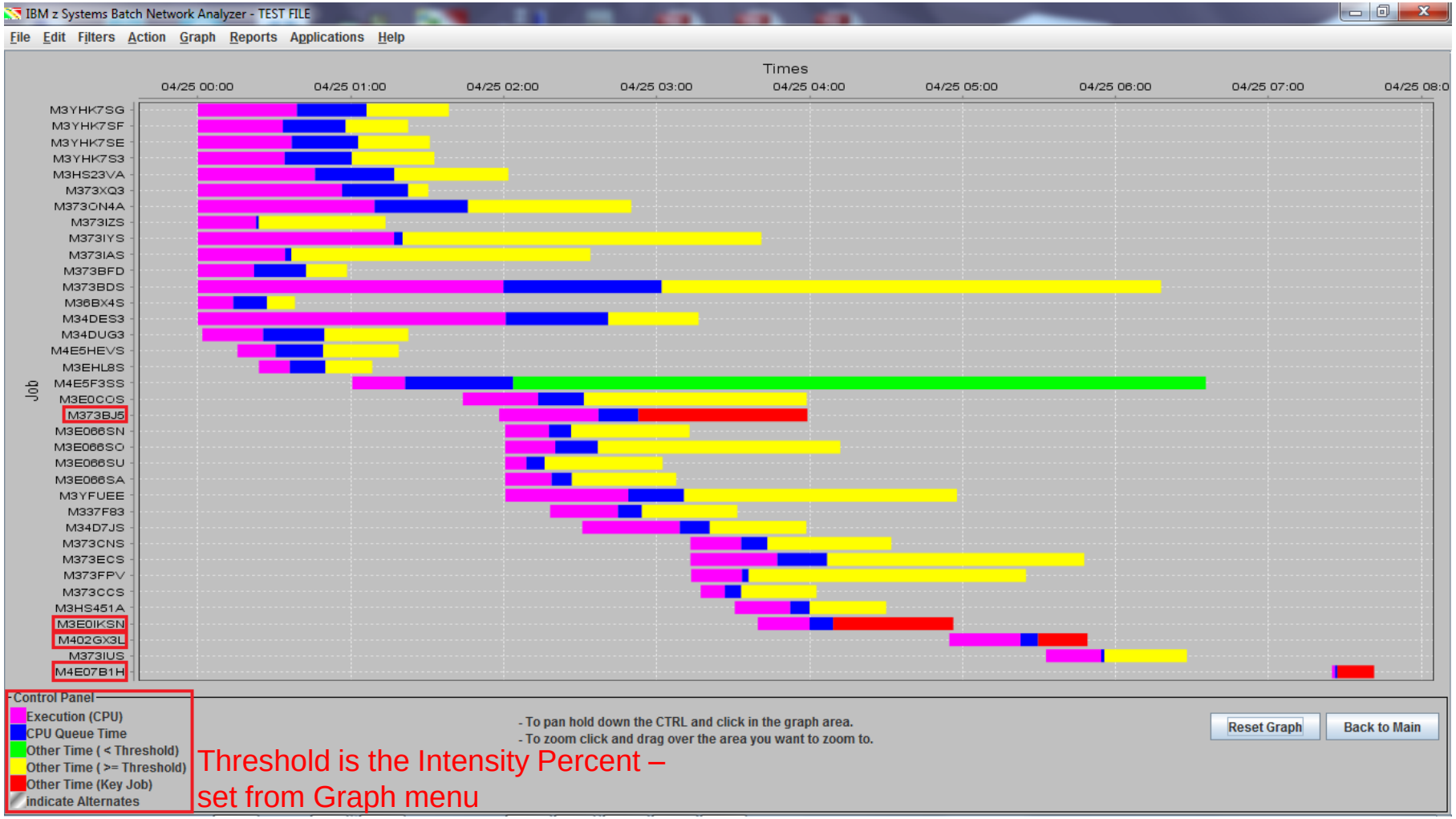
zBNA Filtering Capability



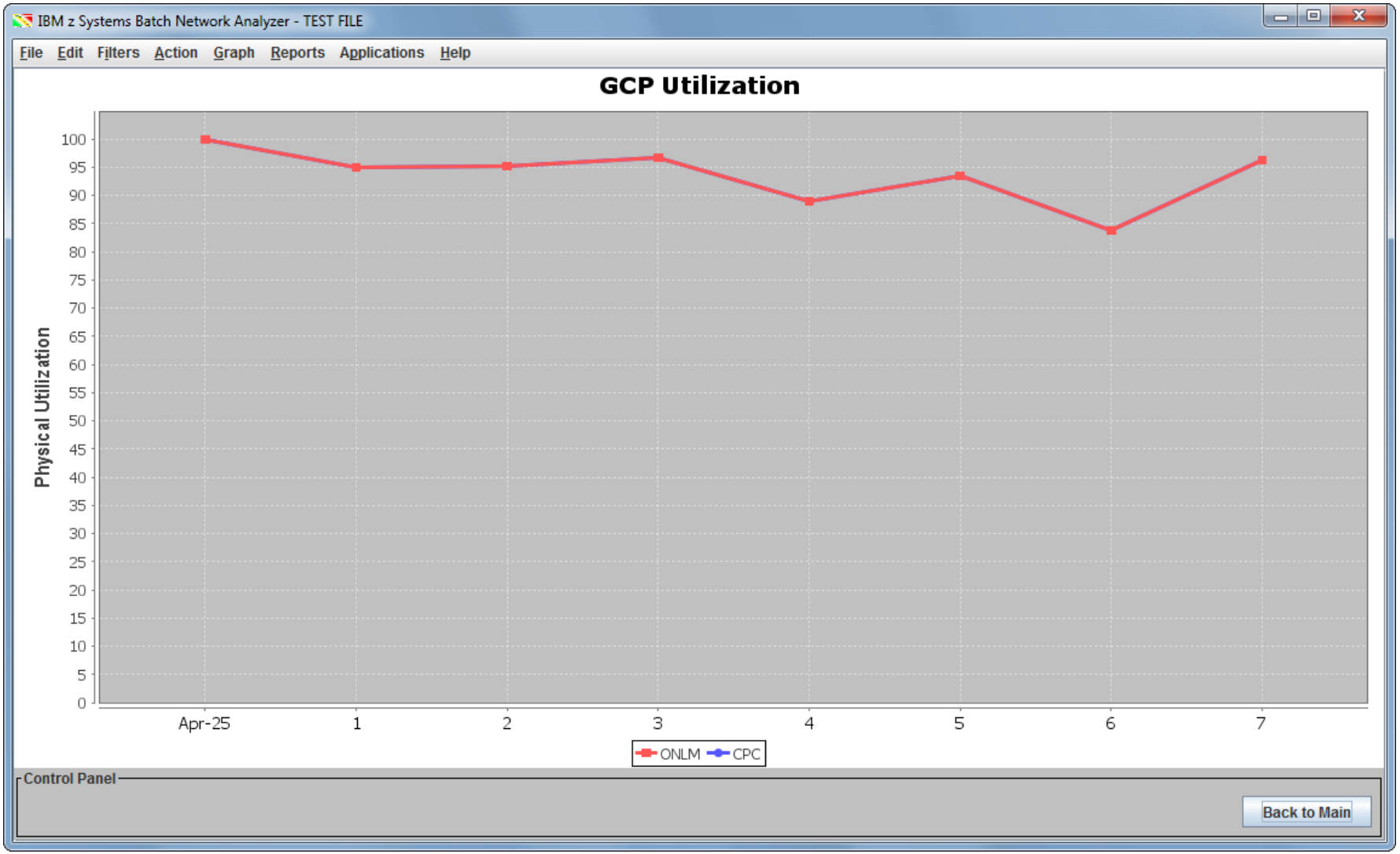
Filtering Rationale



Display Graph for Filtered Jobs



Utilization Graph



Job Details for Filtered Jobs – Elapsed Time Descending

IBM z Systems Batch Network Analyzer - TEST FILE

File Edit Filters Action Graph Reports Applications Help

Applied Filters

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

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	Service Class	Initiator Delay	Elapsed Time	CPU Time	Queue Delay	zIIP Time	Condition Code	CPU Intensity	Excps	Top Program	Top Pgm %
☐	M373BDS		J	BATPRDDF	N/A	6.3h	2.0h	1.0h	0.7s	0000	31.7%	18,169,677	DSNECP10	46.0%
☐	M4E5F3SS		J	BATPRDDF	N/A	5.6h	20.7m	42.4m	0.2s	0000	6.2%	19,960,843	DSNECP10	17.0%
☐	M373IYS		J	BATCHHI	N/A	3.7h	1.3h	202.6s	0.0s	0000	34.8%	144,846	DSNECP10	34.0%
☐	M34DES3		J	BATPRDDF	N/A	3.3h	2.0h	40.2m	0.0s	0000	61.5%	31,510	DSNECP10	92.0%
☐	M3YFUEE		J	BATPRDDF	N/A	3.0h	48.2m	21.9m	0.0s	0000	27.2%	441	DSNECP10	21.0%
☐	M373ON4A		J	BATPRDDF	N/A	2.8h	1.2h	36.6m	0.0s	0000	40.8%	56,388	DSNECP10	63.0%
☐	M373ECS	3	J	BATPRDDF	N/A	2.6h	34.1m	19.6m	0.0s	0000	22.1%	316	DSNECP10	25.0%
☐	M373IAS	3	J	BATCHHI	N/A	2.6h	34.2m	145.3s	0.0s	0000	22.2%	67,910	DSNECP10	26.0%
☐	M3E0COS	3	J	BATPRDDF	N/A	2.2h	29.6m	18.0m	0.0s	0000	21.9%	4,404	DSNECP10	26.0%
☐	M3E066SO	2	J	BATPRDDF	N/A	2.2h	19.6m	16.8m	0.0s	0004	14.9%	344	DSNECP10	15.0%
☐	M373FPV	9	J	BATCHHI	N/A	2.2h	20.0m	157.5s	0.0s	0000	15.2%	1,776,060	DSNECP10	17.0%
☐	M3HS23VA	3	J	BATPRDDF	N/A	2.0h	45.9m	31.1m	0.0s	0000	37.7%	21,905	DSNECP10	49.0%
☑	M373BJ5	11	J	BATPRDDF	N/A	2.0h	39.0m	15.7m	0.4s	0000	32.2%	14,821,030	SYNCSORT	9.0%
☐	M3YHK7SG	26	J	BATPRDDF	N/A	1.6h	38.9m	27.3m	0.0s	0000	39.5%	596,359	DSNECP10	62.0%
☐	M3YHK7S3	26	J	BATPRDDF	N/A	1.5h	34.0m	26.4m	0.0s	0000	36.7%	512,864	DSNECP10	62.0%
☐	M3YHK7SE	26	J	BATPRDDF	N/A	1.5h	36.8m	26.1m	0.0s	0000	40.5%	874,506	DSNECP10	64.0%
☐	M373XQ3	5	J	BATPRDDF	N/A	1.5h	56.6m	26.0m	0.0s	0000	62.5%	6,101	DSNECP10	87.0%
☐	M34D7JS	3	J	BATPRDDF	N/A	1.5h	38.2m	11.7m	0.0s	0000	43.5%	3,735,605	DSNECP10	21.0%
☐	M3YHK7SF	26	J	BATPRDDF	N/A	1.4h	33.3m	24.6m	0.0s	0000	40.4%	731,964	DSNECP10	63.0%
☐	M34DUG3	15	J	BATPRDDF	N/A	1.3h	23.9m	24.0m	0.0s	0000	29.5%	21,548	DSNECP10	29.0%
☐	M373CNS	5	J	BATPRDDF	N/A	1.3h	19.9m	10.3m	0.0s	0000	25.3%	392,740	DSNECP10	19.0%
☑	M3E0IKSN	4	J	BATPRDDF	N/A	1.3h	20.3m	553.2s	0.0s	0000	26.5%	1,976,574	DSNECP10	8.0%
☐	M373IZS	3	J	BATCHHI	N/A	1.2h	22.8m	68.7s	0.0s	0000	31.0%	43,231	DSNECP10	22.0%
☐	M337F83	5	J	BATPRDDF	N/A	1.2h	26.6m	559.6s	0.0s	0000	36.3%	2,434,989	DSNECP10	26.0%
☐	M3E066SN	2	J	BATPRDDF	N/A	1.2h	17.2m	520.7s	0.0s	0004	23.7%	320	DSNECP10	13.0%
☐	M3E066SA	2	J	BATPRDDF	N/A	1.1h	18.2m	475.9s	0.0s	0004	27.1%	340	DSNECP10	22.0%
☐	M4E5HEVS	7	J	BATPRDDF	N/A	1.1h	15.0m	18.6m	0.0s	0000	23.7%	6,954	DSNECP10	18.0%
☐	M3E066SU	2	J	BATPRDDF	N/A	1.0h	498.0s	430.0s	0.0s	0004	13.4%	342	DSNECP10	12.0%
☐	M3HS451A	9	J	BATPRDDF	N/A	59.4m	21.8m	453.8s	0.0s	0000	36.6%	121,786	DSNECP10	23.0%
☐	M373BFD	7	J	BATPRDDF	N/A	58.5m	22.1m	20.4m	0.0s	0000	37.7%	865,814	DSNECP10	48.0%
☐	M373IUS	14	J	BATCHHI	N/A	55.3m	21.6m	79.7s	0.2s	0000	39.1%	3,407,043	DSNECP10	24.0%
☑	M402GX3L	17	J	BATPRDDF	N/A	54.2m	27.9m	414.3s	0.0s	0000	51.5%	2,949,226	ENGEXE	4.0%
☐	M373CCS	15	J	BATPRDDF	N/A	45.5m	571.8s	385.1s	0.0s	0000	21.0%	510,039	DSNECP10	13.0%
☐	M3EHL8S	2	J	BATPRDDF	N/A	44.5m	12.2m	14.0m	0.0s	0000	27.3%	36,613	DSNECP10	15.0%

36 Jobs

Step Details for Job M373BDS

zBNA Job Details

File Action

Job Name: M373BDS
Job Number: JOB27655
Number of Steps: 21
Key Batch: No
Start Date: Apr 25, 2013
Start Time: 12:00:00 AM
End Date: Apr 25, 2013
End Time: 6:17:52 AM
Job Class: J
Service Class: BATPRDDF
Account Code: 37397332
Condition Code: 0000
Top Pgm %: 46%
Top Program: DSNECP10
Elapsed Time: 22672.7 Seconds
CPU Intensity: 31.7%
Rdr-Initiator Delay: N/A
Initiator Delay: 9.0s
Sys Aff Delay: N/A
Hold Delay: N/A
RACF Userid: J151DEF
RACF Group: *

Steps

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	Report Class	Elapsed Time	CPU Time	zAAP Time	zIIP Time	IIP CP Time	Init Time	CPU Delay	EXCP	CPU Intensity	Top Program	Top Pgm %
	4/25/13	00:00:00	4/25/13	06:17:52				21 Total	Job	J	37397332	BATPRDDF		6.3h	2.0h	0.0s	0.7s	0.0s	n/a	1.0h	18,169,677	31.7%	DSNECP10	46.0%
	4/24/13	23:47:50	4/25/13	02:31:53		S373BD3	LNMHIW23	3	Step	J		BATPRDDF		2.7h	40.1m	0.0s	0.0s	0.0s	n/a	34.6m	2,857,559	24.5%	DSNECP10	29.0%
	4/25/13	03:13:13	4/25/13	04:51:07				13	Step	J		BATPRDDF		1.6h	47.3m	0.0s	0.0s	0.0s	n/a	12.4m	743,926	48.3%	DSNECP10	31.0%
	4/25/13	05:08:59	4/25/13	06:12:10				19	Step	J		BATPRDDF		1.1h	34.8m	0.0s	0.0s	0.0s	n/a	446.6s	1,487,759	55.1%	DSNECP10	46.0%
	4/25/13	03:02:35	4/25/13	03:10:51		EDFNXS8	LHEJHQHU	11	Step	J		BATPRDDF		495.0s	15.1s	0.0s	0.0s	0.0s	n/a	70.9s	1,263,027	3.0%	IEFIIC	0.0%
	4/25/13	02:39:29	4/25/13	02:47:18		EDFNXS4	LHEJHQHU	5	Step	J		BATPRDDF		469.0s	8.2s	0.0s	0.0s	0.0s	n/a	54.0s	2,695,024	1.7%	IEFIIC	0.0%
	4/25/13	04:58:26	4/25/13	05:06:15		EFNXS32	LHEJHQHU	17	Step	J		BATPRDDF		469.0s	6.5s	0.0s	0.0s	0.0s	n/a	59.0s	1,232,235	1.4%	IEFIIC	0.0%
	4/25/13	02:31:53	4/25/13	02:39:29		EDFNXS3	LHEJHQHU	4	Step	J		BATPRDDF		455.0s	13.8s	0.0s	0.0s	0.0s	n/a	52.4s	1,263,029	3.0%	IEFIIC	0.0%
	4/25/13	02:55:25	4/25/13	03:02:35		S373BD4	LNMHIW23	10	Step	J		BATPRDDF		430.0s	12.1s	0.0s	0.0s	0.0s	n/a	53.8s	1,375,561	2.8%	IEFIIC	0.0%
	4/25/13	06:12:10	4/25/13	06:17:52		EFNXS33	LHEJHQHU	20	Step	J		BATPRDDF		341.0s	7.3s	0.0s	0.0s	0.0s	n/a	24.3s	2,131,726	2.1%	IEFIIC	0.0%
	4/25/13	04:51:15	4/25/13	04:54:59		EDFNXS0	LHEJHQHU	15	Step	J		BATPRDDF		223.0s	3.8s	0.0s	0.0s	0.0s	n/a	25.0s	672,945	1.7%	IEFIIC	0.0%
	4/25/13	04:54:59	4/25/13	04:58:26		EDFNXS1	LHEJHQHU	16	Step	J		BATPRDDF		207.0s	3.3s	0.0s	0.0s	0.0s	n/a	23.2s	657,977	1.6%	IEFIIC	0.0%
	4/25/13	02:47:18	4/25/13	02:50:28		EDFNXS5	LHEJHQHU	6	Step	J		BATPRDDF		189.0s	3.7s	0.0s	0.0s	0.0s	n/a	21.8s	1,069,746	1.9%	IEFIIC	0.0%
	4/25/13	05:06:15	4/25/13	05:08:59		VRUW23	VBQFVRUW	18	Step	J		BATPRDDF		163.0s	5.2s	0.0s	0.1s	0.0s	n/a	21.1s	4,221	3.2%	IEFIIC	0.0%
	4/25/13	02:52:45	4/25/13	02:55:25		VRUWBD3	VBQFVRUW	9	Step	J		BATPRDDF		160.0s	4.1s	0.0s	0.3s	0.0s	n/a	18.4s	3,967	2.6%	IEFIIC	0.0%
	4/25/13	03:10:51	4/25/13	03:13:13		VRUWBD5	VBQFVRUW	12	Step	J		BATPRDDF		142.0s	5.0s	0.0s	0.3s	0.0s	n/a	20.4s	4,216	3.5%	IEFIIC	0.0%
	4/25/13	02:51:11	4/25/13	02:52:45		EDFNXS7	LHEJHQHU	8	Step	J		BATPRDDF		93.0s	1.7s	0.0s	0.0s	0.0s	n/a	10.8s	455,276	1.8%	IEFIIC	0.0%
	4/25/13	02:50:28	4/25/13	02:51:11		EDFNXS6	LHEJHQHU	7	Step	J		BATPRDDF		42.0s	0.8s	0.0s	0.0s	0.0s	n/a	4.9s	228,224	1.8%	IEFIIC	0.0%
	4/25/13	04:51:07	4/25/13	04:51:15		EDFNXS9	LHEJHQHU	14	Step	J		BATPRDDF		7.0s	0.1s	0.0s	0.0s	0.0s	n/a	0.9s	22,927	1.8%	IEFIIC	0.0%
	4/25/13	06:17:52	4/25/13	06:17:52		DEHQG	S373DEQG	21	Step	J		BATPRDDF		0.0s	0.0s	0.0s	0.0s	0.0s	n/a	0.0s	0	0.0%	IEFIIC	0.0%

Get the Life of this Program

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Life of a Program

zBNA: Life of a Program

File Edit Action

Program Details:

Program: LNMHIW23

Number of Job Steps: 31

Key Batch	Job Name	Start Date	Start Time	End Date	End Time	Proc Step	Step Name	Program Name	Step Number	Sub Type	Job Class	Acct Code	Service Class	Report Class	Elapsed Time	CPU Time	zAAP Time	zIIP Time	IIP CP Time	Init Time	CPU Delay	EXCP	CPU Intensity	Top Program	Top Pgm %
☐	M0WKUG5J	4/25/13	00:31:31	4/25/13	00:31:31		WHPSGE	LNMHIW23	1	Step	A		BATTSTDF		0.0s	0.0s	0.0s	0.0s	0.0s	n/a	0.0s	145	0.0%	IEFIIC	0.0%
☐	M373BFD	4/24/13	21:17:29	4/25/13	00:42:17		S373BF4	LNMHIW23	4	Step	J		BATPRDDF		3.4h	1.4h	0.0s	0.0s	0.0s	n/a	14.7m	377,688	40.0%	DSNECP10	48.0%
☐	M373IZS	4/24/13	22:56:46	4/25/13	01:13:37		S373GU3	LNMHIW23	3	Step	J		BATCHHI		2.3h	42.4m	0.0s	0.0s	0.0s	n/a	68.7s	43,080	31.0%	DSNECP10	22.0%
☐	M34DUG3	4/25/13	01:22:30	4/25/13	01:22:31		VWHS233	LNMHIW23	10	Step	J		BATPRDDF		0.0s	0.1s	0.0s	0.0s	0.0s	n/a	0.1s	247	9.5%	IEFIIC	0.0%
☐	M373XQ3	4/24/13	04:11:11	4/25/13	01:30:25		S373XQ5	LNMHIW23	4	Step	J		BATPRDDF		21.3h	13.3h	0.0s	0.0s	0.0s	n/a	26.0m	5,762	62.6%	DSNECP10	87.0%
☐	M373IAS	4/24/13	22:56:46	4/25/13	02:33:59		S373GU3	LNMHIW23	3	Step	J		BATCHHI		3.6h	48.3m	0.0s	0.0s	0.0s	n/a	145.3s	67,754	22.2%	DSNECP10	26.0%
☐	M373ON4A	4/23/13	22:49:08	4/25/13	02:49:59		S373ON4	LNMHIW23	3	Step	J		BATPRDDF		28.0h	11.4h	0.0s	0.0s	0.0s	n/a	36.6m	56,252	40.8%	DSNECP10	63.0%
☐	M3E066SU	4/25/13	02:00:34	4/25/13	03:02:19		GVQWLDXO	LNMHIW23	2	Step	J		BATPRDDF		1.0h	497.9s	0.0s	0.0s	0.0s	n/a	430.0s	342	13.4%	DSNECP10	12.0%
☐	M3E066SA	4/25/13	02:00:34	4/25/13	03:07:40		GVQWLDXO	LNMHIW23	2	Step	J		BATPRDDF		1.1h	18.2m	0.0s	0.0s	0.0s	n/a	475.8s	340	27.1%	DSNECP10	22.0%
☐	M3E066SN	4/25/13	02:00:34	4/25/13	03:12:54		GVQWLDXO	LNMHIW23	2	Step	J		BATPRDDF		1.2h	17.2m	0.0s	0.0s	0.0s	n/a	520.7s	320	23.7%	DSNECP10	13.0%
☐	M373IYS	4/24/13	22:56:46	4/25/13	03:41:04		S373GU3	LNMHIW23	3	Step	J		BATCHHI		4.7h	1.6h	0.0s	0.0s	0.0s	n/a	202.6s	144,659	34.8%	DSNECP10	34.0%
☐	M3E0COS	4/25/13	01:43:54	4/25/13	03:58:49		S3E0COD	LNMHIW23	2	Step	J		BATPRDDF		2.2h	29.6m	0.0s	0.0s	0.0s	n/a	18.0m	4,012	21.9%	DSNECP10	26.0%
☐	M373CCS	4/25/13	03:17:15	4/25/13	03:59:34		S373CC3	LNMHIW23	3	Step	J		BATPRDDF		42.3m	552.6s	0.0s	0.0s	0.0s	n/a	363.1s	300,998	21.8%	DSNECP10	13.0%
☐	M373CCS	4/25/13	03:59:45	4/25/13	03:59:46		S373CC5	LNMHIW23	9	Step	J		BATPRDDF		0.0s	0.1s	0.0s	0.0s	0.0s	n/a	0.1s	861	9.1%	IEFIIC	0.0%
☐	M3E066SO	4/25/13	02:00:34	4/25/13	04:12:00		GVQWLDXO	LNMHIW23	2	Step	J		BATPRDDF		2.2h	19.6m	0.0s	0.0s	0.0s	n/a	16.8m	344	14.9%	DSNECP10	15.0%
☐	M373CNS	4/25/13	03:13:14	4/25/13	04:30:59		S373CN3	LNMHIW23	3	Step	J		BATPRDDF		1.3h	19.9m	0.0s	0.0s	0.0s	n/a	10.2m	171,085	25.6%	DSNECP10	19.0%
☐	M373FPV	4/25/13	03:13:31	4/25/13	03:15:15		S373FP22	LNMHIW23	3	Step	J		BATCHHI		103.0s	2.2s	0.0s	0.0s	0.0s	n/a	1.6s	1,049	2.1%	IEFIIC	0.0%
☐	M373FPV	4/25/13	03:15:15	4/25/13	03:15:54		S373FPV3	LNMHIW23	4	Step	J		BATCHHI		38.0s	1.0s	0.0s	0.0s	0.0s	n/a	0.6s	2,230	2.6%	IEFIIC	0.0%
☐	M373FPV	4/25/13	03:15:54	4/25/13	05:07:51		S373FPV4	LNMHIW23	5	Step	J		BATCHHI		1.9h	19.1m	0.0s	0.0s	0.0s	n/a	132.9s	575,155	17.1%	DSNECP10	17.0%
☐	M373ECS	4/25/13	03:13:13	4/25/13	05:47:43		S373EC32	LNMHIW23	2	Step	J		BATPRDDF		2.6h	34.1m	0.0s	0.0s	0.0s	n/a	19.6m	316	22.1%	DSNECP10	25.0%
☐	M373BDS	4/24/13	23:47:50	4/25/13	02:31:53		S373BD3	LNMHIW23	3	Step	J		BATPRDDF		2.7h	40.1m	0.0s	0.0s	0.0s	n/a	34.6m	2,857,559	24.5%	DSNECP10	29.0%
☐	M373BDS	4/25/13	02:55:25	4/25/13	03:02:35		S373BD4	LNMHIW23	10	Step	J		BATPRDDF		430.0s	12.1s	0.0s	0.0s	0.0s	n/a	53.8s	1,375,561	2.8%	IEFIIC	0.0%
☐	M373BDS	4/25/13	03:13:13	4/25/13	04:51:07		S373BD5	LNMHIW23	13	Step	J		BATPRDDF		1.6h	47.3m	0.0s	0.0s	0.0s	n/a	12.4m	743,926	48.3%	DSNECP10	31.0%
☐	M373BDS	4/25/13	05:08:59	4/25/13	06:12:10		S373BD6	LNMHIW23	19	Step	J		BATPRDDF		1.1h	34.8m	0.0s	0.0s	0.0s	n/a	446.6s	1,487,759	55.1%	DSNECP10	46.0%
☐	M373IUS	4/25/13	05:33:43	4/25/13	06:11:42		S373GU4B	LNMHIW23	9	Step	J		BATCHHI		38.0m	20.4m	0.0s	0.0s	0.0s	n/a	52.9s	1,330,035	53.7%	DSNECP10	24.0%
☐	M4E5F3SS	4/25/13	01:00:37	4/25/13	01:34:27		P4E5PF41	LNMHIW23	5	Step	J		BATPRDDF	J2B3MBR	33.8m	15.7s	0.0s	0.0s	0.0s	n/a	338.9s	1,099	0.8%	IEFIIC	0.0%
☐	M4E5F3SS	4/25/13	01:34:28	4/25/13	01:40:49		P4E5PF23	LNMHIW23	7	Step	J		BATPRDDF	J2B3MBR	381.0s	6.2s	0.0s	0.0s	0.0s	n/a	63.8s	17,666	1.6%	IEFIIC	0.0%
☐	M4E5F3SS	4/25/13	01:59:49	4/25/13	01:59:54		P4E5PF29	LNMHIW23	36	Step	J		BATPRDDF	J2B3MBR	4.0s	0.1s	0.0s	0.0s	0.0s	n/a	0.8s	2,294	3.1%	IEFIIC	0.0%
☐	M4E5F3SS	4/25/13	01:59:54	4/25/13	02:00:02		P4E5PF20	LNMHIW23	37	Step	J		BATPRDDF	J2B3MBR	8.0s	0.2s	0.0s	0.0s	0.0s	n/a	1.2s	4,774	2.6%	IEFIIC	0.0%
☐	M4E5F3SS	4/25/13	02:00:07	4/25/13	02:06:24		P4E5PF5E	LNMHIW23	44	Step	J		BATPRDDF	J2B3MBR	377.0s	14.6s	0.0s	0.0s	0.0s	n/a	43.4s	951,178	3.9%	IEFIIC	0.0%
☐	M4E5F3SS	4/25/13	02:06:24	4/25/13	04:19:29		P4E5PF32	LNMHIW23	45	Step	J		BATPRDDF	J2B3MBR	2.2h	99.3s	0.0s	0.0s	0.0s	n/a	16.9m	907,623	1.2%	DSNECP10	1.0%

OK

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

IBM z Systems Batch Network Analyzer - TEST FILE

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Applied Filters

SERVICE CLASS: BATCHHI
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	Service Class	Initiator Delay	Elapsed Time	CPU Time	Queue Delay	zIIP Time	Condition Code	CPU Intensity	Excps	Top Program	Top Pgm %
☐	M4E07EMH	99	B	BATCHHI	N/A	129.0s	10.8s	2.3s	0.0s	0000	8.4%	90,392	IEFIIC	0.0%
☐	M4E07WWH	126	B	BATCHHI	N/A	120.0s	11.6s	2.2s	0.0s	0000	9.7%	124,052	IEFIIC	0.0%
☐	M4E07HZH	128	B	BATCHHI	N/A	27.8m	114.5s	21.7s	0.1s	0000	6.9%	3,499,688	IEFIIC	0.0%
☐	M4E07HZF	51	B	BATCHHI	N/A	107.0s	22.7s	1.4s	0.0s	0000	21.1%	23,613	IEFIIC	0.0%
☐	M4E07N7H	212	B	BATCHHI	N/A	179.0s	19.7s	2.7s	0.0s	0000	11.0%	186,397	IEFIIC	0.0%
☐	M4E07HBH	212	B	BATCHHI	N/A	143.0s	13.8s	2.2s	0.0s	0000	9.6%	79,513	IEFIIC	0.0%
☐	M4E072HH	171	B	BATCHHI	N/A	129.0s	13.5s	1.9s	0.0s	0000	10.5%	106,668	IEFIIC	0.0%
☐	M4E07LHH	124	B	BATCHHI	N/A	248.0s	20.1s	5.7s	0.0s	0000	8.1%	438,290	IEFIIC	0.0%
☐	M4E070TH	212	B	BATCHHI	N/A	271.0s	16.2s	6.2s	0.0s	0000	6.0%	76,878	IEFIIC	0.0%
☐	M4E07AIH	90	B	BATCHHI	N/A	134.0s	10.3s	3.1s	0.0s	0000	7.6%	130,425	IEFIIC	0.0%
☐	M4E072GH	212	B	BATCHHI	N/A	18.1m	90.5s	24.9s	0.1s	0000	8.3%	1,182,800	IEFIIC	0.0%
☐	M4E07APH	131	B	BATCHHI	N/A	26.3m	121.9s	35.2s	0.0s	0000	7.7%	4,479,181	IEFIIC	0.0%
☐	M4E07HRH	126	B	BATCHHI	N/A	107.0s	11.4s	2.8s	0.0s	0000	10.6%	123,460	IEFIIC	0.0%
☐	M4E07HCH	126	B	BATCHHI	N/A	119.0s	12.2s	3.1s	0.0s	0000	10.2%	164,071	IEFIIC	0.0%
☐	M4E0768H	90	B	BATCHHI	N/A	114.0s	10.3s	6.2s	0.0s	0000	8.9%	120,118	IEFIIC	0.0%
☐	M4E0799H	130	B	BATCHHI	N/A	129.0s	13.5s	7.0s	0.0s	0000	10.4%	180,207	IEFIIC	0.0%
☐	M4E07B0H	132	B	BATCHHI	N/A	484.0s	36.3s	26.2s	0.1s	0000	7.5%	972,318	IEFIIC	0.0%
☐	M4E07B1H	132	B	BATCHHI	N/A	16.5m	71.9s	53.6s	0.1s	0000	7.2%	3,028,474	IEFIIC	0.0%
☐	M4E07I5H		B	BATCHHI	N/A	112.0s	10.0s	6.1s	0.0s	0000	8.9%	72,482	IEFIIC	0.0%

Show Step Details
Exclude Data
Toggle Key Batch
Job Dataset Report

19 Jobs

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	Disconn 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	
S4E018A4	66	Y325.L576.WPV	25.0s	249682	0.1	0.0	0.0	0.0	
S4E03FQG	44	I4E0SEY.M4E07B1S.HAW2KLS.CDWD	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

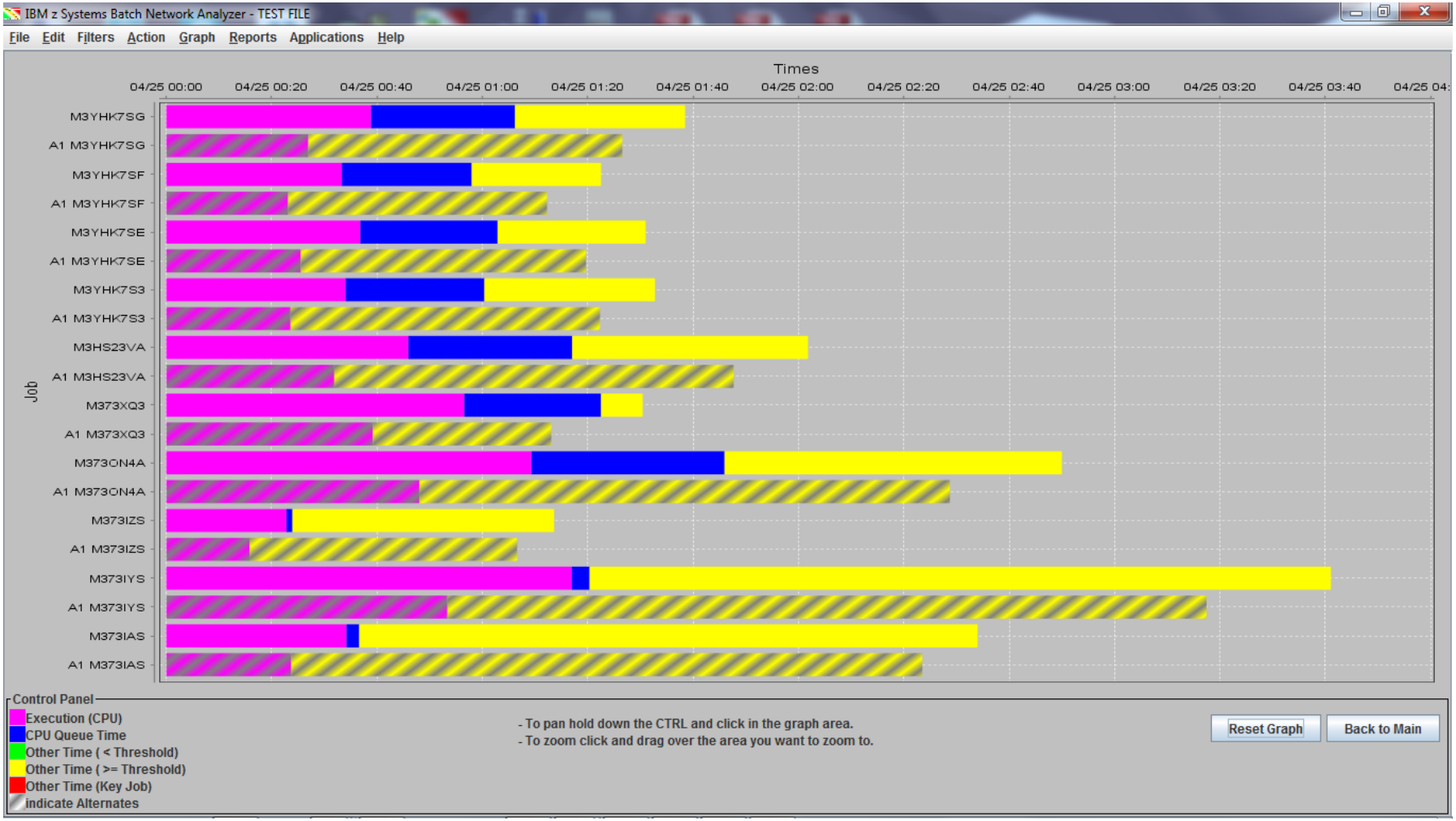
Job	Step	Step Number	Job Number	Step End	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time
M4E07B1H	S4E5N27D	88	JOB21576	04/25/2013 07:31:53	0.1s	130	1.1	0.0	0.0	1.0	0.0
M4E07B1H	S4E5N227	92	JOB21576	04/25/2013 07:41:01	188.0s	1,879,622	0.1	0.0	0.0	0.0	0.0

Block Size	Read Percent	Compressed	Type	Extended
512	6	No	KSDS index	No
512	100	No	KSDS index	No

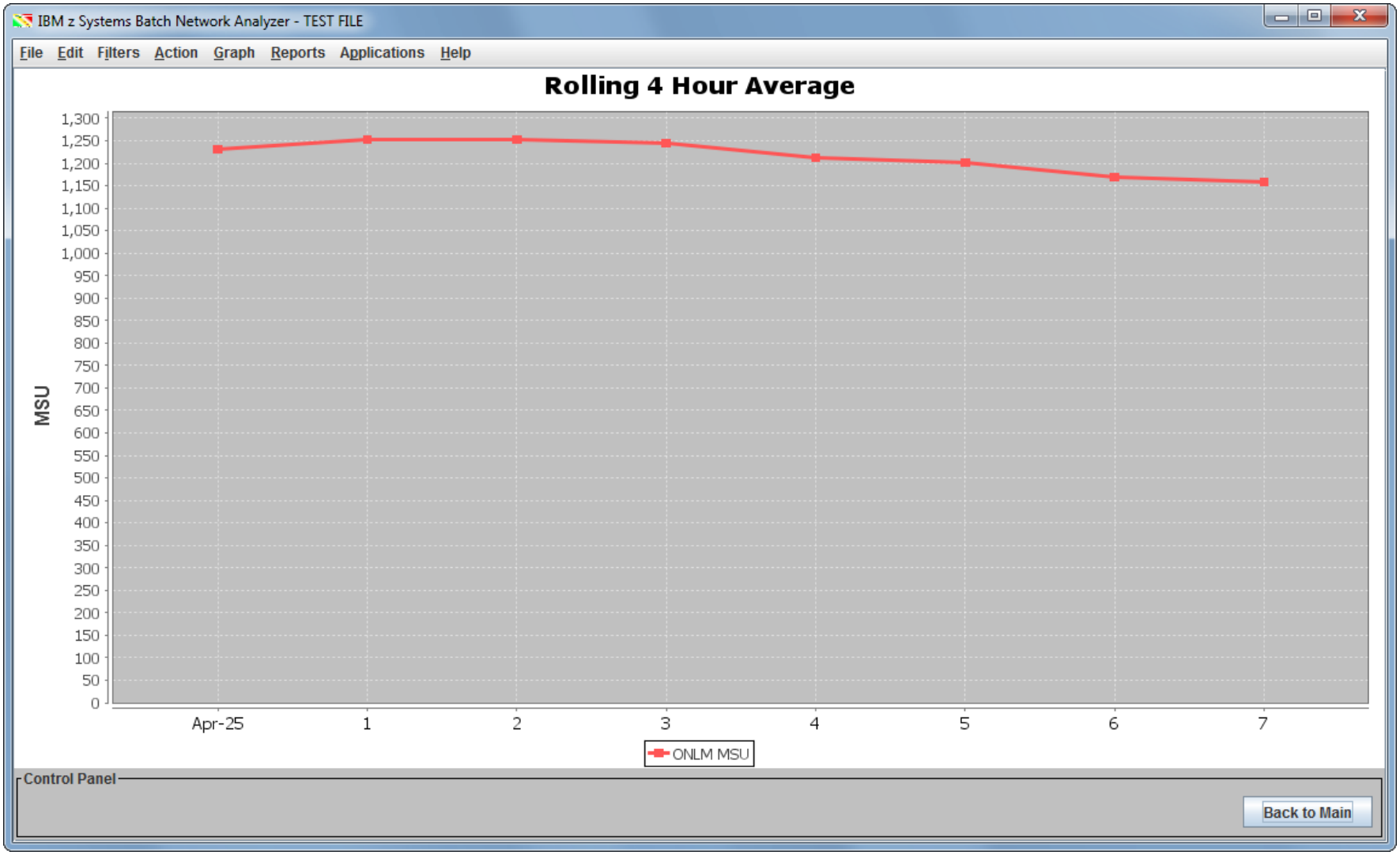
Investigate SMF 64s and consider increasing LSR / NSR buffers to hold Index Set and potentially eliminate ~3 Minutes of I/O time

OK

Alternate Processor Analysis – z196-711 to z13-708



Rolling 4-hr Average Graph



SMF 42.6 DASD Data Set Information

Top Data Sets Report

IBM z Systems Batch Network Analyzer - TEST FILE

File Edit Filters Action Graph Reports Applications Help

Top Datasets
zEDC: Compression

Applied Filters

SERVICE CLASS: BATCHHI
JOB NAMES: M4E07*

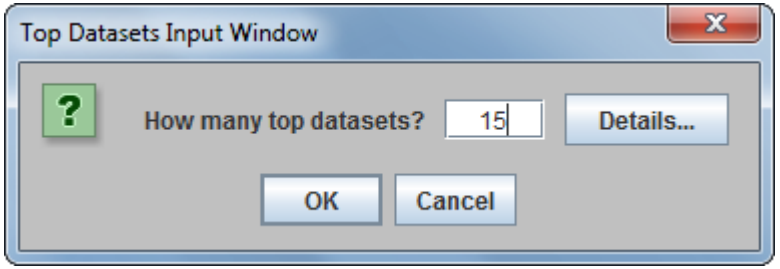
Mainframe Information

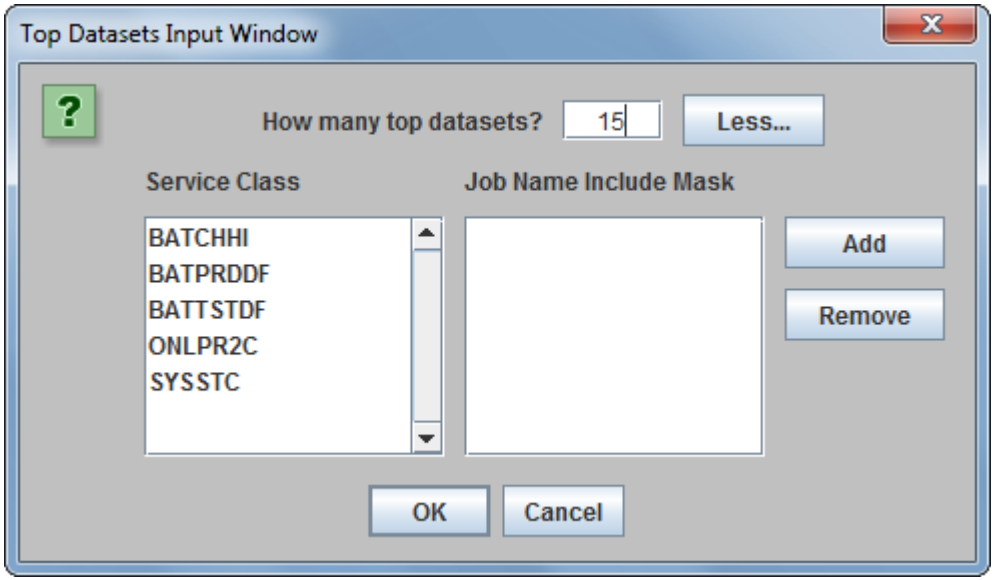
Model:	2817-711
Partition Name:	ONLM
SYSID:	SYS1
Partition Logical Utilization:	93.7%
CPC Utilization:	93.7%

Key Batch	Job Name	Steps	Job Class	Service Class	Initiator Delay	Elapsed Time	CPU Time	Queue Delay	zIIP Time	Condition Code	CPU Intensity	Excps	Top Program	Top Pgm %
	M4E07EMH	99	B	BATCHHI	N/A	129.0s	10.8s	2.3s	0.0s	0000	8.4%	90,392	IEFIIC	0.0%
	M4E07WWH	126	B	BATCHHI	N/A	120.0s	11.6s	2.2s	0.0s	0000	9.7%	124,052	IEFIIC	0.0%
	M4E07HZH	128	B	BATCHHI	N/A	27.8m	114.5s	21.7s	0.1s	0000	6.9%	3,499,688	IEFIIC	0.0%
	M4E07HZF	51	B	BATCHHI	N/A	107.0s	22.7s	1.4s	0.0s	0000	21.1%	23,613	IEFIIC	0.0%
	M4E07N7H	212	B	BATCHHI	N/A	179.0s	19.7s	2.7s	0.0s	0000	11.0%	186,397	IEFIIC	0.0%
	M4E07HBH	212	B	BATCHHI	N/A	143.0s	13.8s	2.2s	0.0s	0000	9.6%	79,513	IEFIIC	0.0%
	M4E072HH	171	B	BATCHHI	N/A	129.0s	13.5s	1.9s	0.0s	0000	10.5%	106,668	IEFIIC	0.0%
	M4E07LHH	124	B	BATCHHI	N/A	248.0s	20.1s	5.7s	0.0s	0000	8.1%	438,290	IEFIIC	0.0%
	M4E070TH	212	B	BATCHHI	N/A	271.0s	16.2s	6.2s	0.0s	0000	6.0%	76,878	IEFIIC	0.0%
	M4E07AIH	90	B	BATCHHI	N/A	134.0s	10.3s	3.1s	0.0s	0000	7.6%	130,425	IEFIIC	0.0%
	M4E072GH	212	B	BATCHHI	N/A	18.1m	90.5s	24.9s	0.1s	0000	8.3%	1,182,800	IEFIIC	0.0%
	M4E07APH	131	B	BATCHHI	N/A	26.3m	121.9s	35.2s	0.0s	0000	7.7%	4,479,181	IEFIIC	0.0%
	M4E07HRH	126	B	BATCHHI	N/A	107.0s	11.4s	2.8s	0.0s	0000	10.6%	123,460	IEFIIC	0.0%
	M4E07HCH	126	B	BATCHHI	N/A	119.0s	12.2s	3.1s	0.0s	0000	10.2%	164,071	IEFIIC	0.0%
	M4E0768H	90	B	BATCHHI	N/A	114.0s	10.3s	6.2s	0.0s	0000	8.9%	120,118	IEFIIC	0.0%
	M4E0799H	130	B	BATCHHI	N/A	129.0s	13.5s	7.0s	0.0s	0000	10.4%	180,207	IEFIIC	0.0%
	M4E07B0H	132	B	BATCHHI	N/A	484.0s	36.3s	26.2s	0.1s	0000	7.5%	972,318	IEFIIC	0.0%
	M4E07B1H	132	B	BATCHHI	N/A	16.5m	71.9s	53.6s	0.1s	0000	7.2%	3,028,474	IEFIIC	0.0%
	M4E07I5H	90	B	BATCHHI	N/A	112.0s	10.0s	6.1s	0.0s	0000	8.9%	72,482	IEFIIC	0.0%

19 Jobs

“Top 15” Data Sets Report





“Top 15” Data Sets Report

zBNA: Top 15 Data Sets by Total I/O Time

File Edit Action

Service Class	Job Name	Dataset Name	Total IOTime	IO Count	Response Time	Queue Time	Pending Time	Connect Time	Disconnect Time	Block Size	Compressed	Type	Extended
ALL	ALL	I3DLSR.GVQGEG.GOGPS2E2.A3532223.M2223.D223	1.8h	10,542,807	0.6ms	0.0ms	0.1ms	0.3ms	0.0ms	4,096	No	Linear	Yes
ALL	ALL	Y401SR.F7WQSURG.SODQ.DPFA.LQGHA	1.2h	43,109,680	0.1ms	0.0ms	0.0ms	0.0ms	0.0ms	2,048	Yes	KSDS index	Yes
ALL	ALL	Y0PTSR.PTS6.ORJFRSB3.GV25.GDWD	1.1h	3,198,420	1.2ms	0.0ms	0.0ms	1.1ms	0.0ms	4,096	No	Linear	No
ALL	ALL	Y0PTSR.PTS6.ORJFRSB4.GV25.GDWD	59.7m	3,158,817	1.1ms	0.0ms	0.0ms	1.0ms	0.0ms	4,096	No	Linear	No
ALL	ALL	VBV3.VFHHUXQ	57.3m	2,163,487	1.6ms	0.0ms	0.0ms	1.3ms	0.0ms	32,760	No	PDS	No
ALL	ALL	I3YFSR0J.GVQGEG.GWYYS222.AWYYJ2D6.L2223.D223	53.9m	7,631,715	2.3ms	0.0ms	0.0ms	0.2ms	1.8ms	4,096	No	Linear	Yes
ALL	ALL	I373SR5J.GVQGEG.GVS3S222.US3A223.L2223.D223	45.2m	3,745,583	0.8ms	0.0ms	0.0ms	0.0ms	0.5ms	4,096	No	Linear	Yes
ALL	ALL	I4E5SR.GVQGEG.GPH4S222.UPH4H22.L2223.D223	44.2m	2,568,297	1.1ms	0.0ms	0.1ms	0.7ms	0.2ms	4,096	No	Linear	Yes
ALL	ALL	I4E5SR.GVQGEG.GPH5S222.APH5H245.M2223.D228	43.9m	736,290	3.7ms	0.0ms	0.0ms	0.0ms	3.5ms	4,096	No	Linear	Yes
ALL	ALL	Y401SR.F7WQSOQW.SODQ.GDWD	36.7m	752,166	2.9ms	0.0ms	0.0ms	2.7ms	0.0ms	8,192	Yes	KSDS data	Yes
ALL	ALL	I373SR5J.GVQGEG.GVS3S222.US3A223.L2223.D226	35.3m	6,579,270	0.4ms	0.0ms	0.0ms	0.0ms	0.1ms	4,096	No	Linear	Yes
ALL	ALL	I3YFSR5J.GVQGEG.GDW4S222.UDW4C22.L2223.D223	34.5m	2,816,155	0.8ms	0.0ms	0.0ms	0.6ms	0.0ms	4,096	No	Linear	Yes
ALL	ALL	I329SR.F7WQSURG.SODQ.GDWD	33.8m	717,814	2.8ms	0.0ms	0.0ms	2.6ms	0.0ms	8,192	Yes	KSDS data	Yes
ALL	ALL	I355.QT.DD33.B	33.6m	385,472	5.1ms	0.0ms	0.1ms	0.6ms	4.1ms	27,996	No	Phys Seq	No
ALL	ALL	I355.QT.DF33.B	32.9m	382,207	4.8ms	0.0ms	0.1ms	0.6ms	3.9ms	27,996	No	Phys Seq	No

OK

Cancel

“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	458	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 01:22:44	0.7s	157	4.3	0.0	0.1	0.1	3.9

OK

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

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.

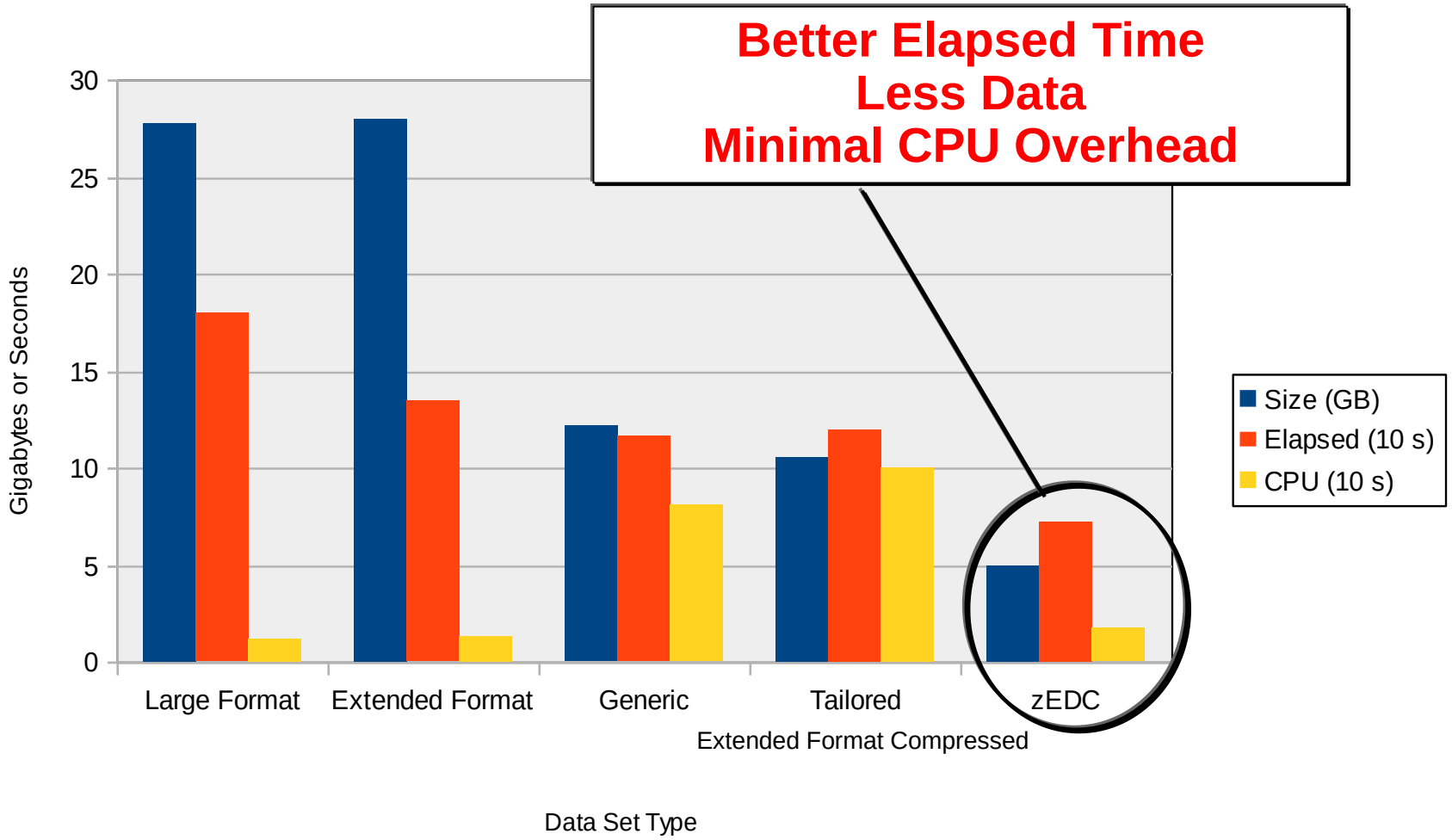
- **Disk Savings:** Many people are already getting value from CMPSC compression and software compression today
- **Performance:** High throughput alternative to existing z Systems compression for large or active files.
- **Industry Standard:** Low cost compressed data exchange across all platforms
- **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 zEDC – zEC12 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

Extended Format EOV

- APAR OA47899

- The Compressed format data set section (Type 1) is not present in SMF Record Type 14/15 when written at End of Volume. This may result in misleading information about the data set since there is no way to tell that the data set is compressed format without this section.

- zBNA uses the compressed format data set section for all dataset types, not just those that are compressed using Generic or Tailored compression.

zEDC Analysis

IBM z Systems Batch Network Analyzer - TEST FILE

File Edit Filters Action Graph Reports Applications Help

Applied Filters

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

Top Datasets
zEDC: Compression

Mainframe Information

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

Key Batch	Job Name	Steps	Job Class	Service Class	Initiator Delay	Elapsed Time	CPU Time	Queue Delay	zIIP Time	Condition Code	CPU Intensity	Excps	Top Program	Top Pgm %
☐	M36BX4S	3	J	BATPRDDF	N/A	38.0m	13.9m	13.2m	0.0s	0000	36.5%	172,542	DSNECP10	10.0%
☐	M373BFD	7	J	BATPRDDF	N/A	58.5m	22.1m	20.4m	0.0s	0000	37.7%	865,814	DSNECP10	48.0%
☐	M3EHL8S	2	J	BATPRDDF	N/A	44.5m	12.2m	14.0m	0.0s	0000	27.3%	36,613	DSNECP10	15.0%
☐	M373IZS	3	J	BATCHHI	N/A	1.2h	22.8m	68.7s	0.0s	0000	31.0%	43,231	DSNECP10	22.0%
☐	M4E5HEVS	7	J	BATPRDDF				18.6m	0.0s	0000	23.7%	6,954	DSNECP10	18.0%
☐	M3YHK7SF	26	J	BATPRDDF				24.6m	0.0s	0000	40.4%	731,964	DSNECP10	63.0%
☐	M34DUG3	15	J	BATPRDDF				24.0m	0.0s	0000	29.5%	21,548	DSNECP10	29.0%
☐	M373XQ3	5	J	BATPRDDF				26.0m	0.0s	0000	62.5%	6,101	DSNECP10	87.0%
☐	M3YHK7SE	26	J	BATPRDDF				26.1m	0.0s	0000	40.5%	874,506	DSNECP10	64.0%
☐	M3YHK7S3	26	J	BATPRDDF				26.4m	0.0s	0000	36.7%	512,864	DSNECP10	62.0%
☐	M3YHK7SG	26	J	BATPRDDF				27.3m	0.0s	0000	39.5%	596,359	DSNECP10	62.0%
☐	M3HS23VA	3	J	BATPRDDF				31.1m	0.0s	0000	37.7%	21,905	DSNECP10	49.0%
☐	M373IAS	3	J	BATCHHI	N/A	2.6h	34.2m	145.3s	0.0s	0000	22.2%	67,910	DSNECP10	26.0%
☐	M373ON4A	4	J	BATPRDDF	N/A	2.8h	1.2h	36.6m	0.0s	0000	40.8%	56,388	DSNECP10	63.0%
☐	M3E066SU	2	J	BATPRDDF	N/A	1.0h	498.0s	430.0s	0.0s	0004	13.4%	342	DSNECP10	12.0%
☐	M3E066SA	2	J	BATPRDDF	N/A	1.1h	18.2m	475.9s	0.0s	0004	27.1%	340	DSNECP10	22.0%
☐	M3E066SN	2	J	BATPRDDF	N/A	1.2h	17.2m	520.7s	0.0s	0004	23.7%	320	DSNECP10	13.0%
☐	M34DES3	6	J	BATPRDDF	N/A	3.3h	2.0h	40.2m	0.0s	0000	61.5%	31,510	DSNECP10	92.0%
☐	M337F83	5	J	BATPRDDF	N/A	1.2h	26.6m	559.6s	0.0s	0000	36.3%	2,434,989	DSNECP10	26.0%
☐	M373IYS	3	J	BATCHHI	N/A	3.7h	1.3h	202.6s	0.0s	0000	34.8%	144,846	DSNECP10	34.0%
☐	M34D7JS	3	J	BATPRDDF	N/A	1.5h	38.2m	11.7m	0.0s	0000	43.5%	3,735,605	DSNECP10	21.0%
☐	M3E0COS	3	J	BATPRDDF	N/A	2.2h	29.6m	18.0m	0.0s	0000	21.9%	4,404	DSNECP10	26.0%
☑	M373BJ5	11	J	BATPRDDF	N/A	2.0h	39.0m	15.7m	0.4s	0000	32.2%	14,821,030	SYNCSORT	9.0%
☐	M373CCS	15	J	BATPRDDF	N/A	45.5m	571.8s	385.1s	0.0s	0000	21.0%	510,039	DSNECP10	13.0%
☐	M3E066SO	2	J	BATPRDDF	N/A	2.2h	19.6m	16.8m	0.0s	0004	14.9%	344	DSNECP10	15.0%
☐	M3HS451A	9	J	BATPRDDF	N/A	59.4m	21.8m	453.8s	0.0s	0000	36.6%	121,786	DSNECP10	23.0%
☐	M373CNS	5	J	BATPRDDF	N/A	1.3h	19.9m	10.3m	0.0s	0000	25.3%	392,740	DSNECP10	19.0%
☑	M3E0IKSN	4	J	BATPRDDF	N/A	1.3h	20.3m	553.2s	0.0s	0000	26.5%	1,976,574	DSNECP10	8.0%
☐	M3YFUEE	3	J	BATPRDDF	N/A	3.0h	48.2m	21.9m	0.0s	0000	27.2%	441	DSNECP10	21.0%
☐	M373FPV	9	J	BATCHHI	N/A	2.2h	20.0m	157.5s	0.0s	0000	15.2%	1,776,060	DSNECP10	17.0%
☐	M373ECS	3	J	BATPRDDF	N/A	2.6h	34.1m	19.6m	0.0s	0000	22.1%	316	DSNECP10	25.0%
☑	M402GX3L	17	J	BATPRDDF	N/A	54.2m	27.9m	414.3s	0.0s	0000	51.5%	2,949,226	ENGEXE	4.0%
☐	M373BDS	21	J	BATPRDDF	N/A	6.3h	2.0h	1.0h	0.7s	0000	31.7%	18,169,677	DSNECP10	46.0%
☐	M373IUS	14	J	BATCHHI	N/A	55.3m	21.6m	79.7s	0.2s	0000	39.1%	3,407,043	DSNECP10	24.0%

Progress...

Reading .dat file for 14 & 15 data.

Cancel

36 Jobs

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

zEDC Top Data - with DASD Space MB Savings

zBNA: zEDC Top Data Sets

File Edit Action Graph Report Help

- [x] Show Compressed Files
- [x] Show EF Files (not compressed)
- [x] Show PS Files (not EF and not EXCP)

Show by Rate or MB?
- ( ) by Rate (MB/sec)
- (•) by MB (total)

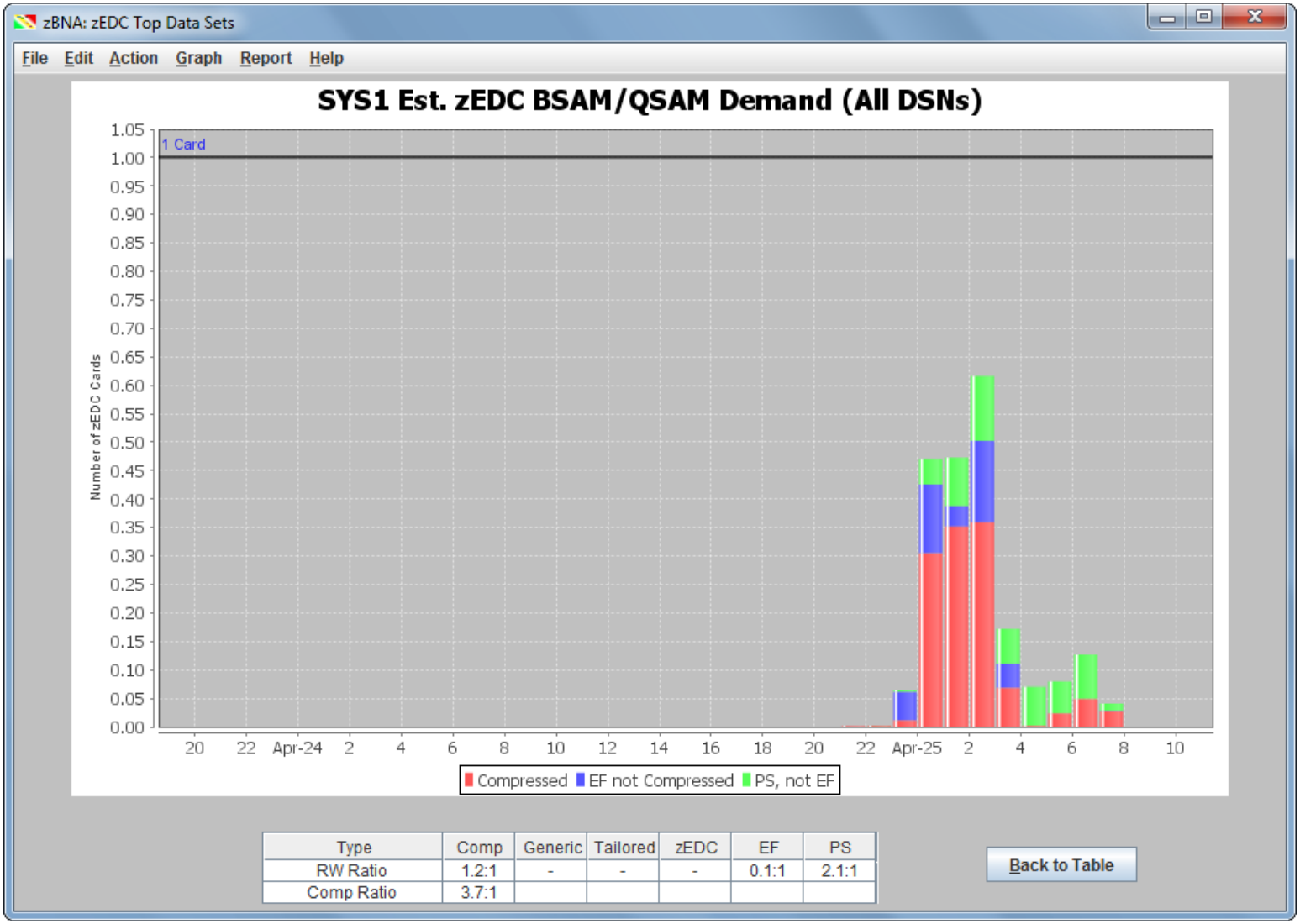
Estimate PS or EF Comp. Ratio
- ( ) High (8.1)
- (•) Medium (5.4)
- ( ) Low (2.7)
- ( ) Custom 1.0

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	-205.5s	-1,662
	I3SK.UA592.VXE.HHLG3.J3994Y22	COMP	93,431	1:1	6.8:1	-226,345	-254.5s	-205.5s	-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	-196.5s	-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	-196.4s	-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
	[illegible]	COMP	56,449	1:1	5.2:1	-196,767	-196.9s	-124.5s	[illegible]

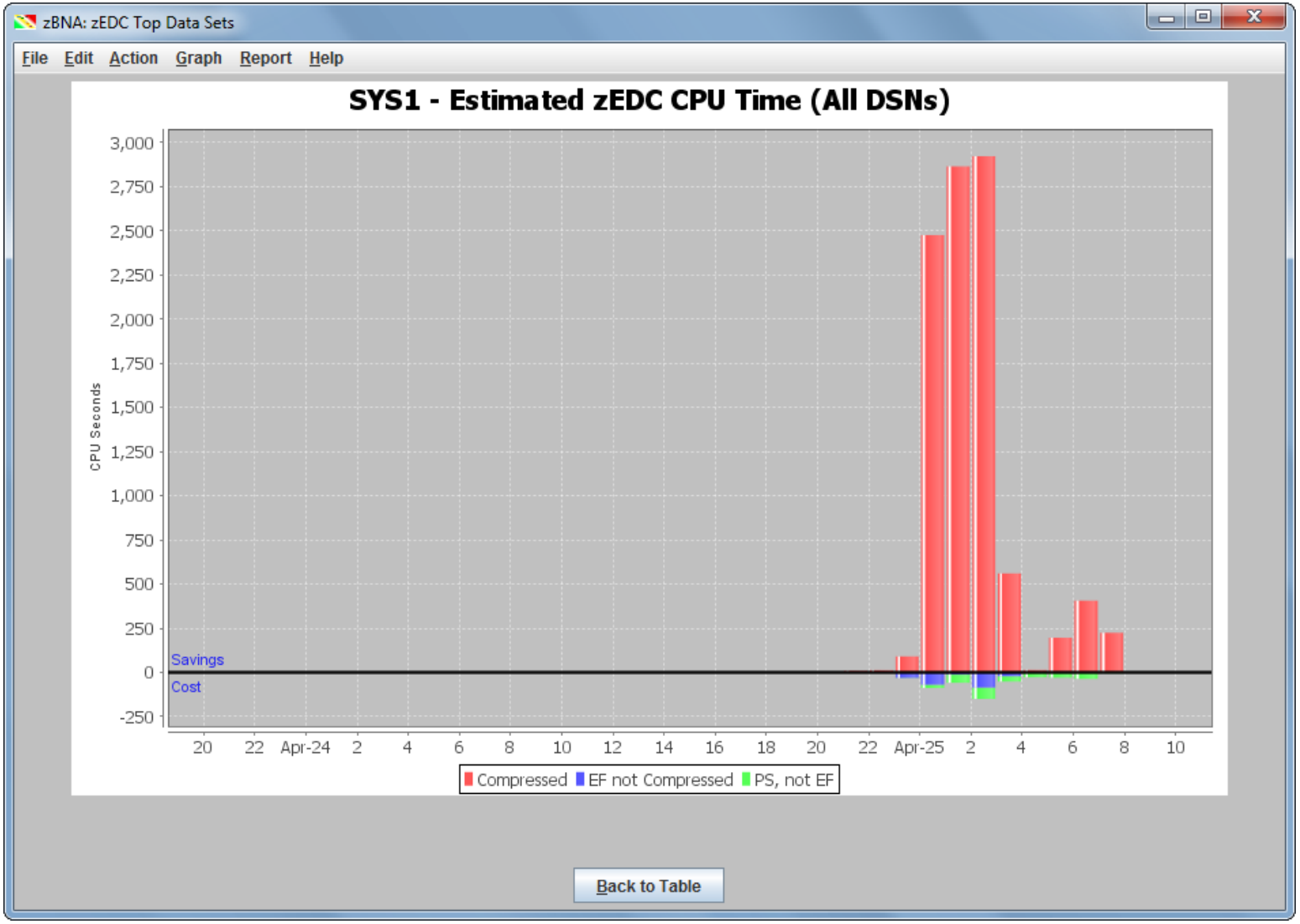
Displaying 50 of a total 3605 datasets; 0 selected

Estimated zEDC Cards Report – SYS1 All Data Sets

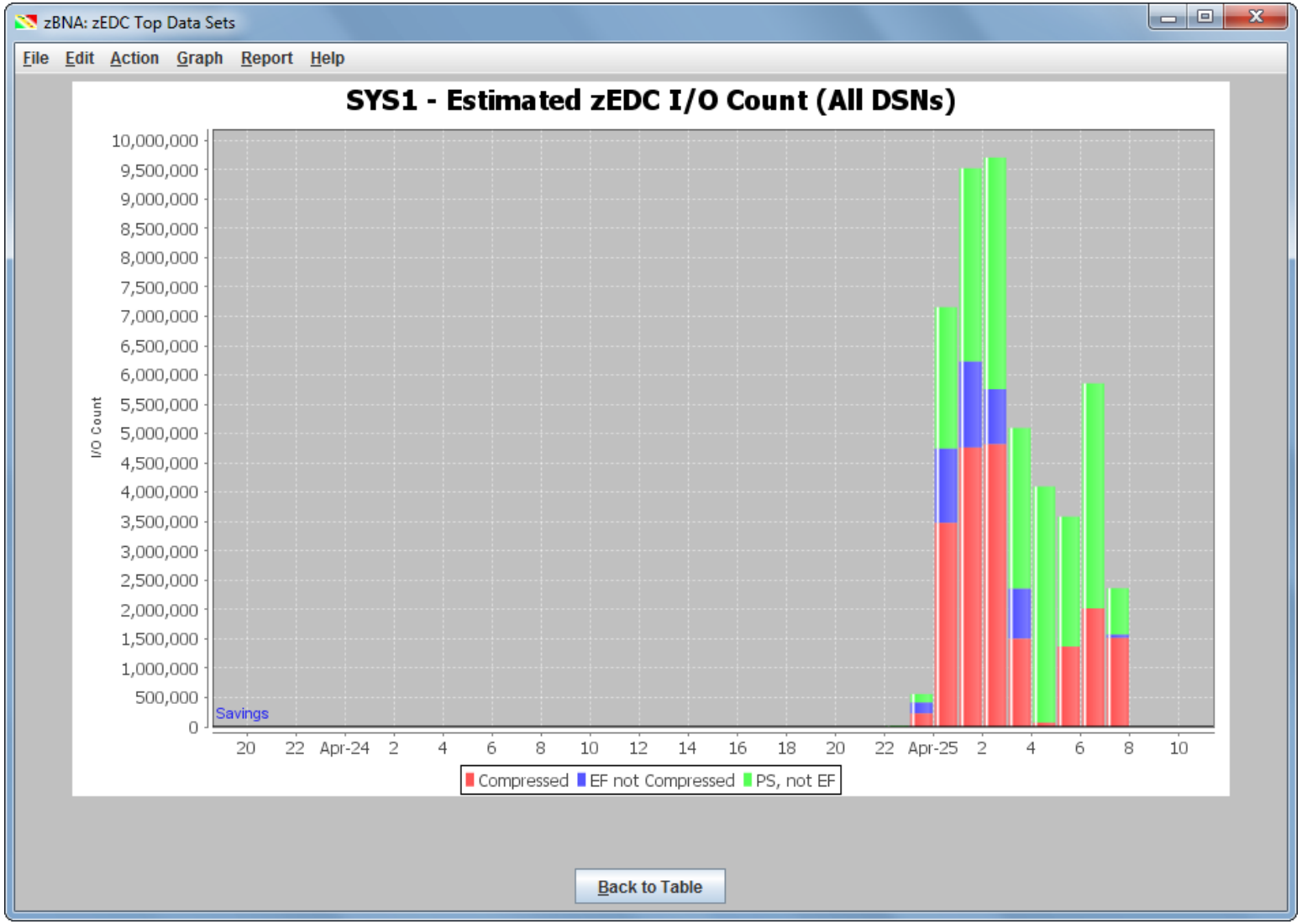


Type	Comp	Generic	Tailored	zEDC	EF	PS
RW Ratio	1.2:1	-	-	-	0.1:1	2.1:1
Comp Ratio	3.7:1					

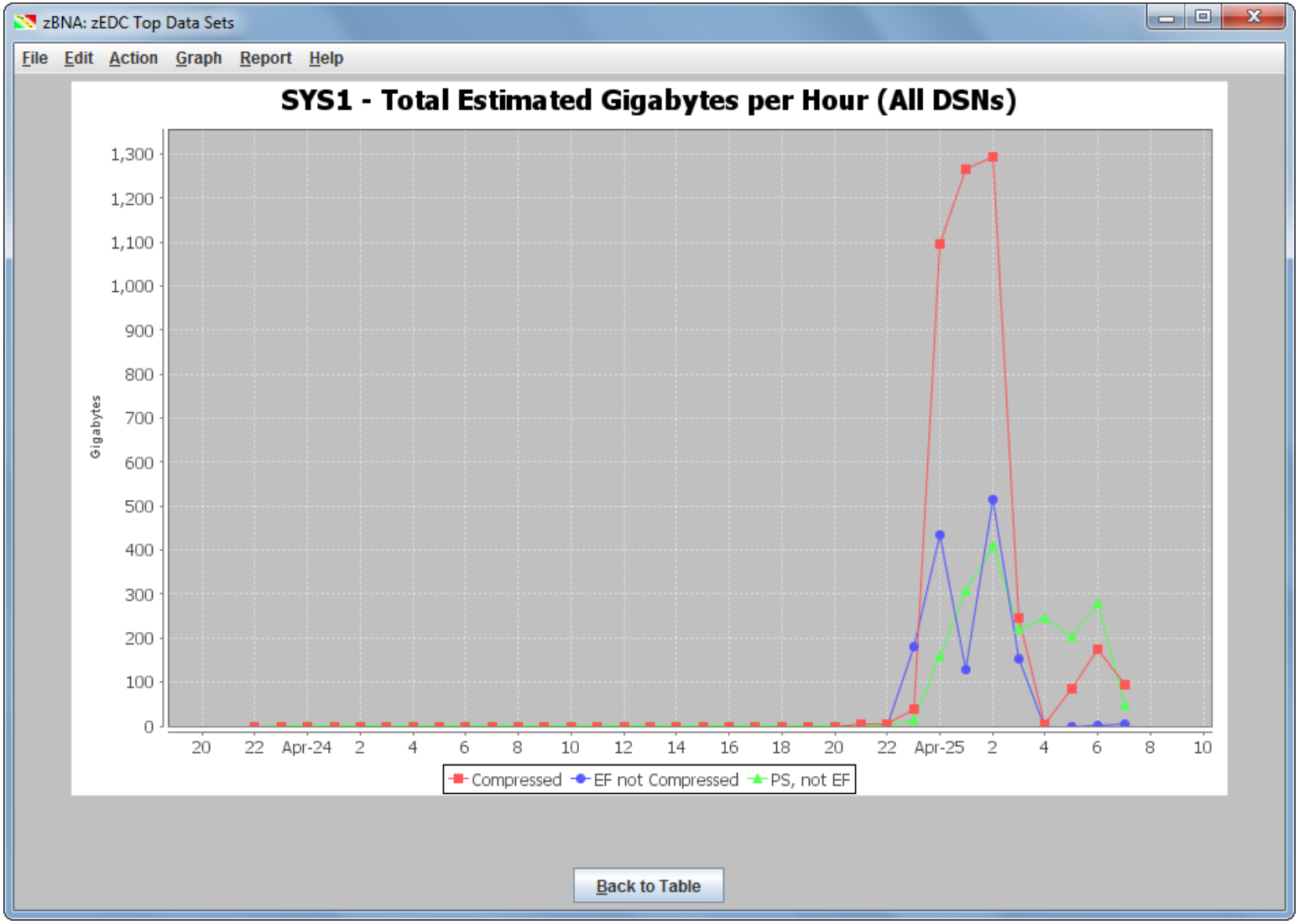
Estimated CPU Savings Report – SYS1 All Data Sets



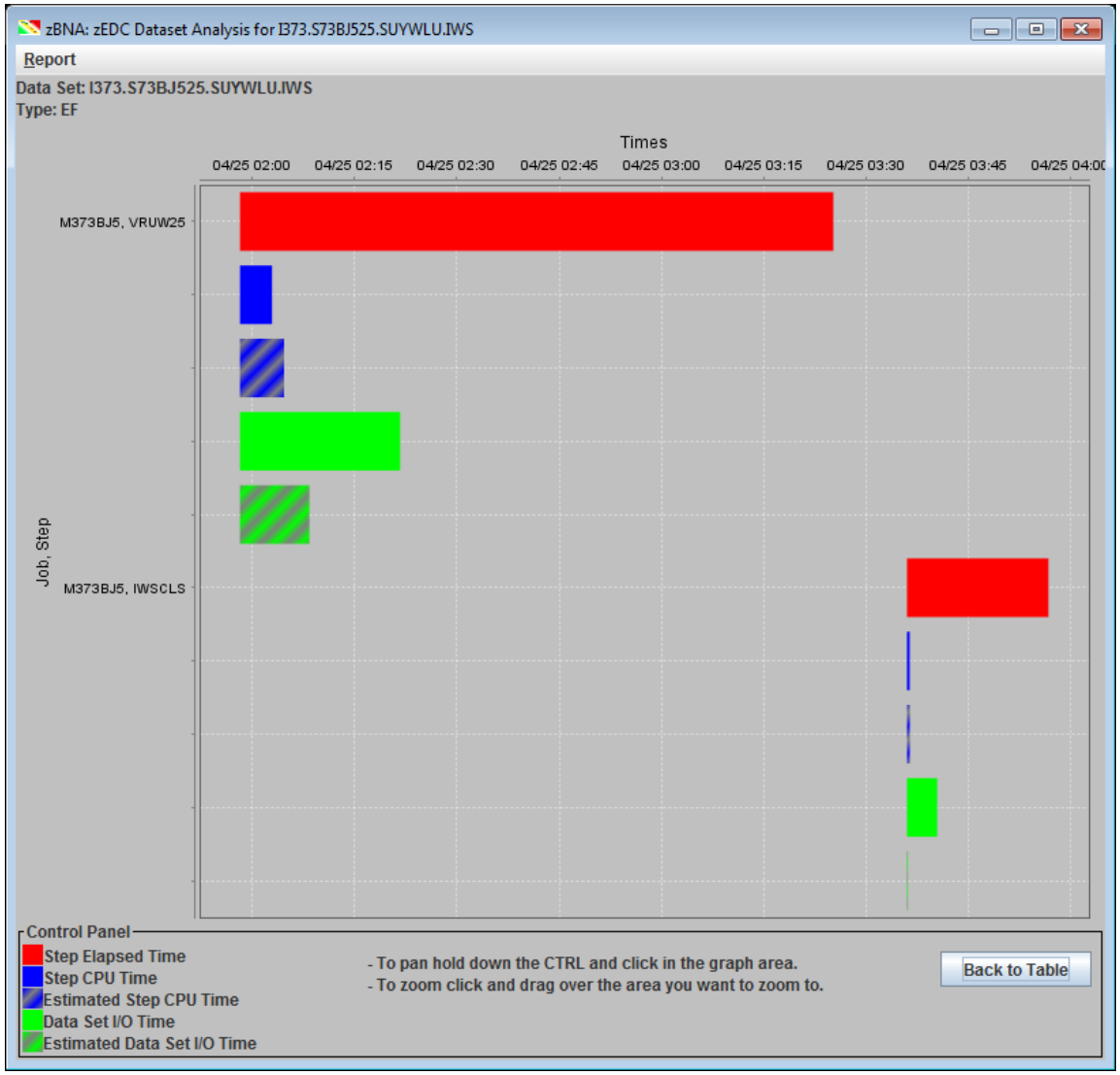
Estimated I/O Savings Report – SYS1 All Data Sets



Estimated Gigabytes/Hour Report – SYS1 All Data Sets



zEDC Data Set Analysis



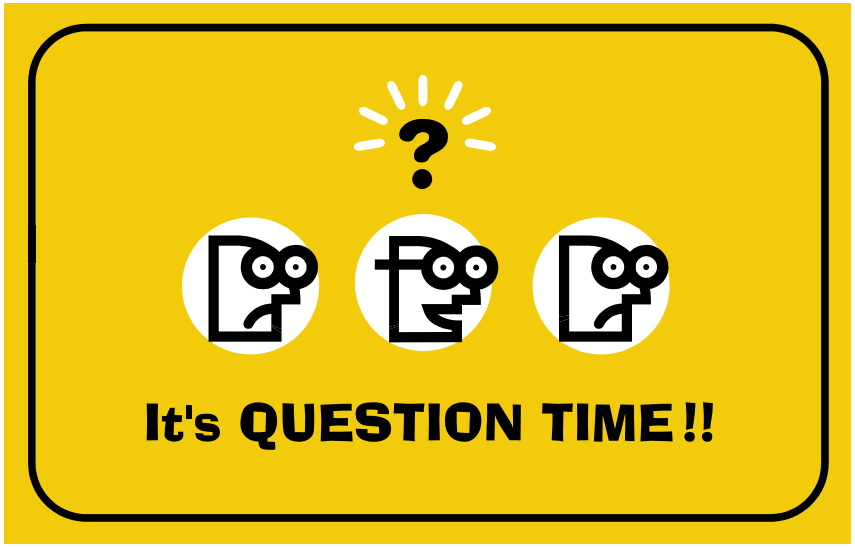
zBNA – Some Recent Updates include:

- V1.7.2 – 8/19/16
  - Miscellaneous updates
- V1.7.1 – 7/08/16
  - Miscellaneous updates
- V1.7.0 – 6/24/16
  - Support for Java Version 8 migration
  - Applications menu, which includes Top Datasets and zEDC Compression
  - Top Dataset can sort on columns, and added Service Class and Job Name
  - Performance improvements to load process
- V1.6.9 – 3/31/16
  - MSU 4-hour Rolling Average graph
- V1.6.8 – 2/16/16
  - z13s support and based on z/OS 2.1
  - Life of a Program
  - Top 10 Data Set – added columns and can select number of data sets
  - Edit Select Columns and Reset Default Columns
- V1.6.7 – 12/10/15
  - File remembers last 4 loaded files
  - Import File matches DAT qualifier with EDF qualifier
  - Main Panel includes Queue Delay,
  - Main Panel user can (optionally) select Job Information columns / order to be included
- v1.6.6 – 9/30/15
  - Partition/CPC Utilization graph
- v1.6.4 – 7/30/15
  - Job CPU delay metrics

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

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 TechDocs
  - Education Tab has:
    - User's Guide (updated for zBNA 1.6.8)
    - Sample Files
    - Lab exercise written for zBNA 1.6.8
    - Recorded Demo from June 2013



Thank You for Attending!

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Back Up

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.

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